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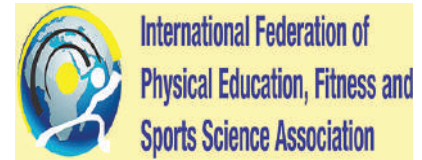
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Review Article

Distance vector-hop optimal localization algorithm based on sparrow algorithm and adaptive probabilistic mutation strategy

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ABSTRACT

Most of the sensor nodes in wireless sensor networks are deployed randomly, which directly affects the accuracy of node localization using distance vector (DV)-Hop algorithm. This paper proposes a DV-Hop optimized localization algorithm based on sparrow search algorithm and adaptive probability variation strategy to effectively solve such problems. First, the sparrow algorithm is introduced to reduce the error value of the initial coordinates of unknown nodes obtained by DV-Hop; then, the adaptive probabilistic mutation strategy is used to correct the coordinates; and finally, the node coordinates are determined. The comparison of experimental results shows that based on the same network experimental parameters, the improved algorithm proposed in this paper has more significant improvement in localization accuracy and stronger applicability than the classical DV-Hop algorithm.

Keywords: Adaptive probabilistic variation, Distance vector-hop optimal location algorithm, Localization accuracy, Sparrow algorithm

INTRODUCTION

Wireless sensor network (WSN) is a self-organized wireless communication network composed of a large number of sensor nodes and is widely used in agricultural, military, and medical fields. The current research on sensor node localization algorithms focuses mainly on two aspects: Distance-based localization and non-distance-based localization. Among them, receiver signal strength indicator, angle of arrival, time of arrival, etc., are belonging to distance-based localization algorithms, while CL, APIT, distance vector (DV)-Hop, etc., are belonging to non-distance-based algorithms. Among them, the DV-Hop algorithm is simple, has low running overhead, and can achieve localization when the node obtains three or more beacon node location information, which is more commonly used. However, there are problems such as large localization

error and high time overhead in determining the location of unknown nodes.

In recent years, population intelligence optimization algorithms have become a research hotspot in many fields, and for this reason, many foreign scholars have taken this opportunity to propose many improvements for the DV-Hop algorithm. Lin *et al.* (2019) got the node coordinates for the DV-Hop algorithm, introduced the genetic variation operator for global search in the population, and then used the ant colony algorithm for further search to retain the optimal individuals and determine the best location. This improved algorithm improves the localization accuracy of DV-Hop, but there is still room for improvement. Shi *et al.* (2020) first estimated the node jump distance using the similar path search algorithm and further corrected the jump distance value using the gray wolf algorithm, which improves the localization accuracy of the DV-Hop algorithm, but the convergence needs to be further improved. The sparrow search algorithm (SSA) is a new population intelligence optimization technique. It has the advantages of simple structure, fast speed, and easy expansion compared with

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other population intelligence optimization algorithms (Xue, 2020). The DV-Hop optimized localization algorithm based on sparrow algorithm and adaptive probabilistic variation strategy proposed in this paper uses adaptive probabilistic variation strategy to generate new race individuals based on SSA algorithm, which has stronger search capability, faster convergence speed, and can optimize the unknown node coordinates in DV-Hop algorithm even in WSNs with uneven node distribution, and then improve the localization accuracy.

Through the comparative analysis of experimental results, by changing the conditions of the number of beacon nodes, communication radius, and the number of populations, the optimization algorithm proposed in this paper has significantly improved the localization accuracy and convergence performance compared with the classical DV-Hop algorithm and the DV-Hop algorithm based on the sparrow algorithm.

ANALYSIS OF DV-HOP ALGORITHM

DV-Hop Algorithm

Instead of using direct ranging methods for localization, the DV-Hop algorithm draws on the distance vector-based routing mechanism in computer networks, and the localization process of the algorithm consists of three main stages.

1. The beacon node broadcasts the group containing its own information (including number, location, number of hops to other nodes, etc.) to its neighboring nodes. By broadcasting, all nodes can not only get the location of the beacon node but also determine the minimum number of hops between them and the beacon node
2. Estimating the distance between the unknown node and the beacon node. The beacon node uses the minimum hop count obtained in the first stage to estimate its own distance per hop by combining the positions of other beacon nodes, and then forwards the information containing the hop distance in a group broadcast to neighboring nodes, and the unknown node multiplies the hop distance received from the beacon node by the minimum hop count to estimate the distance between each beacon node
3. When the unknown node acquires distance data from more than 3 beacon nodes, the position coordinates of the unknown node are estimated using the trilateral measurement method of Equation (1) (Bing *et al.*, 2018).

$$\begin{cases} (x - x_1)^2 + (y - y_1)^2 = d_1^2 \\ (x - x_2)^2 + (y - y_2)^2 = d_2^2 \\ \vdots \\ (x - x_n)^2 + (y - y_n)^2 = d_n^2 \end{cases} \quad (1)$$

In the equation: (X, Y) denotes the coordinates of the unknown node to be estimated; (X_i, Y_i) denotes the beacon node coordinates ($i = 1, 2, \dots, n$); d_i denotes the distance between the unknown node and the beacon node.

Deficiency of DV-Hop Algorithm

The DV-Hop algorithm is simple and easy to implement. In the third stage of implementation, the unknown node receives at least three beacon nodes to calculate coordinates using the estimation algorithm, and if there is a three-point colinearity or near colinearity problem in the combination of beacon nodes, or if one beacon node is far from the unknown node and the other two beacon nodes are close to the unknown node, the accuracy of the unknown node localization will be greatly affected or even erroneous (Li and Guo, 2017).

DV-Hop optimal localization algorithm based on sparrow algorithm and adaptive probabilistic variation strategy.

In the DV-HOP algorithm, the relationship between the unknown node position and the distance can be obtained based on the distance obtained from the second stage estimation:

$$(x - x_i)^2 + (y - y_i)^2 = d_i^2 + \delta_i \quad (2)$$

In the equation: δ_i indicates the error value ($i = 1, 2, \dots, n$). The goal of building the optimization algorithm is to reduce δ_i to a minimum. Then, the problem to be solved by the optimal positioning algorithm can be summarized as follows:

$$F(x_i, y_i) = |(x - x_i)^2 + (y - y_i)^2 - d_i^2| \quad (3)$$

That is, to find the minimum value of $F(X, Y)$. The fitness function is determined from Equation (3) as:

$$f(x_i, y_i) = \frac{v}{F(x_i, y_i)} \quad (4)$$

In the equation: v is a constant value > 1 .

Mathematical Model for Optimal Localization Algorithm

Sparrows prefer to live in groups, and captive sparrows contain two main identities: The Producer and the Scrounger. The Producer is responsible for finding food and providing foraging areas and directions for the whole population, while the Scrounger utilizes the Producer to obtain food. The foraging process of sparrows uses the Producer-Scrounger model. Each sparrow can be described using location attributes in the population.

The sparrow algorithm updates the searching range and the convergence optimum position by a suitable number of iterations. However, as the number of iterations goes deeper, the algorithm tends to cause problems such as falling into local optimum and weak global search ability. Using the adaptive probability variation strategy for population individual variation, new population individuals are generated to continue the search so that the algorithm jumps out of the local optimum (Sun *et al.*, 2019).

Description of the Optimal Localization Algorithm

The mathematical model of sparrow foraging can be divided into four processes: Population initialization, expansion of foraging search range, foraging location localization, and location correction.

Population initialization

The number of individual sparrows in the population is n . Designating m sparrows in the better position as Producers, and the remaining $n-m$ sparrows as Scroungers, and the range of variation in the number of discoverer populations is $[ul, ur]$. Determine the maximum number of iterations T . The population initialization position formula is:

$$(X, Y) = \begin{pmatrix} (x_1, y_1) \\ (x_2, y_2) \\ \vdots \\ (x_n, y_n) \end{pmatrix} \quad (5)$$

Using Equation (4) as a fitness function of each sparrow.

Expanding the scope of foraging search

The Producer can provide a larger search range for the population to forage, which facilitates the population to forage for more food. During each iteration, the equation for Producer's updating location is (x_i^t, y_i^t) :

$$x_i^{t+1} = x_i^t \cdot \exp\left(-\frac{i}{\alpha \cdot T}\right) \quad (6)$$

In the equation: t indicates the number of current iterations; α denotes a random number in the interval $(0, 1]$. The updating of y_i^t is also calculated by referring to Equation (6).

Positioning of foraging localization

During the process of foraging and searching, the Producers always monitor the Scroungers' movement, and when they detect that the Producers have found better food, they immediately go to the location of the food and compete for the Producers' food. The equation for Producer's updating location is:

$$x_k^{t+1} = \begin{cases} Q \cdot \exp\left(\frac{x_{worst} - x_k^t}{t^2}\right) & (k > n/2) \\ x_p^{t+1} + |x_k^t - x_p^{t+1}| \cdot A^+ \cdot L & (k \leq n/2) \end{cases} \quad (7)$$

In the equation: X_{worst} denotes the worst position of the sparrow at the t^{th} iteration; X_p indicates the current best position of the Producer; x_p^{t+1} denotes the best position of the discoverer at the $(t+1)^{\text{th}}$ iteration. A^+ denotes a $1 \times d$ matrix with each element randomly assigned 1 or -1. When $k > n/2$, it indicates that the i^{th} Scrounger did not get food and failed to forage; when $k \leq n/2$, it indicates that the k^{th} follower has arrived near the optimal position X_p . The updating of y_k^t is also calculated by Equation (7).

Position correction

The sparrow algorithm can quickly locate near the best position, and when the search result does not change many times in a row, the position is corrected using an adaptive probability variation strategy. In which, the variation probability is calculated as:

$$P = \frac{t}{10T} \quad (8)$$

When the iteration $t \rightarrow T$, the probability of variation reaches a maximum. The adaptive variation probability is calculated as:

$$P_{self} = \begin{cases} P\omega^{t_\omega-2} & t_\omega > 3 \\ P & t_\omega = 0 \\ 0.9 & P_{self} > 0.9 \end{cases} \quad (9)$$

In the equation: t_ω denotes the number of iterations where the Scrounger's position has not changed; ω denotes the variance growth rate constant ($\omega > 1$). When a better position of Scrounger is calculated, set P_{self} to the variance probability of the current number of iterations. The variation of the Scrounger is calculated as:

$$h^{t+1} = lb + r_3(ub - lb) \quad r_3 < P_{self} \quad (10)$$

In the equation: h denotes mutated sparrow individuals; r_3 indicates a random value ($r_3 \in [0, 1]$), thus will transform the search area to the vicinity of $x(X_h, Y_h)$.

EXPERIMENTAL RESULTS AND ANALYSIS

Experimental Environment

To verify the localization performance of the improved algorithm, using MATLAB 2018a to simulate. Assuming that all sensor nodes have the same structure and any two nodes in

the region can communicate, the parameters of the simulation network environment are set as shown in Table 1. Based on the above experimental environment and parameter settings, the number of beacon nodes, the communication radius, and the number of populations are transformed, and the performance of the DV-Hop algorithm, the DV-Hop algorithm based on the sparrow algorithm (hereafter referred to as SSA DV-Hop) and the optimized localization algorithm proposed in this paper are compared. The average relative positioning error is used as the evaluation index, and the calculation formula is:

$$MLE = \frac{\sum_{i=1}^{N-M} \sqrt{(x-x')^2 + (y-y')^2}}{R \times (N-M)} \quad (11)$$

In the equation: N indicates the total number of nodes; M indicates the number of beacon node; (X, Y) indicates the estimated coordinate information of the unknown node; (X', Y') indicates the actual coordinate information of the unknown node; R indicates the node communication radius.

Comparison of Localization Performance

Influence of the number of beacon nodes on localization performance

Figure 1 shows the performance of the localization accuracy of the three algorithms with a communication radius of 15 m, 30 iterations, and the number of beacon nodes varying from

Table 1: Simulation network environment parameter settings

Parameter name	Evaluation
Scope of simulation area	100×100 m
Communication radius	15~30 m
Number of nodes	200
Number of beacon nodes	10~60
Population quantity	20~50
Iterations	30~100

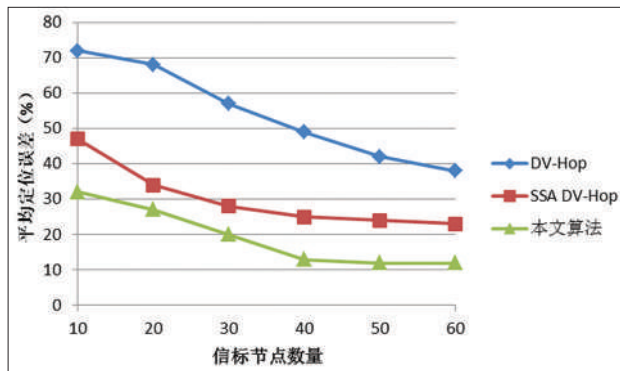


Figure 1: The influence of changes in the number of beacon nodes on positioning accuracy

10 to 60. The results show that with the increase of the number of beacon nodes, the localization accuracy of DV-Hop algorithm can be improved by about 34%, SSA DV-Hop algorithm by about 24%, and the optimized localization algorithm proposed in this paper by 20%, and the optimized localization algorithm proposed in this paper has higher localization accuracy.

Influence of communication radius variation on localization performance

Figure 2 shows the performance of the localization accuracy of the three algorithms when the number of beacon nodes is 15, the number of iterations is 30, and the communication radius is varied from 15 m to 30 m. The results show that with the increase of communication radius, the localization accuracy of DV-Hop algorithm can be improved by about 23%, that of SSA DV-Hop algorithm by about 25%, and that of the optimized localization algorithm proposed in this paper by about 30%.

Influence of population quantity on localization performance

Figure 3 shows the comparison between the SSA DV-Hop algorithm and the optimized localization algorithm proposed in this paper with the number of beacon nodes being 50, the number of iterations being 30, the communication radius being 15 m, and the population size varying from 10 to 40. The results

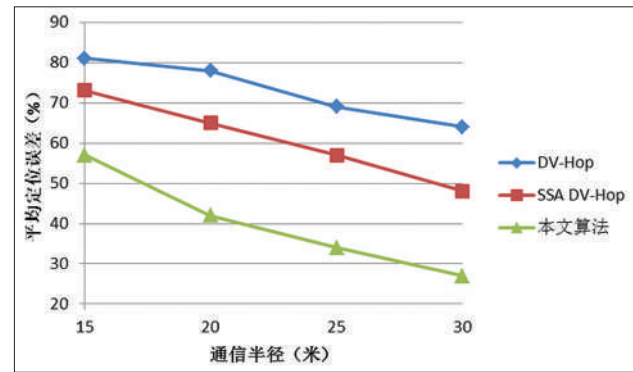


Figure 2: The influence of communication radius change on positioning accuracy

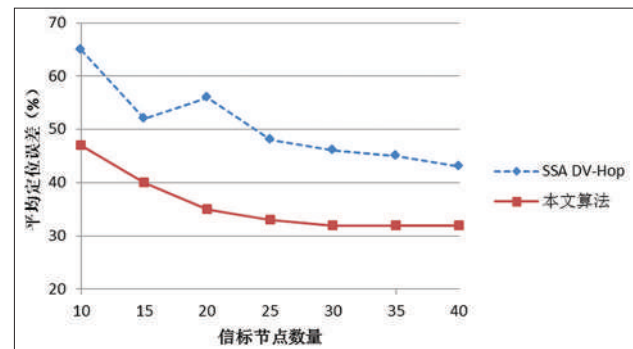


Figure 3: The influence of population size on positioning accuracy

show that with the increase of population size, the accuracy of localization of SSA DV-Hop and the optimized localization algorithm proposed in this paper improves about 22% and 15%, respectively. When the population size reaches about 30, the accuracy of the proposed algorithm does not change significantly and the accuracy of the localization is higher.

CONCLUSION

To address the shortcoming of low accuracy of DV-Hop algorithm localization, the improved optimized sparrow algorithm is applied to the DV-Hop algorithm based on the analysis of the principle of sparrow algorithm to achieve the optimization of beacon node hop distance. Simulation results and related experiments show that the optimized DV-Hop localization algorithm based on the sparrow algorithm and adaptive probabilistic variation strategy can effectively improve the accuracy of node localization without adding additional network overhead. Of course, in practical applications, the sensor nodes in WSNs have unequal energy, so the localization techniques of WSNs need to be studied in depth.

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Research Article

Isolated and combined effect of yoga and endurance exercise on dribbling skill among football players

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ABSTRACT

The purpose of the study was to find out the combined effect of yoga and endurance exercises on performance-related parameter among intercollegiate football players. To achieve the purpose of the study, 45 ($n = 45$) men intercollegiate football players studying in various engineering colleges in Rayalaseema Region, affiliated to Jawaharlal Nehru Technological University, Anantapur, Andhra Pradesh state, India, during the academic year 2019–2020 were selected randomly as subjects and their ages ranged between 18 and 21 years. The subjects were randomly divided into three groups of 15 each, namely, yoga training ($n = 15$), endurance exercise ($n = 15$), and combined yoga and endurance exercise ($n = 15$), respectively. The training period was limited to 6 weeks. The criterion variable selected for this study was football dribbling skill. The selected parameter was assessed using selected testing protocol before and immediately after the training period. The analysis of covariance was used to analyze the significant differences, if any, among the groups. Since three groups were compared, whenever the obtained “F” ratio for adjusted post-test was found to be significant, the Scheffe’s test was used to find out the paired mean differences, if any. The 0.05 level of confidence was fixed as the level of significance to test the “F” ratio obtained by the analysis of covariance, which was considered appropriate.

Keywords: “F” ratio, Dribbling, Endurance, Engineering students, Rayalaseema region, Yoga training

INTRODUCTION

“Enjoy the game and chase the dreams. Dreams do come true.”

Sachin Tendulkar

Yoga is an excellent method of enhancing the performance of sports participants. Salient feature of yoga is the combination of both physical conditioning and focused concentration. One of the most essential elements for athletic performance is balance. Physical fitness is a must for any good performance in sports. Different sports require different types of fitness emphasizing a particular fitness factor. However, general level of physical fitness is necessary for every sportsman. The law of use and

disuse suggests that if you want to be fit you must exercise. The routine of exercise differs from individual to individual according to purpose. Sportsmen also select different routines of participation. This can be attained excellently by indulging in yogic routine.

Yogic exercises deal with the vital organs of the body on which health depends. The precursor of physical fitness lies in the efficient working of the vital organs of the body and yoga aims at it. The various selected asanas giving different movements to the spine, controlled respiration, relaxation technique, and concentration practice as a whole form an excellent routine to taking care of the health of the vital organs of the body.

This is vital for the sportsperson who otherwise develops the muscular system but puts too much stress and strain on the other systems leading to failure sooner than later. In yoga, all possible body positions are explored and the body is exercised standing, sitting, lay-down (front, side, and back). This creates

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an acute awareness of the entire body, strengthens the body systems, and develops flexibility of the body that is not present in most sportspersons. Excellent performance in any sport is governed by several factors of physical fitness.

Endurance exercise is the act of exercising to increase stamina and endurance. The term “Endurance exercise” generally refers to training the aerobic system as opposed to anaerobic. The need for endurance in sports is often predicated as the need for cardiovascular and simple muscular endurance, but the issue of endurance is far more complex. Endurance can be divided into two categories: General endurance and specific endurance. It can be shown that endurance in sport is closely tied to the execution of skill and techniques. A well-conditioned athlete can be defined as, the athlete who executes his or her technique consistently and effectively with the least effort (Yessis, 2008).

The increased ability to perform is mainly accomplished through an increase in maximal oxygen uptake ($\text{Vo}_2 \text{ max}$) and an increased ability of skeletal muscle to generate energy through oxidative metabolism without improvements in muscle strength. Strength training, which represents the other extreme of physical activity, encompasses short-duration activity at high or maximal exercise intensities, increases the capacity to perform high intensity, high resistance exercise of a single or relatively few repetitions such as Olympic weightlifting, power lifting, and throwing events in track and field. Improved strength-related performance is accomplished through neuromuscular learning and increased fiber-recruitment synchronicity, muscle cell hypertrophy, and, possibly, hyperplasia without changes in $\text{Vo}_2 \text{ max}$ or in the capacity to generate adenosine triphosphate through oxidative metabolism (Fletcher *et al.*, 2001).

MATERIALS AND TOOLS

To achieve the purpose of the study, 45 ($n = 45$) men football players studying in various engineering colleges in Rayalaseema Region (Zone-IV), Andhra Pradesh state, India, during the academic year 2019–2020 were selected randomly as subjects and their ages ranged between 18 and 21 years. The subjects were randomly divided into three groups of 15 each, namely, yoga training ($n = 15$), endurance exercise ($n = 15$) and combined yoga and endurance exercise ($n = 15$), respectively.

RESULTS

The analysis of covariance on dribbling of the pre, post, and adjusted test scores of yoga training, endurance exercise, and combined yoga and endurance exercise group has been analyzed and presented in Table 1.

The above table shows that the pre-test mean and standard deviation values on dribbling of experimental groups “A,” “B,” and “C” group were 18.88, 18.90, and 18.90 and ± 0.32 , ± 0.03 , and ± 0.30 , respectively. The obtained “F” ratio of 0.03 for pre-test scores was lesser than the table value of 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on dribbling.

The post-test mean and standard deviation values on dribbling of experimental groups “A,” “B,” and “C” group were 18.58, 18.50, and 18.30 and ± 0.30 , ± 0.28 , and ± 0.29 , respectively. The obtained “F” ratio of 3.63 for post-test scores was greater than the table value of 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on dribbling.

The adjusted post-test means on dribbling of experimental groups “A,” “B,” and “C” group were 18.59, 18.50, and 18.29, respectively. The obtained “F” ratio of 388.36 for adjusted post-test mean was greater than the table value of 3.23 for degrees of freedom 2 and 41 required for significance at 0.05 level of confidence on dribbling.

The results of the study indicated that there was a significant difference between the adjusted post-test means of yoga training, endurance exercise, and combined yoga and endurance exercise group on dribbling.

Since, three groups were compared, whenever the obtained “F” ratio for adjusted post-test was found to be significant, the Schiff’s test was used to find out the paired mean difference and it is presented in Table 2.

The above table shows that the mean difference values of experimental group “A” and experimental group “B,” experimental group “A” and experimental group “C,” and experimental group “B” and experimental group “C” were 0.09, 0.30, and 0.21, respectively, which were greater than the confidence interval value of 0.03 on dribbling at 0.05 level of confidence. The results of the study showed that there was a significant difference between experimental group “A” and experimental group “B,” experimental group “A” and experimental group “C,” and experimental group “B” and experimental group “C.” The above data also reveal that combined yoga and endurance exercise group had better dribbling scores.

The above data also reveal that the combined yoga and endurance exercise group was better than the yoga group and the endurance exercise group on dribbling.

The pre, post, and adjusted mean values of yoga training, endurance exercise, and combined yoga and endurance exercise group on dribbling are graphically represented in Figure 1.

Table 1: Analysis of covariance of the data on dribbling of pre, post, and adjusted scores of experimental groups (In seconds)

Test	Yoga training group (Group-I) expt. Group "A"	Endurance exercise group (Group-II) expt. Group "B"	Combined yoga and endurance exercise group (Group-III) Expt. Group "C"	Source of variance	Sum of squares	df	Mean squares	F-ratio
Pre-test SD(±)	18.88±0.32	18.90±0.03	18.90±0.30	Between groups	0.005	2	0.002	0.03
				Within groups	3.94	42	0.09	
Post-test SD(±)	18.58±0.30	18.50±0.28	18.30±0.29	Between groups	0.61	2	0.31	3.63*
				Within groups	3.55	42	0.08	
Adjusted post-test	18.59	18.50	18.29	Between sets	0.71	2	0.35	388.36*
				Within sets	0.04	41	0.001	

*Significant at 0.05 level of confidence, Table value for df (2, 42) at 0.05 level = 3.22. Table value for df (2, 41) at 0.05 level = 3.23

Table 2: Scheffe's test for the difference between paired means on dribbling

Yoga training group (Group-I) Expt. Group "A"	Endurance exercise (Group-II) Expt. Group "B"	Combined yoga and endurance exercise group (Group-III) Expt. Group "C"	Mean difference	Confident interval value
18.59	18.50	---	0.09*	0.03
18.59	---	18.29	0.30*	
---	18.50	18.29	0.21*	

*Significant at 0.05 level of confidence

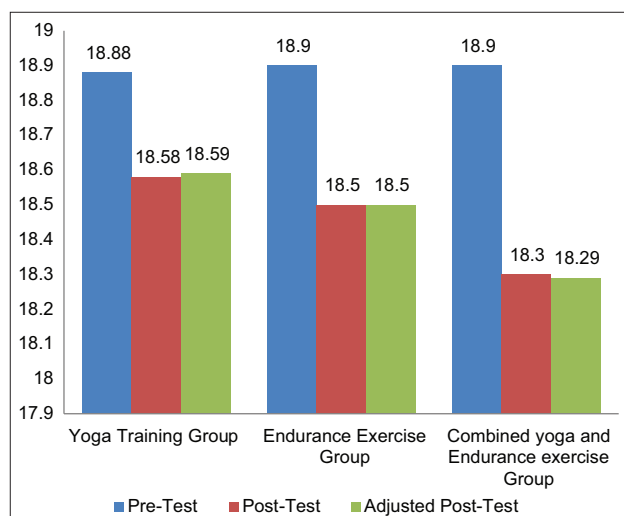


Figure 1: The pre, post, and adjusted mean values of yoga training, endurance exercise, and combined yoga and endurance exercise group on dribbling

CONCLUSIONS

From the analysis of the data, the following conclusions were drawn.

1. There was a significant difference among yoga training, endurance exercise, and combined yoga and endurance

exercise on selected football performance parameter as dribbling among intercollegiate football players

2. The significant improvements were noticed on selected football performance parameters such as dribbling, passing, and shooting due to yoga training, endurance exercise, and combined yoga and endurance exercise
3. Among the experimental groups, combined yoga and endurance exercise group had shown significant improvement on the selected dependent variable, namely, football dribbling, then that of yoga training and endurance exercise groups.

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Research Article

A study on socioeconomic status of female junior athletes and badminton players of Telangana state

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ABSTRACT

The study was conducted to investigate the socioeconomic status of junior athletes and badminton players of Telangana state. For the present study, 100 athletes and 100 badminton players were selected who participated at state-level tournament. The socioeconomic status questionnaire prepared and validated by Kuppaswamy was used for the purpose of data collection to find out the significant effect of socioeconomic status of athletes and badminton players. Mean, standard deviation t-value, and correlation were computed result of the study positive effect of the study indicated of socioeconomic status of the female athletes and badminton players of Telangana state. Significance of difference was also observed in high and low socioeconomic status between athletes and badminton players.

Keywords: Income athletes badminton state level, Socioeconomic status

INTRODUCTION

Families are based on certain factors such as income from all sources, level of education achieved by, profession, material goods, and role and authority in society studymode.com. The hierarchical divide is maintained and observed by all components of the social set up.

Socioeconomic Status

Socioeconomic status is the social standing or class of an individual or group. It is often measured as a combination of education, income, and occupation.

Social economic theories may differ from conventional beliefs about economics. Traditional schools of thought often assume that actors are self-interested and make rational decisions.

Social economics also referred to as socioeconomics, is concerned with the relationship between social and economic factors within society. These factors influence how a particular group or socioeconomic class behave within society, including their actions as consumers. Different socioeconomic classes may have different priorities regarding how they direct their funds.

Certain goods or services may be considered unavailable to specific classes based on their own perceived ability to afford them and their income. These goods or services can include access to more advanced or complete medical care, educational opportunities, and the ability to buy food that meets specific nutritional guidelines.

Statement of the Problem

The purpose of the present study was "To find out the impact of Socioeconomic status of Female Junior Athletes and Badminton players of Telangana State."

Objectives of the Study

1. The objectives of the study were to assess the socioeconomic status of female junior badminton players of Telangana state.

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Hypotheses of the Study

1. It was hypothesized that there would be no significant difference between parents income of athletes and badminton players.

METHODOLOGY

Selection of Subjects

To achieve the purpose of the study, 200 female players out of which 100 athletes and 100 badminton players from various districts of Telangana state those who have participated at state-level competition aged under 17 years were selected as subjects.

Instrumentation

The socioeconomic status questionnaire prepared and validated by Kuppaswamy's scale was used for the purpose of data collection during state-level championship of athletics and badminton.

The questionnaire is reliable and valid instrument to determine the socioeconomic status for the present investigation. In this study, the investigator has adopted Kuppaswamy's scale for all the three variables.

Statistical procedure

The test of significance or hypothesis testing always calls for some kind of statistical technique to be used there are different ways and techniques in which data can be treated and analyzed statically. In the present study, mean, standard deviation, *t*-test, and correlation were used to compare the data.

RESULTS AND DISCUSSION

To find out the significant effect of socioeconomic status of female junior athletes and badminton players of Telangana state, means, standard deviation *t*-value, and correlation were computed from the collected data and data pertaining to this have been presented in table.

t-test for Income

Descriptive statistics				
	Income	<i>n</i>	Mean	Std. deviation
Income score	Athletics	100	2.29	0.998
	Badminton	100	5.89	2.871

DISCUSSION ON HYPOTHESIS

It was hypothesized that there would be no significant difference between parents income of athletes and parents income of badminton players.

The above table the parents income of 100 athletes mean value

is 2.29 and standard deviation is 0.998, and similarly, 100 badminton players have mean is 5.29 and standard deviation is 2.871.

Independent Samples Test

Income score	<i>t</i> -test for equality of means	
Equal variances assumed	<i>t</i>	df
Equal variances not assumed	11.846	198
	11.846	

The above table the calculated *t*-value is 11.846 which is greater than the table value of 1.96 at 0.05 level of significance. Hence, the formulated hypothesis is rejected.

We conclude that there is a significant difference between parent's income of athletes and parents income of badminton players.

Correlations (Income)

Descriptive statistics			
	Mean	Std. deviation	<i>n</i>
A Income	2.29	.998	100
B Income	5.89	2.871	100

From Table 1, it can be observed that the parents income of 100 athletes mean value is 2.29 and standard deviation is 0.998, and similarly, 100 badminton players mean value is 5.89 and standard deviation is 2.871 which shows the parent of the badminton players is positioned in better income when compared with parents of athletes.

The correlation between the income of the parents of athletes and badminton players is 0.045 which is a negative correlation.

Hence, it clearly indicates that the parents of badminton players are highly positioned in their respective income when compared with the parents of athletes.

Table 1: Correlations

	A Income	B Income
A Income		
Pearson correlation	1	-0.045
Sig. (two tailed)		0.655
N	100	100
B Income		
Pearson correlation	-0.045	1
Sig. (two tailed)	0.655	
N	100	100

The correlation between the income of the parents of athletes and badminton players is 0.045 which is a negative correlation. Hence, it clearly indicates that the parents of badminton players are highly positioned in their respective income when compared with the parents of athletes.

CONCLUSIONS

From the results of the study, the research scholar arrived at the following conclusions. The income of parents of badminton players is significantly high when compared with the parents of athletes.

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Research Article

We call the shot: Women referees officiating men's basketball

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ABSTRACT

Most people believe that basketball is male-dominated kind of sport. This study sought to know the experiences of female referees in men's basketball in the Philippines; to identify if female referees experienced gender abuse; to determine the problems they encountered; and to know how they coped with these problems. Using qualitative research method, experiences of the six female referees in the Philippines were determined and documented. Through the use of purposive sampling, participants and key informants were identified. Local, professional, new, experienced, and former female referees together with the key informants who have significant knowledge about the participants were interviewed one-on-one with the help of the validated self-made interview guide questions. Female referees' experiences are commonly linked with the coaches, spectators, and the pressure of the game, but still and all officiating for them is fun. The experiences of some female referees who claimed in experiencing gender abuse such as touching, persistence cannot be considered forms of abuse but more on harassment. The problems of female referees are mostly verbal bullying, unequal physical strength, and attitude of the player, coach, and audience. In coping problems female referees do it in an intrinsic way, by determining the cause and effect and learning from it and motivating oneself.

Keywords: Women referees, Men's basketball, Officiating, Basketball

INTRODUCTION

Since the very beginning, men have dominated women, (Genesis 3:16). In sports, where men have always been ahead of women from the start, capabilities of women are being questioned not just within the game but also in the workplace. One of this is the field of men's basketball. The ability of women in making split decision, doing hand signals, and calling out fouls is observed to be often questioned.

Given, basketball is highly competitive no one could have thought that a woman can have the authority to officiate this commonly male-dominated type of sport. Women are often rendered as delicate and powerless than men. They are subject to mistreatment as officials in all level of sports, specifically

men's basketball. In fact, according to an article published by Fox News (2018) a female referee, Michelle Campbell has been eliminated by a religious school in officiating boys' basketball game due to the reasons that Campbell cannot take authoritarian position over boys because of the views of the academy.

Although the number of women, participating in sports increases (Burton and Parker, 2010) women's roles in athletic administration programs are still declined (Galloway, 2012). Regardless of the progress in terms of increased participation of women in sport organization, still one of the most visible concern that should be completely understand is the mistreatment of women in the workplace and the challenges they faced working in a male dominated profession (Tingle *et al.*, 2014; Sartore and Sagas, 2006). Women certainly have remained underrepresented in administrative management and authority positions in sports on professional level (Lapchick, 2011). More specifically, in the manly sport industry, they are being represented seriously in lower ranks (Whalen, 2017).

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In the Philippines, women are given less acknowledgement in officiating community. Indeed, it was only in year 2016 when two female referees have been given a big break to officiate in one of country's main event in sports, the Philippine Basketball Association (PBA) Governor's Cup last July 15, 2016 (Lozada, 2016). Edith Boticario, 29 and Janine Nicandro, 23 marked the PBA Governor's Cup 2016 when they were chosen to officiate the opening match between the Meralco Bolts and Phoenix Petroleum Masters. The Philippine Basketball Association (PBA) has considered female referees to rule the court for the first time in history (Olivares, 2016).

In this study, the researchers have determined the experiences of referees in their officiating profession and how they were able to overcome these problems. This is relatively new knowledge in officiating basketball which was used to be governed by men only. The study seeks to inform of the society: Basketball Referee Associations, another women's organizations in their continuous pursuit to addressed/avoid problems related to the mistreatment of women in the workplace.

METHODOLOGY

In exploring the experiences of female referees, qualitative research method was employed, since qualitative research is used to primarily explore the underlying reasons and to have a better understanding on opinions and motivations (Wyse, 2011). According to Crossman (2017), qualitative research is categorized under social science research that gathers and focuses on non-numerical data that aim to analyze the meaning of the data collected and will greatly contribute in understanding the social life with the help of the study of the desired population or place. This kind of method permits the researcher to inspect the true meaning lying within people's behavior and the way they act and interacts with others.

Participants

The researcher used purposive sampling in identifying the data source. Purposive sampling is way of selecting the participants who have knowledge or experience of the topic or area being examined. By formulating criteria, the researchers selected and determined the following key informants and participants for the one-on-one interview. The key informants must have significant relationship with and knowledge of the female referees. The preferred Key Informants are (1) Representative from the Center for Human Rights and Gender Studies, (1) Former Philippine Basketball Association Male Referee, (1) Basketball team coach, and (1) Men's Basketball Player. The participant should be female that is a: Local referee (officiating for 1 year and above), professional referee (officiating for 1 year and above, new referee (officiating for almost 1 year), long experienced referee (officiating for 5 years and above), and former referee.

Procedure

The main tool used to gather the data of this research is an interview guide. Through a validated self-made interview guide questions, the participants and informants personally gave answers which were recorded. Maintaining high ethical standards is a well-established need in conducting a research (Neale and Hanna, 2012). After the validation of the self-made interview guide questions, the researchers sought permission to the desired key informants by writing letter, and the other key informants were asked personally to take part to the interview. The participants were communicated through phone and social networks. The copy of the validated guide questions were sent to them a week before the interview. The schedules of the interview were arranged depending on the availability of the participants and key informants. The data gathered were transcribed and prepared for the analysis and documentation.

Data Collection and Analysis

The participants and the key informants were interviewed one by one through validated interview guide questions. The interviews were audio recorded and the researchers transcribed the responses of the participants. Thematic analysis was used in the study.

RESULTS

The data gathered from the key informants and participants were analyzed to achieve the objectives, and to accomplish the goal to know the experiences of female referees; identify if female referees experience gender abuse; determine the problems female referees have encountered; and know how they coped with the problems they encountered.

Experiences of Female Referees

Female referees often experienced being criticized and pressured by the coaches, players and spectators *"The pressure, the external forces and the crowd of course, that's the first thing and being nervous with yourself on how you will officiate properly. That's my experiences, also with the crowd, those people who will keep on saying bad against you"* (Professional Referee). Criticisms are common for the new referee, *"Actually, at first they keep on teasing me, since, I am the only woman in the group. On game distribution, they gave me those weak games, just to test me. Of course there are some players who are rude, those who will say, "Don't mind that, it's just a woman, that's nothing"* (New Referee).

Despite of the pressure female referees experienced they still find the good thing about their profession. *"Officiating career is good, so far. When it comes to acceptance, with the players, coaches they are okay. They are open with female referees as long as we will just do our part as an official. In case you make a mistake, own it. But the way they approach, it's not the same as when they approach male referees. Just like when they're angry,*

they're being carried away by their emotions. It seems like they control their temper when it comes to us women" (Professional referee 1). For the long experienced referee, "For me, officiating is my passion, so good and bad experience for me is learning. When it comes to the game, difficult situations are being handled well so far." Meanwhile the former referee found it as a fun experience. "I have a lot of experience in officiating, I've been in different country, found many friends and acquaintances internationally. Good experiences because I've been the first female international referee here in the Philippines."

Gender Abuse among Female Referees

Female referees have different answers on this, some said "no" and some said "yes." The Local referee same as with the two professional referees said, "Nothing." They did not experience gender abuse.

While the new referee claims that she experienced gender abuse. "Yes, as what I have said a while ago, some will say "it's just a girl, that's nothing", of course it's a two man or three man, mostly it's only two man. Then they will be surprise when I'll blow my whistle and call fouls and travelling violations, they think it's not true and I'm just guessing with my calls, she stated. She also recalls her experience officiating in barangay leagues wherein she was disrespected. Another experience of hers was when one player held her waist during the game. That player was not contented and asks her cellular number after the game. "That was so annoying because I'm on my uniform and it seems like they don't treat me as an official. Sometimes, during the game they will call you "baby girl," but my co-referees teach me that in cases like that, I should just warn the player first and be more stiff and focused on the game"(New Referee). Moreover, the experienced referee agrees there could be gender bias at first but she stated that, "If they already know you, they will not keep on complaining about your call. They call it in a senior way "the face value" that you have to establish first in officiating" (Experienced Referee). The former referee also had an experience in gender bias at first when she experienced when one of the player who is a celebrity said bad words to her. "Yes, of course. Because sometimes there are players who doesn't accept their mistakes, there was once happened to me, there's a player, a celebrity player who really said totally foul words on me. He said, "Is there any male referee here? Why should a female referee's officiating here?" she answered. She also added that in international games the executions of the hand signals should be proper. Unlike in barangay leagues where sometimes it is not taken seriously since the people there are not serious according to her. She also had experienced inside the court when some player hit her buttocks but they did not know that it is not allowed inside the court.

Problems Female Referees Encountered

Problems based on the experiences of female referees talks about the physical ability and strength of a woman. "With

regards with the speed of the game when you are tired, sometimes you experience muscle cramps" (Local Referee). On the former referee's side, she thinks that when it comes to being stronger and masculine, men are really better than women. According to her, "Of course, men are still stronger than us women, when whistling. I used to blow my whistle in low key that's why I always use double whistle. Of course men are still bigger and more masculine and in officiating if you are small, they seem to underestimate you" (Former Referee). This was agreed by one of the key informants saying that, women may not keep up with the intense and pressured ball games.

While in the perception of the two other female referees in professional level, problems are just created by individuals. "Problems? Well, problems are just within us. It is within ourselves if how will we overcome it. Within the court, problems occur when you are not in focused and when you are not that certain in what you are doing. Once you enter the court, once you will officiate, your mind should be in focus and set within the game and officiating. There should be no distractions and stay on the present always. You will encounter problems once you missed the situation" (Professional Referee 1). The other one also has the same perspective, "I think, we were the one who created those problems. It is just within us. Once you missed or you're not on the right position or angle. Because as a referee you should be in focus so that you won't miss any fouls, infractions and violations" (Professional Referee 2).

One problem also cited, is when officiating in far places such as barangay and province leagues. The people in these areas seem to act impolite compared to those who are involved in professional leagues. It is maybe because unlike in tournaments, professional leagues like PBA are strict when it comes to implementing the rules and regulations of the basketball. They impose fines for unsportsmanlike conduct of the players, coaches, and even with the rude spectators. "In places like in province or barangay who were far from home, the people there are rude and impolite. Before I officiate in Cavite, the people there act so impolite. Even if you already make the call, they will just disregard it and continue with the game. That's one of the problems unlike in professionals or even in school you have the security" (New Referee). The long experienced referee also shares her experience in taking the FIBA examination. "Based on my experience, when I was taking my exam on FIBA, I take my exam on Dubai and I have no idea about their culture that time. They were not shaking hands with women. I feel like I was discriminated, without knowing that it was part of their culture. Then my two co-referees who are male, they are not engaging me on their conversation. It seems like they underestimated my performance but after I perform, they already talked to me." She considers lack of cultural awareness as a problem she has encountered. On the other hand, some of the key informants think that the problems of female referees are the bullying

crowd and high-tempered coaches, but being in a competitive sport all of these are common and accepted.

Coping Problems

One referee copes with her problem by improving her physical ability to avoid physical problems. *"Just doing the work-out"* (Local Referee). The remaining female referees do it in an intrinsic way. They determine the cause of the problem and make way in solving it and learning from it. *"I'll figure out; why did it happen? Where did I fail? And of course how should I solve those problems"* (Professional Referee 1). *"As simple as, you have to learn from your mistakes and do not let those mistakes happens again, because you will not grow if you keep on making the same mistake all over again. Also, ask some advice on what to do"* (Professional Referee 2). *"You just have to be stiff on the game and avoid distractions. Focus on the game, not on the personality of the player"* (New Referee). *I just showed them that I deserve to be a referee and that I can also move along with them"* (Experienced Referee).

DISCUSSION

Based on female referees' common experiences, they justified that officiating a 48-min game of basketball is not easy. Referees have difficult job in keeping the orderliness of the game. They are responsible for decision making which must be done as fast as they can. Other than the pressure of the game, officials are also subjected to criticisms and violent reactions from the spectators, coaches' sports managers and organizers. In the study of Todey (2013) she wrote, sports official function mainly as the game's ultimate authority figure, the one who hold the power of the game. Their presence and authority makes them as the targets for criticisms and violent reactions. Violent reactions and verbal aggression are expected to take place towards them (Todey, 2013). Sports officials are indeed, criticized and blamed by the coaches, players, and spectators because of the decisions they make. To make proper call, one must be authoritative and consistent, which was thought to be lacking in a woman's characteristics. Due to the difficulties in sport officiating, the ability of women in ruling the game is somewhat being questioned.

Women officials participating in a manly world of sport mostly experienced discrimination from their co-referees and even supervisors (Tingle *et al.*, 2014). Male and female are both predicted to fulfill their own gender roles by community from the day they were born. As cited by Wilde (2015), Woolum (1998) and Sherrow (1996), the highlights and history on how women evolved on sports. Point out that over the centuries, sports and any athletic tournaments are mainly dominated by men. This is the reason why a lot of girls decided not to participate in sports. It was during mid-1800's, when women begin to exert effort in participating in mild exercises such as dancing and ice-skating. Then after the civil war, in the late

1800's, women are eventually given the chance to join sports. Some of these sports, were, golf, archery, and croquet, since these sports do not involve physical contact. Women's physical recreation activities were limited that time because it is said to be not a "ladylike" attitude if a woman is involving in physical contacts and competition.

In today's generation, there are women who are now taking paths and careers that are considered only for male before. In fact, according to a former PBA referee who is one of the key informants, during their time, having women as a referee is not accepted, it is during the time of commissioner Narvasa when women are allowed to officiate in the Philippine Basketball Association. He also added that the problem on how women can go as far as with men is a matter of acceptance. The lives of female referees and how they learn from their experiences, may it bad or good experiences, varies depending on how they accept the criticisms from the external factors and the pressure of their chosen profession.

When it comes to gender abuse among the participants, violent act against women triggered by her gender can be considered as gender abuse when it is done collectively and continuously by the abuser that is usually someone known by her. Base on the answers of the female referees, who said yes, on experiencing gender abuse, their experience like some player holds their waist and strike their buttocks falls under harassment. Harassment may differ in gender abuse depending on the act of the party or group. Harassment is when someone or a group keeps on annoying somebody especially women by making actions such as telling some dirty jokes, holding sensitive and non-sensitive part of the body, threats, and demands. There are also different forms of harassment; it can be physical, verbal and even visual.

On Republic Act No.7877, an act declaring sexual harassment unlawful in the employment, education or training environment, and for other purposes, offences which may fall under sexual harassment can be categorized into light, serious, and grave offences. The key informants also considered gender abuse among female referees, except for the basketball player who said that, there is no gender abuse among women because of the respect for them. In this study, the experiences of female referees are considered more on harassment not as a gender abuse.

On the third objective which is to determine the problems female referees has encountered, focuses more on physical and strength capability of a woman. While women can still have the same amount of strength relating to their body size, it is undeniable that men are still stronger than women (Brown, 2017). Resulting from making decision constantly, referees are always drawn from criticisms in every decisions and mistake they make (Guillen and Feltz, 2011). This is regardless if the referee is male or female.

In managing those problems each individual has a way to get rid of the problems in life. Coping is defined as one's unique efforts in managing external or internal demands from the environment (Folkman and Lazarus, 1990). The coping strategies of individual are changing. Some of the changes result in situation that causes distress strategy (problem-focused coping) and regulating distress (emotion-focused coping). In their book, Folkman and Lazarus also discuss the two forms of appraisal, the primary and secondary appraisal in evaluating problems. In primary, the person will ask if what she/he would risk for every problem encountered. While the secondary appraisal is more on what a person can do and what are his/her coping way questions¹⁹. Their promise supports the method of coping used by some of the respondents.

CONCLUSIONS

Based on the findings of the study, the researchers concluded that the experiences of the female referees are mostly associated with external forces, such as the coaches, spectators, the pressure of the game, being teased by co-referee, and have been disrespected by some players, but in general they still consider their experiences to be enjoyable. The referees are divided in responses. Two of them do not consider their experiences to be gender abuse while the touching, persistence, and disrespect that were experienced by the other referees cannot be considered forms of abuse but harassment which did not happen in receiving phase. The problems of female referees are mostly verbal bullying, unequal physical strength, speed, monthly period attitude of the player, coach and audience, and lack of cultural awareness for those who travelled abroad to officiate. Nevertheless, they also considered their problems to be more of their own perception. Female referees coped with the problems in an intrinsic way which means internal motivation, by determining the cause and effect and learning from it.

CONFLICTS OF INTEREST

We have no conflicts of interest to disclose.

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Research Article

Perceived multiple intelligences and learning styles in teaching physical education

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ABSTRACT

The study aimed to investigate multiple intelligence and learning styles of physical education students. Research group consists of 400 students, chosen purposively who studied in a state university in Central Luzon Philippines enrolled in Physical Education 101 and 102, respectively. The data elicitation instrument was derived from two standardized instrument, one on Learning Styles (Honey and Mumford, 2006), and one on Multiple Intelligence (Chislett and Chapman, 2005). The data gathered using the questionnaire were coded, encoded, and statistically analyzed using statistical software called IBM-SPSS Statistics version 21. Implication on enhancement of teaching pedagogies among activist, theorist, and musical type of intelligence in the learning process is highly recommended.

Keywords: Multiple intelligence, Learning style, Physical education

INTRODUCTION

Exploring learning style and multiple intelligence type of learners can enable the students to identify their strengths and weaknesses and learn from them. It is also very important for teachers to understand their learners' learning styles and multiple intelligences since they can carefully identify their goals and design activities that can teach to the different intelligences, and design student-centered activities (Şener and Çokçalışkan, 2018). The relevance of exploring Learning Style and Multiple Intelligence was also recognized in the field of Physical Education. As mentioned in their study (Cid *et al.*, 2018), a review of the works published between the years 2010 and 2017 shows few studies on the learning styles in students or professionals of the physical education, a situation that happens in many of the careers of education, being the areas of health and engineering that present Learning Styles in Physical Education more inquiries about this subject. As concluded in their study, it is not only necessary to measure learning styles but also to teach them how to use them appropriately. Majority of the studies previously conducted described the

style of learning of participants (Bicans and Grundspenkis, 2016; Şener and Çokçalışkan, 2018; Alemdağ, 2020; Eğitimi *et al.*, 2015). This study aims to reveal Learning Styles and Intelligence Type of pre-service physical education teachers and an attempt to structure appropriate methodologies for each combination of style of learning and intelligence in the form of a Learning Menu.

REVIEW OF THE LITERATURE

Differentiated Instruction in Physical Education

Differentiated instruction (DI) is a teaching and learning approach that provides a context to adjust sufficiently several aspects of the curriculum to address effectively the needs of all learners. However, the impact of DI is often related to several learning subjects, for example, reading, and mathematics (Tomlinson and Imbeau, 2010), while scarce empirical evidence exists regarding its effectiveness in the context of physical education. The lack of attention on DI in physical education may be due to the current best practices that focus on the personalization of learning tasks (Colquitt *et al.*, 2017). Recently, a growing emphasis on differentiated instruction may have further increased teachers' tendency to look at learning styles as an instructionally relevant variable

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when individualizing instruction in increasingly heterogeneous classrooms (Landrum and McDuffie, 2010).

The Multiple Menu Model for Developing Differentiated Curriculum

The Multiple Menu Model (Renzulli, 1988) emerged from their work over the last 10 years in looking for strategies teachers can use to improve the curriculum writing process. It was observed that teachers who are overloaded with volumes of state curriculum guides, caught on a seesaw between the importance of authentic knowledge (content) and instructional techniques (process), and challenged to include activities from the latest educational bandwagon, the Herculean task of curriculum writing often falls to an intrepid committee relegated to work during summer vacation. Their stories of frustration are common, and the ever present black, three-ring curriculum binder that sits on their colleagues' shelves collecting dust serves as a reminder that their work is not always relevant to their colleagues' instructional needs. While the curriculum writers' intentions are good and the work is rigorous, they come to realize that the hours of toil often result in a conglomeration of activities that does little to enhance the teaching and learning process in any meaningful way. It is their belief that for a curriculum guide to be effectively applied to the learning process in the regular classroom, teachers must be equipped with the tools and the time to translate these lists of curricular outcomes into meaningful units of instruction. The Multiple Menu Model respects this goal by providing six practical planning guides for menus that all teachers, K-12, can use to design in-depth curriculum units for classroom use. It is based on the work of theorists in curriculum and instruction.

Similar to this study, the researchers chose to create an intelligence learning menu because, like the choices that appear in the pull down menus of many computer software programs or on a restaurant menu, it provides the teacher-as-curriculum-designer with a range of options within each of the components of the model. The menus encourage teachers to design in-depth curriculum units that bring together an understanding of the structure of a discipline, its content and methodologies, and the wide range of instructional techniques teachers use to create teaching and learning experiences. In this study, the menu shall be based on the students' learning and intelligence classification. Thus, there is a need to assess the Learning Styles and Multiple Intelligence of students and come up with an Intelligence- Learning Style Menu to address diverse learner preferences and intelligences.

METHODOLOGY

Sampling and Participant

The descriptive cross-sectional study design was used to determine the Intelligence Type and Learning Styles of Physical Education students in the university. The

respondent of the study is students from all campuses enrolled in physical education 101 and 102 during the 2nd semester for AY 2017–2018. This research is aimed at analyzing the multiple intelligence levels and learning styles of physical education students to serve as basis in an Intelligence-Learning Style Menu. The research universe is composed of 518 students in physical education, of which 241 are girls and 274 are boys from physical education classes of five different campuses of Bataan Peninsula State University.

The Survey Instrument

Honey and Mumford's model, *Learning Styles Questionnaire* (LSQ) was used in the study which is directly derived from Kolb's theory (Honey and Mumford, 2006). While basically the same as Kolb's model, there are a couple of differences. First, they substitute the terms "reflector" for divergers (reflective observation), "theorist" for assimilators (abstract conceptualization), "pragmatist" for convergers (concrete experience), and "activist" for accommodators (active experimentation). In addition, the new labels have slightly different meanings.

Chislett and Chapman (2005) Instrument, based on Gardner's Multiple Intelligences Model was used to measure Multiple Intelligence of respondents. (*TESTE Múltiplas Inteligências*, n.d.)

Data Collection

To determine the general profiles of learning styles and multiple intelligences of the students in the university enrolled in physical education, data collection focused on distributing the survey on learning styles and multiple intelligences to elicit participants' responses in different campuses. Out of a total of 520 students, there were 120 non-respondents to the survey, and the respondent rate was 76.92% which resulted in a total of 400 respondents.

Data Analysis

The data gathered using the questionnaire were coded, encoded, and statistically analyzed using statistical software called IBM-SPSS Statistics version 21. The data were analyzed using various statistical tools such as weighted mean, correlation, ANOVA, MANOVA, and regression analysis. Weighted mean was utilized to describe the level of multiple intelligences of the students, Further, MANOVA was used to determine whether the multiple intelligences varies across different learning styles of the students.

RESULTS

This section presents analysis and interpretation of data relevant to multiple intelligences and learning styles of students in physical education in a state university in Central Luzon, the Philippines

Learning Style

Table 1 presents the learning style of the students as activist, theorist, Reflector, and pragmatist in frequency, percentage, and rank.

The table reveals that learning style of the students is clustered into four groups where 29.3% of the students are theorist, 26% are activist, 24% are reflector, and 20.8% are pragmatist. The results indicate that students in physical education are diverse when it comes to learning style.

Level of Multiple Intelligences of the Students

Table 2 summarizes the level of multiple intelligences of the students.

As shown, the intelligence with the highest mean is the musical intelligence with a mean of 30.14 followed by intrapersonal intelligence with 29.71 then interpersonal intelligence with 29.36. The lowest mean is 26.94 which is the linguistic intelligence.

Comparison of Learning Style and Multiple Intelligences of the Students

Table 3 reflects the significant difference between learning style and multiple intelligences of the students.

From Table 3, the multivariate ANOVA shows that multiple intelligences of the students do not differ based on their learning style as indicated by the Wilk's Lambda of 0.955 and F-value of 0.855 which is significant at 0.05 level. In addition, the mean scores of each learning style are very close to each other for each intelligence.

Table 1: Learning style of the students

Type	Frequency	%	Rank
Activist	104*	26.0	2
Theorist	117*	29.3	1
Reflector	96*	24.0	3
Pragmatist	83*	20.8	4
Total	400	100	

*Very strong preference

Table 2: Level of multiple intelligences of the students

Intelligence	Mean	Standard deviation	Rank
Linguistic	26.94	1.86	8
Logical	27.91	2.22	7
Bodily Kinesthetic	28.46	1.14	6
Visual Spatial	26.95	1.56	2
Musical	30.14	2.08	1
Intrapersonal	29.71	2.12	3
Interpersonal	29.36	1.19	4
Naturalist	28.52	3.45	5

Table 3: Multivariate ANOVA of multiple intelligences and learning style

Multiple intelligences	Learning style	Wilk's Lambda	F	Sig.
Linguistic, Logical, Bodily Kinesthetic, Visual Spatial, Musical, Intrapersonal, Interpersonal, Naturalist	Activist, Theorist, Reflector, Pragmatist	0.955	0.855	0.651
Descriptive statistics				
Multiple intelligences	Learning style	Mean	SD	N
Linguistic	Activist	26.71	3.746	104
	Theorist	26.77	3.694	117
	Reflector	27.04	4.167	96
	Pragmatist	27.35	4.032	83
	Total	26.94	3.889	400
Logical	Activist	27.91	3.742	104
	Theorist	27.65	4.003	117
	Reflector	27.89	4.284	96
	Pragmatist	28.29	4.479	83
	Total	27.91	4.101	400
Musical	Activist	29.88	5.174	104
	Theorist	30.57	5.062	117
	Reflector	30.65	5.016	96
	Pragmatist	29.25	5.316	83
	Total	30.14	5.144	400
Bodily Kinesthetic	Activist	28.18	4.337	104
	Theorist	28.45	4.248	117
	Reflector	28.45	4.710	96
	Pragmatist	28.83	4.896	83
	Total	28.46	4.512	400
Visual Spatial	Activist	26.54	3.547	104
	Theorist	26.64	4.591	117
	Reflector	27.39	4.276	96
	Pragmatist	27.41	4.553	83
	Total	26.95	4.260	400
Interpersonal	Activist	29.38	4.329	104
	Theorist	29.45	4.440	117
	Reflector	29.34	3.976	96
	Pragmatist	29.20	4.531	83
	Total	29.36	4.308	400
Intrapersonal	Activist	29.64	4.187	104
	Theorist	29.52	4.238	117
	Reflector	29.69	4.027	96
	Pragmatist	30.06	3.479	83
	Total	29.71	4.017	400

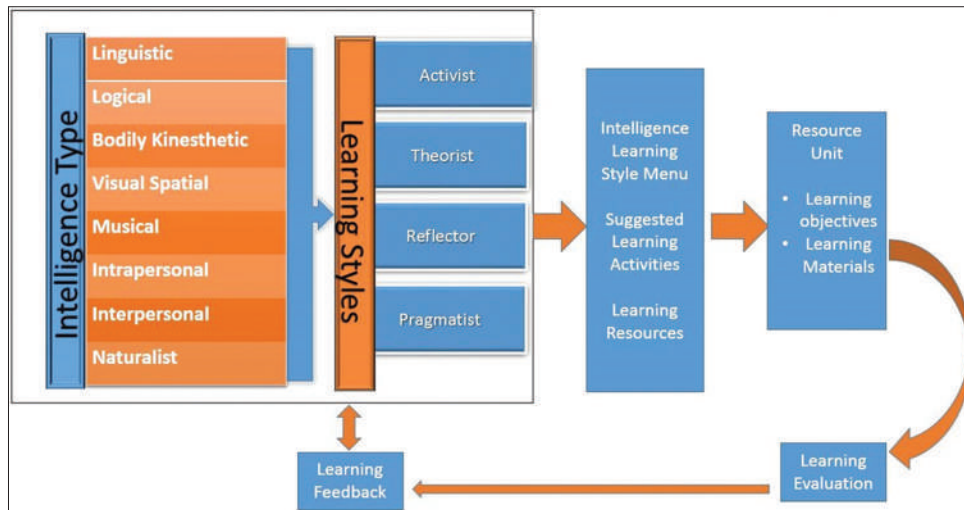


Figure 1: Intelligence-learning style integration model

DISCUSSION

The main aim of the study was to discover the profiles of learning styles and multiple intelligences among college students in physical education courses. Another aim of the data analysis was to determine the dominant learning styles and multiple intelligences of the students. This group had theorist and activist styles as their highest percentages. Learners who are inherently theorists seek to understand the theory behind the action. They enjoy following models and reading up on facts to better engage in the learning process. Theorists love reading stories and quotes, and they appreciate as much background information as they can get. Activists are people who learn by doing. They need to get into the action and experience what they are trying to learn. These types of people typically have an open mind, they do not come into situations with biases, they like to brainstorm, and they are open to group discussions and problem-solving sessions. The third group – reflector, learns best by watching people and thinking about what is happening. These students observe from the sidelines and collect data, and then they take the numerous experiences they have perceived and work toward an appropriate conclusion. Finally, Pragmatists want to know how to put what they are learning into practice in the real world. They do not like abstract concepts or games. They experiment with theories, ideas, and techniques and take the time to think about how what they have done relates to reality. In terms of Intelligence Type, Musical has the highest mean, followed by Visual Spatial, then Intrapersonal. A literature concerning learning style of PE students showed that the learning styles of the PE students were more stable in time based on the measurements performed at different intervals. This situation suggests that when PE students' learning styles are identified, one can be informed about their learning characteristics for a specified period (2–3 years). This period may be regarded as reasonable, considering the duration of the PE teaching program. Thus, lecturers or those who do not

manage teaching programs will not have to apply a very strict program to identify PE students' learning styles (Alemdağ, 2020).

CONCLUSION

Results indicated that the participants' dominant learning styles are Theorist and Activist and their dominant multiple intelligences are Musical'

Implications for Pedagogy

To emerge with a better classroom learning environment, for example, for EFL college students in Kuwait, it is of vital importance to identify students' learning styles and multiple intelligences to begin to accommodate their dominant learning styles and multiple intelligences by college teachers and the college curriculum at large (Alrabah *et al.*, 2018). In Addressing diverse learner preferences and intelligences in Teaching of Physical Education in the University, it was noted that physical education is generally thought of as a kinesthetic (learning with movement) content area; however, incorporating various learning styles into PE lesson plans have been proven to maximize the learning experience for all students. Results indicated that while the participants' dominant learning styles are theorist and activist and their dominant multiple intelligences are musical, the mean scores of each learning style are very close to each other for each intelligence. Physical education teachers in the Philippines can accommodate the diverse learning styles and multiple intelligences through the use of the researcher made Intelligence Learning Menu Tool.

Figure 1 illustrate integration of intelligence and learning style in the learning process.

In using the Integrated Intelligence Menus particularly for module development — without trying to do everything

at once, use *the menus as a compass*. Since the students of physical education in the university are diversified in terms of intelligence and learning styles, PE teachers may include in their teaching plans most of the suggested activities applicable to the PE subjects being taught.

Recommendations

This study was important to emphasize physical education teachers' awareness of multiple intelligences and learning styles in the learning process. Implications for positive effects will be seen when educators began to integrate the results into their teaching practices with a focus on activists, theorist, and musical type of intelligences.

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Research Article

A phenomenological investigation of the college transition from former high school athletes no longer engaged in varsity competition

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ABSTRACT

Participation in sport not only provides athletes with health benefits but can be an important aspect of living a meaningful life as a student. The study looked into the reasons what makes the athletes discontinued engaging in sports trainings and competition participation. Based on the data gathered by the researchers through one-on-one interview, there are many challenges and factors that considered by the former student athletes. The researchers have found out that time management, injury, and their role transition are those challenges are a big factor for them when it comes to balancing their time and roles. Keywords: sports, participation, athletics, athletes.

INTRODUCTION

- Organized sport plays an important role in collegiate athlete development. Despite this, there has been an increase athlete that discontinue participating in sports in these ages, especially in occidental countries due to the massification of sport practice among youths, leading to more numbers of discontinued athletes which is particularly worrying in collegiate ages in 18–22
- In relation to adolescent sports, athletes discontinued participation in sports' phenomenon can be explained as a moment when young athletes terminate their athletic careers prematurely and before they have reached their top performance. According to Guillet *et al.* (2000), provides significant information regarding the periods that discontinue within sport occur; however, it fails to distinguish exactly why this occur. The proliferation of studies conducted in several sports shows existing concern with the increasing number of athletes who discontinue in sport practice. Several investigators (Stratton and Baer,

2000, 2002; Weiss and Chaumeton, 2001) have concluded that the most frequent reasons advanced by children and adolescents who withdraw from sports are interest conflicts or the desire to do something else

- In other definition presented by Cervelló (2000) that seems relevant, in general, sport dropout can be considered as the situation in which the person stops their sports commitment explicitly. In addition, a relevant point on this subject is that most authors do not define discontinue specifically. Sarrazin and Guillet (2002) found that its conceptual definition does not appear to be consensual in literature and, in most studies, where authors do not specify if discontinue is about a specific sport or sports in general
- This study is significant as it aims not only the underlying reasons of withdrawal among athletes' participants within a sport but to also to identify the reason as to why others choose to not pursue their involvement and interest in the sport.

METHODS

- The researcher used an individual interview to obtain information and create meaning to answer the problem of the study

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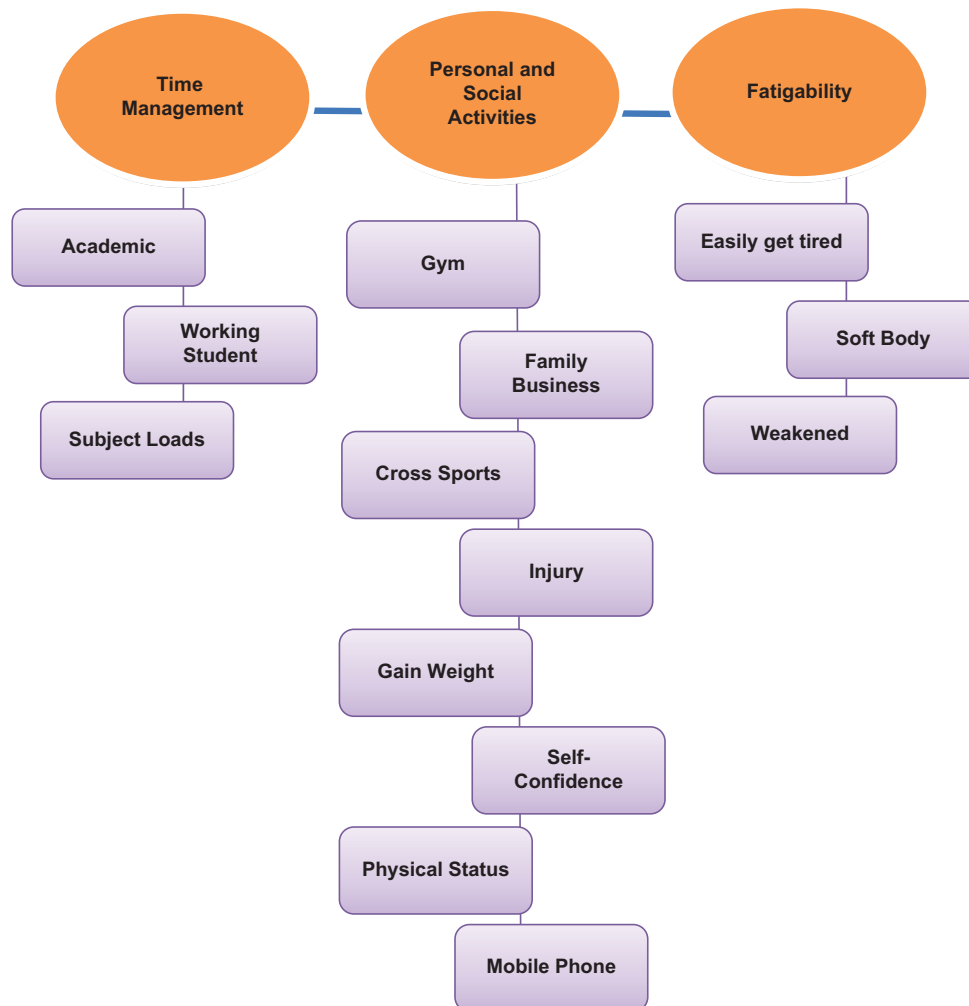
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- b. The following are the guide questions that will help the researcher in collecting the data.
1. What are the reasons that trigger you to discontinue your participation in sports?
 2. How do you manage your daily lifestyle for not engaging sports?
 3. How do you feel about your body conditions when you are not engaging yourself in sports?

RESULTS AND DISCUSSION

Thematic analysis will be utilized to identify, analyze, and report patterns and themes within data. The emergent themes were then organized into thematic networks (Attride-Stirling, 2001) consisting of themes on three levels, namely, time management, personal and social activities, and fatigability themes. These themes are discussed in the subsections below.

This study started with the purpose of the researchers to know the different factors faced by the former athletes in high school who are not committed in sport in college. The researcher gathered data through class room announcement of freshmen we sought to ask this question “who is the former athlete in high school and does not pursuing his sport in college?” to know who will be the key informants of the study and then we gathered 18 participants and we gave them an open-ended questionnaire which is used to interview the key informants and extract answers from their experiences. After collecting the answers, the researcher had a careful analyzation and interpretation of the data. We come-up with five qualified students to our inclusion criteria which is a freshmen student must be range from 18 to 22 years old, an athlete during his/her high school days, and not engaging in sports in college. In interpreting informants shared experiences they enumerated the reasons and challenges why they discontinued in sports. Meanwhile, the common answers are their role transition to college which is an adolescent milestone that is universally – acknowledge as stressful and demanding.



CONCLUSION

- a. The findings of this study are important to high school athlete in the state university as well as their parents and coaches, each of whom would benefit from the young persons, enhance ability to successfully bring back their interest and engagement to sports and also for the benefit of the sports organization in the university to have more competitive athlete can give pride to the university. However, to help the student bring back their physique.

Recommendation

- a. In light of the present gap in the literature, pursuing a deeper understanding of high school athletes' disengagement from sport during the 1st year in college represents a fruitful research endeavor. Indeed, the present study has the potential to extend the existing identity transition literature, which has yet to examine the large population of high school athletes who do not go on to participate in varsity athletics at the intercollegiate level.

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Review Article

The physical activity participation, motivation to exercise, and well-being of BS physical education major students during the COVID-19 pandemic

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ABSTRACT

The coronavirus disease pandemic created a huge stir to the lives of people all over the world. What used to be very active and dynamic Physical Education major students at Mindanao State University, Marawi City, who always did a lot of physical activities in its sports complex, was also affected. Thus, the objective of this study was to document and assess the BS Physical Education (BSPE) students' physical activity (PA) participation before and during the pandemic, as well as their motivation to exercise and well-being during the pandemic. A survey questionnaire was sent online to all BSPE students, officially enrolled during the 1st semester, A.Y. 2020–2021. They were asked about their profile, PA participation before and during the pandemic, motivation to exercise using the Behavioral Regulations to Exercise Questionnaire, and well-being using the short form of the MHC-SF. Profile of the 75 respondents showed that most of the respondents were 21 years old; there was an almost equal distribution between male and female; most were 3rd year and 4th year students; majority were non-Muslim students; and when asked about their location after the “Balik-Probinsya” activity of the university, a large percentage went back to their hometowns as only 17.3% remained inside the MSU campus. Their PA participation before the pandemic indicated that 85.3% of the respondents had a regular schedule; 40.0% engaged in PA from 3 to 4 × per week; 30.7% engaged in PA for 30 min – 1 h; regarding their companions during PA, 81.3% were with friends, classmates, or teammates; majority participated in fitness activities like jogging; and a large percentage of the respondents joined PA at the MSU sports complex, meaning at the gymnasium, grandstand, track oval, and the different courts available. Their PA participation during the pandemic showed that 81.3% of the respondents already had an irregular schedule, with 9.3% who disclosed that they had no PA at all; 81.3% engaged in PA for only 1–2 × per week; 69.3% engaged in PA for <30 min; majority or 56.0% did PA alone but 32.0% also did PA with family or with significant others; majority were still inclined to jogging and other aerobics exercises as their PA; while 41.3% mentioned that they engaged in PA while at home. Even with the pandemic, however, 80.0% of the respondents still remained to have a good motivation to exercise. On the other hand, only 36.0% exhibited a good over-all well-being. Furthermore, during the pandemic, 37.3% displayed a flourishing emotional well-being while only 24.0% were described as languishing; only 21.3% displayed a flourishing social well-being while 36.0% were described as languishing; and 41.3% displayed a flourishing psychological well-being while only 30.7% were described as languishing. The relationship between variables revealed that year level had a significant relationship to motivation to exercise ($P = 0.048$); sex revealed a significant relationship to well-being ($P = 0.036$); and sex had a significant relationship to PA participation during the pandemic ($P = 0.032$). It is also disclosed that there was no significant relationship between motivation to exercise and well-being ($P = 0.745$ and 0.783 , respectively) to PA participation during the pandemic. The following are the recommendations of the study: The College of SPEAR faculty members and coaches of varsity teams and the MSU as a whole should continue to monitor the physical activities of the PE major students and athletes through the conduct of online workouts and trainings through Zoom or Google Meet; programs and activities, though online, should also be offered to support the students who are exposed to various economic and social stressors.

Keywords: Coronavirus disease pandemic, Motivation to exercise, Physical activity participation, Well-being

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INTRODUCTION

During the early part of 2020, the sports and recreational facilities of Mindanao State University in Marawi City were filled with student-athletes, students, and other members of the community who were partaking in different kinds of physical activities. Especially in the afternoon, the gymnasium, the track oval, the different courts, and even the bleachers in the grandstand were sights to behold as MSU constituents stretched, shot baskets, spiked volleyballs, jogged, ran, performed smashes and clears, topspins and chops, kicked, jumped, and sweat out in preparation for upcoming local, regional, and national athletic competitions, as requirements for Physical Education classes, or just simply to keep themselves fit.

However, all these were halted as the novel corona virus or coronavirus disease (COVID-19) pandemic affected all parts of the world. In the Philippines, the whole nation experienced doing things the “new normal” way, which according to Romero (2020) “is the emerging behavior, situations, and minimum public health standards that are institutionalized in common or routine practices and remain while the disease is not totally eradicated through such means as widespread immunization.” The Mindanao State University experienced a lockdown on March 12, 2020 as its administration strictly followed the safety measures and protocols imposed by the Inter-Agency Task Force on Emerging Infectious Diseases or IATF-EID (of the Philippines) and of course, by the World Health Organization (WHO). Large gatherings were not allowed, definitely, what used to be a vibrant sports complex became bare. Face-to-face classes were suspended and works from home were done to help contain the spread of the virus. The term “Stay At Home” was coined as everybody was asked to cut down non-essential transactions.

With these health measures, it was expected that MSU constituents, particularly the BS Physical Education (BSPE) students enrolled in the College of Sports, Physical Education and Recreation (CSPEAR) as the respondents of the study, would be faced with a lot of changes to their physical activity (PA) participation, their motivation to exercise, as well as their over-all well-being. For instance, by May and June 2020, MSU launched the “Balik-Probinsya” program which facilitated the safe return of the students to their families and relatives in the different provinces and municipalities all over Mindanao. This meant that they had to say good-bye to the sports complex which used to be their playground and would have to be innovative in their PA practices in their hometowns. However, these students were still expected to continue to promote physical activities in the home environment as their advocacy as physically active individuals. As believers of *mens sana in corpore sano* or a sound mind in a sound body, it was as well expected that they would remain to be motivated to exercise as

one of the ways to combat the negative effects of the pandemic to an individual’s well-being. In fact, athletes encourage physical movement to avoid negativity in the middle of the pandemic (Cardandang, 2021). Chekroud, Gueorguieva, and Zheutlin (2018) also mentioned that PA is strongly associated with mental health and wellness. Playing and engaging in physical activities also give people opportunities to laugh and smile and to experience positive feelings. Physically active individuals generally experience less stress, depression, and anxiety. Furthermore, Carek, Laibstain, and Carek (2011) added by saying that PA has received attention as a potential treatment for depression and anxiety, in addition to medicines.

Thus, the objectives of this study were to gain an understanding on the impact of the COVID-19 pandemic on the BSPE students. Specifically, this aimed to document changes on their PA participation from before to during the pandemic. In addition, this sought to answer their motivation to exercise and their over-all well-being during the pandemic.

SCOPE OF RESEARCH

This was a survey research to study the PA participation before and during the pandemic among the BSPE students enrolled at Mindanao State University. These included the regularity of PA, frequency of PA, duration of PA, companion during PA, type of PA, and venue of PA. The respondents’ motivation to exercise and well-being during the COVID-19 pandemic were also considered as well as their age, sex, year level, ethnicity, and location.

This study was conducted during the 1st semester A.Y. 2020–2021 between October and November, 2020.

RESEARCH RESPONDENTS

The research respondents were the BSPE students of the Mindanao State University during the 1st semester A.Y. 2020–2021. All the 123 BSPE students in the master list provided by the Chairman of the Department of Professional Studies were sent with the questionnaire through their Messenger and/or institutional email accounts. However, after a period of 2 months, only 75 respondents were able to complete their responses as recorded automatically in the Google Spreadsheet.

RESEARCH INSTRUMENTS

The survey questionnaire comprised four parts: Profile, PA participation before COVID-19 pandemic and PA participation during COVID-19 pandemic, measures of motivation to exercise, and measures of well-being. Profile characteristics included age, sex, year level, ethnicity, and their location during the conduct of the study.

The PA participation before COVID-19 pandemic and PA participation during COVID-19 pandemic had similar questions such as regular/irregular PA participation, frequency of PA or the number of times of PA participation per week, duration of PA or the amount of time of activity per session, companions during PA, type of PA, and venue of PA.

To measure the respondent's motivation to exercise, the Behavior Regulations to Exercise Questionnaire developed by Markland and Tobin (2004) was used. The scale identified five (5) regulations such as amotivation, external regulation, introjected regulation, identified regulation, and intrinsic regulation. Cronbach's alpha reliability was high: 0.83, 0.79, 0.80, 0.73, and 0.86, respectively (The Behavioral Regulation in Exercise Questionnaire, n.d.).

The well-being of the respondents as well as emotional, social, and psychological well-being was measured through the short form of the MHC-SF. The scale was used to classify the respondents as flourishing or languishing. Analysis demonstrated strong internal consistency reliability (≥ 0.80) (Keyes *et al.*, 2008).

DATA COLLECTION

The researchers collected the data in the following order:

1. A letter was sent to the Dean through the Chairman of the Dept. of Professional Studies of CSPEAR requesting for the conduct of the study as well as for the master list of students officially enrolled during the 1st semester A.Y. 2020–2021, which also contained the institutional e-mail addresses of the students
2. Consent was also requested from the Coordinator of Research of the CSPEAR (as a patriotic research)
3. Upon approval, a letter, in the form of a Google form, was sent to all respondents requesting that they respond to the research questionnaire. This was through their institutional e-mail addresses and a few were sent to Messenger accounts
4. Due to problems and challenges brought about by internet connectivity, constant follow-up and communication was done by the researchers to consider their request
5. The collection of data was for a period of four (4) weeks. All data were stored directly to a Google spreadsheet
6. Data analysis was done using a statistical tool.

STATISTICS USED IN DATA ANALYSIS

The data were analyzed by frequency, percentage distribution, mean, and standard deviation. For the relationship between variables, Pearson Product Moment of Correlation or Pearson *r* was employed.

RESULTS AND DISCUSSION

Profile of the Respondents

Age

The youngest respondents were 19 years old while the oldest respondent was 28 years old. The 21-year olds comprised the highest frequency with 21 respondents (28.0%).

Sex

There was an almost equal distribution of the respondents in terms of sex, with 38 male (50.7%) and 37 female (49.3%) BSPE students.

Year level

The 3rd year and 4th year students comprised the majority of the respondents, with 27 (36.0%) and 26 (34.7%), respectively. There were 11 1st year students (14.7%) as well as 11 2nd year students (14.7%).

Ethnicity

The MSU Main Campus is known as an instrument for the multi-cultural integration of Muslims and other cultural minorities in the country (Mindanao State University System, 2013). In this study, majority or 48 respondents were non-Muslim (64.0%) while 27 respondents were Muslim (36.0%). Of these Muslim students, 23 were Maranao (30.7%) and four were Tausug (5.3%).

Location

During the pandemic, almost all or 62 respondents (82.7%) returned to their hometowns. The respondents went home to as far as Sulu, Surigao del Sur, Surigao del Norte, Agusan del Sur, Agusan del Norte, Zamboanga del Sur, and Zamboanga del Norte. Others were sent back to the neighboring provinces of Lanao del Sur and Lanao del Norte. Only 13 students (17.3%) remained inside the MSU Main campus.

PA participation

The World Health Organization or WHO (2020) defined physical activities as any bodily movements which require energy expenditure, including engagements in leisure activities or work-related movements. For 18–64 years old individuals, participation in any physical activities is recommended to be at least 150–300 min of moderate-intensity exertion or at least 75–150 minutes vigorous-intensity exertion on 2 or more times per week.

However, a lot of containment measures, including restriction of people's movement, were done to minimize the spread of the virus. In the Philippines, for instance, restrictions to the conduct of any physical activities were embodied in the Joint Administrative Order No. 2020–0001 of the Philippine Sports Commission, Games and Amusement Board, and Department of Health. Specifically applied for the respondents of this

study are mentioned in the guidelines, that is,: “Recreational and non-professional contact sports and activities shall be temporarily suspended” and “non-professional sporting events such as tournaments, competitive events, and athletic meets shall not be permitted.”

Thus, in Tables 1-3, a dramatic decline of the number of regular PA-goers among the respondents, the frequency of participation, as well as the duration of participation, can be observed. This is also consistent with the findings of the study of Islamoglu *et al.* (2021) in Iran, that 78.0% of the participants did not meet the PA standard guidelines during the pandemic, which was only a low 33.0% before the pandemic. In Brazil, 79.4% of adults reported that their level of PA decreased during the COVID-19 pandemic. In a study conducted by Hernandez and Kim (n.d.) among students in the University of California, San Diego, 72.1% of the respondents claimed that their PA levels decreased, 16.4% stayed the same, while 11.5% said that their PA increased.

As shown in the table, before the COVID-19 pandemic affected the MSU Main campus, majority or 64 respondents (85.3%) engaged in regular PA and only 11 respondents (14.7%) claimed they engaged in PA irregularly. This is due to the fact that these respondents were physical education major students and they have been convinced early on in their academe life about the benefits of engaging in physical activities. The WHO (2020) said that regular PA, such as walking, cycling, doing sports or active recreation, “provides significant benefits for health.”

However, due to the limitations and prohibitions caused by the pandemic, only seven respondents (9.3%) remained regular PA participants, 61 respondents (81.3%) became irregular PA participants, while even respondents (9.3%) did not engage in any exercise or physical activities at all.

In Table 2 (on the next page), the pre-pandemic results on the frequency of PA participation of the respondents passed the WHO’s recommendations of engaging in physical activities in 2 or more times per week, with 19 respondents (25.3%) who partook in PA daily, 11 respondents (14.7%) who exercised 5–6 × per week, and 30 respondents (40.0%) who sweat it out for 3–4 × per week. Only 15 respondents (20.0%) engaged for at least 1–2 × per week.

As mentioned, a drastic change in the frequency of PA participation of the respondents was observed during the pandemic. From previously 15 respondents, there were already 61 respondents (81.3%) who engaged in PA for only 1–2 × per week. Only 5 respondents (6.7%) exercised for 3–4 × per week, while only two respondents (2.7%) flexed their muscles daily. There were even respondents (9.3%) who did not exercise at all.

Table 1: The physical activity participation of the respondents before and during the pandemic

Physical activity participation	Before the pandemic		During the pandemic	
	Frequency (f)	Percentage	Frequency (f)	Percentage
Regular	64	85.3	7	9.3
Irregular	11	14.7	61	81.3
No PA at All	0	0	7	9.3
Total	75	100.0	75	100.0

Table 2: Frequency of physical activity participation of the respondents before and during the pandemic

Frequency of physical activity participation	Before the pandemic		During the pandemic	
	Frequency (f)	Percentage	Frequency (f)	Percentage
1–2 × per week	15	20.0	61	81.3
3–4 × per week	30	40.0	5	6.7
5–6 × per week	11	14.7	0	0
Daily	19	25.3	2	2.7
No PA at All	0	0	7	9.3
Total	75	100.0%	75	100.0%

Table 3 shows that before the pandemic only 13 respondents (17.3%) engaged in PA for <30 min per session. There were 23 respondents (30.7%) who participated in PA for 30 min to 1 h per session, and 22 respondents (29.3%) who did workouts and other physical activities for 1 h–2 h per session, while 17 respondents (22.7%) joined in PA for 2 h or more per session.

During the pandemic, majority or 52 of the respondents (69.3%) experienced exercise for only <30 min per session, which do not meet the guideline standards on physical activities set by the WHO. A combined 16 respondents (21.3%) involved themselves in PA for 30 min–2 h per session. There were seven respondents (9.3%), sadly, who did not engage in PA at all.

Since the BSPE students were located at the MSU-Main Campus before the pandemic happened, majority or 61 respondents (81.3%) trained/worked out with their friends, teammates, or classmates. As mentioned, a large percentage of the PE major students were either members of the sports varsity or members of sports clubs while others were enrolled in major activity courses, hence their companion during PA. Only six respondents (8.0%) engaged in PA alone, six respondents (8.0%) trained with their significant others, while only two respondents (2.7%) exercised with their family.

Because of lockdowns and social distancing measures to help curb the spread of the virus, 42 respondents (56.0%) engaged in PA alone. Since majority of these students went

Table 3: Duration of physical activity participation of the respondents before and during the pandemic

Duration of physical activity participation	Before the pandemic		During the pandemic	
	Frequency (f)	Percentage	Frequency (f)	Percentage
<30 min	13	17.3	52	69.3
30 min - 1 h	23	30.7	12	16.0
1 h - 2 h	22	29.3	4	5.3
2 h or more	17	22.7	0	0
No PA at all	0	0	7	9.3
Total	75	100.0%	75	100.0%

home to their hometowns during the pandemic, there were already 18 respondents (24.0%) who got time to enjoy PA with their family, while six respondents (8.0%) did PA with their boyfriends or girlfriends. Still, there were seven respondents (9.3%) who had no PA at all.

As shown in the table, most of the respondents were engaged in fitness activities before and during the pandemic (41.3% and 60.0%, respectively).

Sports, dance, recreation, combination of fitness and sports, and combination of fitness and dance activities were engaged by the respondents before the pandemic (30.7%, 4.0%, 1.3%, 21.3%, and 1.3%, respectively).

However, during the pandemic, it was evident that 13 respondents (17.3%) were engaged in household chores such as gardening, scrubbing the floor, and cleaning the backyard as their PA. Only six respondents (8.0%) performed sports skills activities, and three respondents (4.0%) were involved in dance activities, while only one respondent (1.3%) had fitness and dance activities combined. Still, there were seven respondents (9.3%) who had no PA at all.

As physical education major students, the MSU Sports Complex, which includes the grandstand, different courts, track oval, and gymnasium, is considered as their home court. Thus, a very large majority or 62 respondents (82.7%) claimed that they engaged in PA at the MSU Sports Complex. Other venues include at dorms, at home, dojo, on the streets, dance studio, and even the golf course.

Answering the call of the government, particularly by the Department of Health (DOH) and the IATF-EID to “Stay At Home,” majority or 43 respondents (57.3%) just engaged in PA inside the comforts of their own home, particularly in their own bedroom, veranda, or backyard. Very noticeable is that none of the respondents did PA at the MSU Sports Complex even if there were still students who remained in the campus.

Table 4: Companion during physical activity participation of the respondents before and during the pandemic

Companion during physical activity participation	Before the pandemic		During the pandemic	
	Frequency (f)	Percentage	Frequency (f)	Percentage
Alone	6	8.0	42	56.0
With Friends (Teammates/Classmates)	61	81.3	2	2.7
With significant others	6	8.0	6	8.0
With family	2	2.7	18	24.0
No PA at all	0	0	7	9.3
Total	75	100.0	75	100.0

Table 5: Type of physical activity of the respondents before and during the pandemic

Type of physical activity	Before the pandemic		During the pandemic	
	Frequency (f)	Percentage	Frequency (f)	Percentage
Fitness	31	41.3	45	60.0
Sports	23	30.7	6	8.0
Dance	3	4.0	3	4.0
Recreation	1	1.3	0	0
Fitness and sports	16	21.3	0	0
Fitness and dance	1	1.3	1	1.3
Household chores	0	0	13	17.3
None	0	0	7	9.3
Total	75	100.0%	75	100.0%

The MSU Administration posted a big tarpaulin reminding their constituents that jogging and other physical activities were prohibited inside the complex. Still, there were seven respondents (9.3%) who had no PA at all.

The PA patterns of these respondents may have changed as a result of facility closures and of course, social distancing recommendations. According to Chan, Hernandez, and Kim (n.d.), accessibility to the different PA facilities was the greatest barrier as to the decline of the PA participation.

As cited by Cashmore (2002), Reber (1995) defined motivation as “an intervening process or an internal state of an organism that impels it to action” while Alderman (1974) said that it is “the tendency for the direction and selectivity of behavior to

Table 6: Venue of physical activity of the respondents before and during the pandemic

Venue of physical activity	Before the pandemic		During the pandemic	
	Frequency (f)	Percentage	Frequency (f)	Percentage
MSU Sports Complex (Grandstand, Courts, Track Oval, Gymnasium)	62	82.7	0	0
At Dorms	2	2.7	5	6.7
At Home	2	2.7	43	57.3
Dojo	1	1.3	0	0
On the Streets	3	4.0	12	16.0
Dance Studio	4	5.3	0	0
Golf Course	1	1.3	0	0
At Barangay Areas	0	0	8	10.7
None	0	0	7	9.3
Total	75	100.0	75	100.0

Table 7: The motivation to exercise of the respondents

Motivation to exercise		Frequency (f)	Percentage
Score range	Qualitative description		
14–23	Very low	0	0
24–33	Low	9	12.0
34–43	Fair	0	0
44–53	High	60	80.0
54–63	Very high	6	8.0
Total		75	100.0

M=48.28, SD=3.843

be controlled by its connections to consequences.” From this, it can be generalized that motivation is an internal state that maintains goal-directed behavior. There should be a connection between action and outcome.

As shown in the table, majority or 60 respondents (80.0%) displayed high level and motivated to workout, train, and move their bodies while 6 BSPE major students (8.0%) maintained very high level of motivation to exercise. With difficulties faced during the pandemic, there were nine respondents (12.0%) who had low level of motivation to exercise.

Amotivation

Occurs when an individual lacks the motivation to do things (Moran, 2018), in this case lacking the motivation to engage in exercise or participate in any physical activities. As gleaned from the table, majority or 59 respondents (78.7%) displayed low amotivation, meaning they were still very interested and very willing to partake in physical activities, more so during the pandemic. They still managed to see reasons why they should be engaged in PA and should be afforded time. Since they are physical education major students, they always knew that there are many desirable outcomes when they do physical activities.

According to Anderson (2017), people are motivated by external regulation due to an external acting influence. An example of this is when a behavior is acted because there is a desire to obtain a reward, in the case of this study, the reward of being accepted by other people such as family, friends, and significant others. From the table, it can be noted that majority or 49 respondents (65.3%) had high external motivation, 24 PE major students (32.0%) were fairly externally regulated, and only two respondents (2.7%) displayed low level of external regulation.

Introjected regulation

Is motivation from an internalized, pressuring voice wherein the behavior of an individual is driven by “guilt, worry, or shame,” (Anderson 2017). This kind of motivation should be avoided, however, because it is difficult to feel happy and positive when doing things, in this case, since the respondents are supposed to be doing these PA just because they are obligated to do so as PE major students. The table shows that majority or 54 of the respondents (72.0%) were fair while 21 respondents (28.0%) exhibited high level in terms of introjected regulation.

Anderson (2017) further mentioned that “if an individual has personally identified with the importance of a behavior and accepted it as a regulation of his/her own because it benefits him/her in achieving a goal, then he/she is motivated by identified regulation.” From the table, it can be gleaned that majority or 60 of the respondents (80.0%) showed high identified regulation while 15 respondents (20.0%) exposed fair identified regulation. They simply recognized that engaging in PA, even in difficult and trying times, is beneficial for them.

Integrated regulation

Arises when a person has fully integrated a motivation within himself/herself (Anderson, 2017). From the standpoint of 51

Table 8: The motivation to exercise according to 5 classifications

Qualitative description	Motivation to exercise									
	Amotivation SD=1.264		External regulation SD=1.708		Introjected regulation SD=0.999		Identified regulation SD=1.530		Integrated regulation SD=1.440	
	f	%	f	%	f	%	F	%	f	%
Low	59	78.7	2	2.7	0	0	0	0	1	1.3
Fair	16	21.3	24	32.0	54	72.0	15	20.0	23	30.7
High	0	0	49	65.3	21	28.0	60	80.0	51	68.0
Total	75	100.0	75	100.0	75	100.0	75	100.0	75	100.0

respondents (68.0%) who had high level and 23 respondents (30.7%) who were fair in terms of integrated regulation, they did PA because it was fun, enjoyable, and pleasurable for them, thus, satisfaction from doing the activities is achieved.

In this study, the respondents were asked about specific feelings they experienced, most especially, when the pandemic struck and put a shock in their lives. Specifically, they were asked how often they felt “happy,” “interested in life,” “satisfied with life,” “that they had something important to contribute to society,” “that they belonged to a community,” “that people are basically good,” “that they liked most parts of their personality,” “that they had warm and trusting relationship with others,” and among others (Keyes, 2009).

There were 27 respondents (36.0%) who had good, seven respondents (9.3%) who had very good, 16 respondents (21.3%) who had fair, 24 respondents (32.0%) who had poor, and one respondent (1.3%) who had very poor well-being experienced during the early parts of the pandemic. The results showed that well-being of the respondents were varied. This supported the findings O'Connor *et al.* (2020) that levels of well-being differed by age groups, with men exhibiting higher well-being compared to women.

As explained by Badali as cited by Gao (2021), a languishing feeling is one that is “characterized by lack of positive emotions and reduced interest in life, with experiences of feelings of loneliness and a sense of emptiness.” On the other hand, a flourishing feeling is one that “brings inner joy and happiness through meeting goals, being connected with life passions, and relishing in accomplishments through the peaks and valleys of life,” (Soots as cited by Ackerman, n.d.).

Certainly, the unprecedented COVID-19 pandemic spared no one when it came to adjustments in managing feelings and emotions. As found out from Table 10 which also supports the findings in Table 9, varied feelings were displayed by the BS PE major during the pandemic.

In terms of emotional well-being, there were 18 respondents (24.0%) who were languishing, 29 respondents (38.7%)

Table 9: The well-being of the respondents

Well-being		Frequency (f)	Percentage
Score range	Qualitative description		
10–25	Very poor	1	1.3
26–41	Poor	24	32.0
42–57	Fair	16	21.3
58–73	Good	27	36.0
74–89	Very good	7	9.3
Total		75	100.0

M=51.93, SD=17.057

Table 10: The well-being according to 3 classifications

Qualitative description	Well-Being					
	Emotional well-being SD=4.195		Social well-being SD=6.201		Psychological well-being SD=7.480	
	f	%	f	%	f	%
Languishing	18	24.0	27	36.0	23	30.7
Fair	29	38.7	32	42.7	21	28.0
Flourishing	28	37.3	16	21.3	31	41.3
Total	75	100.0	75	100.0	75	100.0

who were just fair, while 28 respondents (37.3%) who were flourishing.

In terms of social well-being, there were 27 respondents (36.0%) who were languishing, and 32 respondents (42.7%) who were just fair, while 16 respondents (21.3%) who were flourishing.

In terms of psychological well-being, there were 23 respondents (30.7%) who were languishing, and 21 respondents (28.0%) who were just fair, while 31 respondents (41.3%) who were flourishing.

As shown in Table 11, year level displayed a significant relationship to motivation to exercise as manifested by the $P = 0.048$. The 3rd year and 4th year students were more

Table 11: The relationship between motivation to exercise, well-being, and physical activity participation during the pandemic to other variables

Other Variables	Motivation to exercise		Well-being		Physical activity participation during the pandemic	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Age	-0.004	0.973	0.038	0.745	-0.066	0.575
Sex	0.123	0.293	-0.242	0.036***	0.248	0.032***
Year Level	0.229	0.048***	-0.097	0.408	-0.209	0.072
Ethnicity	0.169	0.148	0.072	0.538	0.090	0.443

***Correlation is significant at the 0.05 level (2-tailed)

Table 12: The relationship between motivation to exercise and well-being to physical activity participation during the pandemic

Physical Activity Participation During the Pandemic	Motivation to Exercise		Well-Being	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
	0.038	0.745	-0.032	0.783

***Correlation is significant at the .05 level (2-tailed)

motivated to still continue their PA participation even during the pandemic, compared to 1st year and 2nd students.

Sex revealed a significant relationship to well-being with $P = 0.036$. As shown by $r = -0.242$, the female BSPE major students were more positive in life in facing the tough and difficult times of the pandemic.

Furthermore, sex had a significant relationship to PA participation during the pandemic with p-value of .032. The male respondents experienced engaging in PA participation regularly compared to the female respondents.

As also shown in Table 11, there was no significant relationship of age and ethnicity to motivation to exercise, well-being, and PA participation during the pandemic.

Table 12 revealed that there was no significant relationship between motivation to exercise and well-being to the PA participation during the pandemic. This manifests that the respondents' motivation to exercise and well-being did not affect their PA participation during the pandemic.

CONCLUSION

No single person in the world was prepared enough to face the challenges brought about by the COVID-19 pandemic. The once very dynamic and active BSPE major students of Mindanao State University were joining PA from regular participation before the pandemic to irregular physical activities during the pandemic. Because of a lot of restrictions and limitations, there was a reduced frequency and duration of

exercise, as well as doing it alone and within the confines of their homes. However, they remained to be highly motivated to exercise as engaging in PA is part of their training as PE major students and athletes. On the other hand, they displayed different outlooks in life when facing the pandemic.

Recommendations

From the results of the study, the following are recommended:

1. As mentioned by the WHO Director General Dr. Tedros Adhanom Ghebreyesus, "Every move counts. We must all move every day – safely and creatively." Since the pandemic is ongoing, the CSPEAR faculty members and coaches of varsity teams should continue to monitor the physical activities of the PE major students and athletes. This can be done by conducting online workouts and trainings through Zoom or Google Meet. Aside from actually performing PA, the students would still be motivated to move; most especially the students from the lower year levels. That is, there should be enough opportunities to be physically active offered where feasible
2. The CSPEAR, and the Mindanao State University as a whole should provide programs and activities, though online, to offer support to students, especially the males, who are highly vulnerable and are exposed to various economic and social stressors
3. As there are no face-to-face class interactions and students are just studying at home, the role of parents and relatives should also be stressed. Even simple physical activities which are fun to do with the family can help respond to the needs of the students
4. Other researches should be done by the CSPEAR regarding the PA participation of their students, this time, a year after the start of the pandemic, with other variables and with a larger sample size.

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Research Article

Characteristics of injury and rehabilitation applied for elite wheelchair athletes

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ABSTRACT

Purpose: Data on injury and rehabilitation measures during training in Vietnamese elite wheelchair athletes are relatively little literature exists. The results obtained from the injury status survey and how to apply the rehabilitation measures served as the basis for the design and evaluation of injury prevention strategies in para sports. The aim of this study is to investigate upper quadrant injuries in elite wheelchair athletes and rehabilitation applied for them. **Method:** A retrospective analysis of upper quadrant injury and rehabilitation measures in elite wheelchair athletes with available data (2019–2020) was conducted using medical notes extracted from the records of the Medical and Scientific Department, Ho Chi Minh city National Sports Training Center (HCM-NSTC). Eligibility criteria include all wheelchair athletes on the list, eligible for HCM-NSTC physical therapy assistance and medical doctor with a wheelchair disability in Weightlifting and Javelin. **Results:** There were a total of 33 injuries from 12 athletes. Participant characteristics: Eight males (66.67%) and four females (33.33%) from two sports, with a mean age of 32.7 ± 3.4 (range 26–37) years and 12 with congenital loss (100%). Almost injury was reported of the total athletes during period of time for training, injuries in female (15/33 times ~54.5%) were higher than in male (18/33 times ~45.5%). Javelin throwers suffered more injuries than weightlifters, with 21/33 times as 63.6% in javelin throwers compare to 12/33 times as 36.4% in weightlifters, respectively. Shoulder pain was reported as the most common, accounting for 51.5% (deltoid R) followed by back pain accounting for 21.2%. Javelin athletes had shoulder injuries 21.2% and back pain 18.2%, while weightlifters shoulder pain 30.3% and back pain just 3%. The rate of injury recurrence is 58.3% and this rate is higher in men (41.7%) than in female athletes (16.7%). Particularly, both sports teams have one athlete relapsed 4 or more times. The main recovery measures after cold application were using pulse electric stimulation, accounting for 57.4%, the magical vibration method 14.9%, the exercise rehabilitation 10.6%, and massage therapy 6.4%. The rate of using occupational therapy was found as similar in both genders (69% in male and 63.6% in female). **Conclusion:** Elite wheelchair athletes experience upper quadrant injuries, with shoulder pain and back pain the most frequently reported. Electrical stimulation and magnetic vibrations are most commonly used in the treatment and rehabilitation of injuries. Rehabilitation exercises and massage therapy are used significantly to accelerate the recovery process for athletes. The quality and consistency of the archival data approached somewhat limited the universality of the conclusions, although the findings highlight the importance of accuracy in recording, detailed description helps to monitoring injuries, post-workout status, and implementing effective injury prevention and recovery strategies.

Keywords: Wheelchair athlete, Weightlifting, Javelin, Injury, Rehabilitation

INTRODUCTION

In sports training and competition, human movement apparatus injuries in general and psychological injuries in particular are frequent problems that to pay of attention from coaches and

manager, sports doctors, and the athletes themselves. Most athletes can suffer some degree of psychological impact or trauma during training and competition, especially for disabled athletes, the inferiority complex is more evident. The causes of the psychological effects and the mechanisms of pathogenesis in athletes are complex. The most important pathophysiological mechanisms recognized by many sports medicine experts are motor overload, the accumulation of micropsychotics, and aseptic inflammation leading to degeneration in the

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fibrin structures: Tendons, ligaments, joint capsule, muscle, cartilage, and bone. Because of the long-term accumulation, the complications are unpredictable, so the physical and mental recovery for athletes needs to be paid more attention in our country. In addition to the common causes and mechanisms of pathogenesis, the sudden increase in load, intensity, time and wrong movements in training techniques, and living habits is the direct cause. Understanding the nature of this matter is important in finding the appropriate treatment and recovery solutions for athletes in training and competition.

Understanding the physical, physiological, and biomechanical impact of limb deficiency in elite athletes, injury surveillance data, including detail of etiological factors, are required across the upper quadrant to inform the development of proactive strategies to mitigate the risk of injury and subsequent impact of injuries on sporting performance.^[1] The elite athletes with limb loss may associate pain of trunk and more specifically the thorax, back, and shoulder, including the thoracic spine; centrally position within functional kinetic chains. In a trial involving elite handball players ($n=660$), a lower prevalence of shoulder problems was reported through the season for those who trained an injury prevention program which included upper trunk exercises.^[2] Within Paralympic sport, the importance understanding what the real, limitation and backside of injuries are to inform further research.

Wheelchair sports such as basketball, rugby, tennis, and auto racing, for example, 100 m to Marathon, are becoming more popular among para-athletes and audiences, with highest performance for these athletes are the Paralympic games. There is a potential matter for wheelchair athletes is how to gain training with peak performance while limitation the risk of injury.^[3-5] Upper extremity injuries, particularly of the shoulder and upper back, are common in wheelchair athletes due to the accumulation of pressure on this joint during activities of daily living, training, and competition.^[6-8]

Participation in international competitions of disability sports is becoming more and more frequent and the Vietnam national team has collected many achievements in the world, Asia and Southeast Asia. This means that athletes' training and tournament schedules are increasingly dense and the risk of injury is also higher. Injury surveillance data in disability sports are still scarce. Injury monitoring and remedial measures are critical to understanding the causes and prevalence of injuries common in specific sports populations so that effective injury prevention strategies can be developed.^[9-11]

The aim of this article was to investigate the status injuries during practice and rehabilitation measures used in elite wheelchair athletes, thereby providing necessary recommendations for managers, coaches, and athletes.

METHODS

All elite athletes with limb deficiency, treated within a Medical and Scientific Department, Ho Chi Minh city National Sports Training Center (HCM-NSTC) setting between March 2019 and December 2020, self-refer to a physiotherapist or medicine doctor reporting a quadrant injury, defined as "tissue damage or other derangement of normal physical function due to participation in sport, exercise activities, resulting to rapid or repetitive transfer of kinetic energy."^[12]

Retrospective study of upper quadrant injury and rehabilitation measures in para-weightlifting and para-javelin athletes with available data was performed using medical notes extracted from the records of the department of medicine and Science. Athletes' names are encrypted for privacy and data are used solely for research purposes.

Seven para-javelin throwers (five males and two females) and four para-weightlifters (two men and 2 women) participated in this study.

Descriptive analysis was performed on athlete demographics, disability characteristics, injury location, injury characteristics, clinical findings, conservative management, and onward referral using mean, range, frequencies, and percentages as appropriate. Histograms were used to visually display results and to enable examination across groups, and according to level of limb deficiency. All data analyses were performed using Excel.

RESULTS AND DISCUSSION

Data are conducted from 312 athletes with limb deficiency [Table 1], with the majority having both limbs deficiency ($n=10$), consist of irregularities limbs or deficiency. Sports included javelin and weightlifting. Participants presented with congenital limb loss (100%, $n=12$). The mean age in total is 32.7 ± 3.4 (range 26–37) years, in which with male is eight players, the mean age is 32.4 ± 3.3 (range 26–36) years and female is four players with average of age is 33.3 ± 4.1 (range 28–37) years.

The number of injuries reported by athletes varied considerably from 1 injury through to 5 injuries, with totally 33 injuries and higher injuries were recorded in female (18 injuries, 54.5%) compare to male (15 injuries, 45.5%). Looking at each sports team separately, it can be seen that the injury rates encountered by both male and female are quite similar. Javelin throwers suffered more injuries than weightlifters, with 21/33 times or 63.6% in javelin throwers compare to 12/33 times or 36.4% in weightlifters.

The frequency of injuries with respect to location across disability groups is reported in Table 1 illustrating frequency

Table 1: Characteristics of injury

		Age		Total	Back pain	Shoulder		Traps	Elbow	Hand	Thigh	Knee	Leg
		Mean	SD			Deltoid	Deltoid						
						Right	Left						
Javelin	<i>n</i> =7	32.4	3.7	21	6	7			1	1	2	1	3
Male	<i>n</i> =5	31.2	3.6	10	4	3				1	1	1	
Female	<i>n</i> =2	32.0	5.7	11	2	4			1		1		3
Weightlifting	<i>n</i> =5	34.4	2.3	12	1	7	3	1					
Male	<i>n</i> =3	34.3	2.1	5		3	2						
Female	<i>n</i> =2	34.5	3.5	7	1	4	1	1					
Total	<i>n</i> =12	32.7	3.4	33	7	14	3	1	1	1	2	1	3
Male	<i>n</i> =8	32.4	3.3	15	4	6	2			1	1	1	
Female	<i>n</i> =4	33.3	4.1	18	3	8	1	1	1		1		3

according to upper quadrant body regions. The shoulder pain was the most commonly recorded injured site (17 injuries) and the majority at the right side of shoulder was 14 injuries but only three cases at the left side.

The second place in terms of injuries is the athlete's back, accounting for 7/33 of the statistics. Javelin throwers tend to have back injuries quite a lot, statistics shows that equivalent to shoulder injuries, most athletes have experienced at least one injury and focus on the back and shoulder area. Injury rates for both male and female javelin throwers were not quite different. Weightlifters tend to have more shoulder injuries than back injuries, with survey data showing a ratio of 7/1. All weightlifters have experienced a shoulder injury at least once, and female athletes are twice as likely to suffer shoulder injuries as male. Other lesions are very few, it detected only 1-2 times in the positions of trapezius, elbow, hand, thigh, knee, shin, ankle, and heel. Particularly, the position in the legs is mainly due to the rubbing or tightening of the belt, causing damage during movement. The statistics is combined sites as shin, ankle, and heel to be the leg area.

The number of injuries reported by athletes varied considerably from 1 injury through to 5 injuries, with four athletes experiencing two injuries, two athletes having three injuries and there is an athlete with four injuries and other guy with five injuries. The frequency of injuries with respect to location across disability groups is reported in Table 2, with Figure 1 illustrating frequency according to upper quadrant body regions. The shoulder was the most commonly recorded injured area with 51.5%, followed by the position in upper trunk is back pain with 21.2%, this accounts for nearly three-quarter of documented injuries (72.7%). A case injury in traps, elbow, and hand site was reported in three athlete separately, which is 3% each in totally.

This is the first report of injury surveillance of elite wheelchair athletes in Vietnam. Irrespective of location and level of lower

limb deficiency, injuries to the shoulder area were the most frequently reported in this population of elite athletes with lower limb loss. This is in line with the previous research^[13-17] regarding shoulder injuries in athletes with various physical impairments.

Athletes with limbs deficiency reported glenohumeral joint, neck and shoulder, and elbow joint injuries. The truly of attempt throwing or elevating action needs maximal strength and power for optimizing overhead performance is dependent on the transmission of kinetic energy, created in the lower limbs, to the shoulder through the pelvis.^[2] Reported from Kibler,^[14] the shoulder is central to the kinetic chain, through transference of force from the lower limbs to the hand through the trunk. In athletes with lower limb deficiency, this is disrupted and results in significant strength discrepancies between the residual and contralateral limbs.^[13,18]

Fewer injuries happened were reported in athletes with transfemoral limb deficiency this may be a result of attend in wheelchair sport, which can be protected by the equipment for the upper quadrant, contributing to fewer shoulder injuries.^[19] Disruption to the kinetic chain in athletes with lower limb deficiency could result in an increase in forces being transmitted through the thorax resulting in musculoskeletal injury.^[20]

Shoulder and neck region was most frequently reported in relation to exacerbation. For some, this could be a consequence of excessive repetition on wheelchair action.^[21] Rehabilitation from shoulder and neck injuries may require rest from sporting activity, however, wheelchair-dependent athletes will require their upper limbs for activities of daily living, for example, transfers, which may account for the increased numbers of injury exacerbations and reoccurrences.

There is lot of variations and inconsistencies of injury types within injury retrospective data^[18] making comparison

Table 2: Injury frequency

		Injury	Reoccurrence	Reoccurrence	count			
		Percentage	Count	(%)	5	4	3	2
Javelin	<i>n</i> =7	63.6	4/7	57.1	1	2	2	
Male	<i>n</i> =5	30.3	3/7	42.9	1	2		
Female	<i>n</i> =2	33.3	1/7	14.3				2
Weightlifting	<i>n</i> =5	36.4	3/5	60.0	1			2
Male	<i>n</i> =3	15.2	2/5	40.0				2
Female	<i>n</i> =2	21.2	1/5	20.0	1			
Total	<i>n</i> =12	100.0	7/12	58.3	1	1	2	4
Male	<i>n</i> =8	45.5	5/12	41.7		1	2	2
Female	<i>n</i> =4	54.5	2/12	16.7	1			2

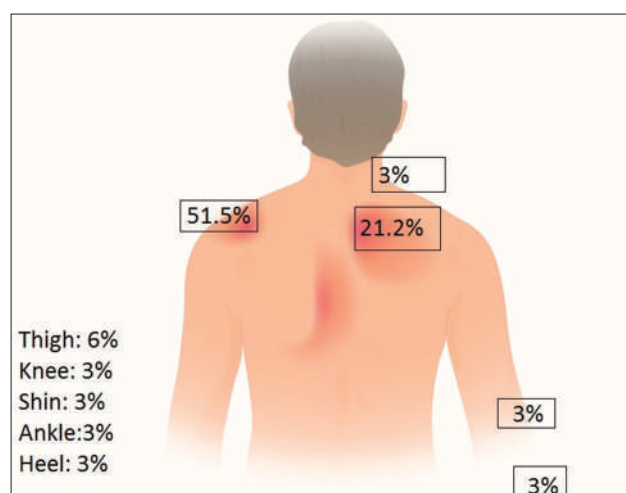


Figure 1: Injury area percentage

more difficult. Early agreement supported that injury types are based on return-to-play criteria allowing for improved reporting consistency and comparisons to be made across sporting populations.^[22,23] The most recent consensus statement from the International Olympic Committee (IOC) details a robust methodological framework to support comprehensive recording and reporting of epidemiological data on injuries^[24] which is needed to improve injury surveillance in Paralympic populations.

Injury management, including physical therapy and medical interventions, was evaluated to examine how often these approaches were used in athletes [Table 3]. Depending on the extent and type of injury, the medicine doctor will decide which rehabilitation measures to apply. According to statistics, electrical stimulation is used most commonly with 27 treatments, the rate of using this method is up to 57.4%. This rehabilitation measure is applied more on javelin throwers with 20 times performed, accounting for 42.6%, while weightlifters have 7 times of pulse electrical stimulation, accounting for

14.9%. When looking at each type of measure applied on gender, it can be seen that electric stimulation is the most commonly used, with 20/29 treatments applying this measure on male athletes accounted for 69%, and 7/11 times female athletes were applied this measure accounted for 63.6%.

Magnetic vibration method is one of the priority options indicated for rehabilitation of disabled athletes at this medical and scientific department with seven treatments, accounting for 14.9%. There were 5/29 times of male athletes receiving treatment, accounting for 17.2% and this rate in female athletes was 2/11 times, corresponding to 18.2%.

Using rehabilitation exercises are also a method chosen by many doctors and medical technicians. Searching archives show that female athletes were applied this measure quite a lot with 3/11 times of use, accounting for 27.3% and higher than male athletes with 2/29 times of use with 6.9%.

Massage therapy for recovery after exercise is quite commonly used in sports training, it is also applied to rehabilitation therapy for disabled athletes, with 6.9% application rate on male athletes and 9.1% on female athletes.

Compression bandage as an adjunct to the rehabilitation treatment was found in the documents archives and it was used on male athletes with 5/29 treatments accounting for 17.2%. No data were found on female athletes.

Injury diagnosis in the majority of cases was based on clinical assessment by a physiotherapist, supported in some cases by a doctor, rather than medical investigation. Clinical diagnosis may vary between and within professions^[25] and is in part illustrated here with the number of different terms used to suggest an injury if the shoulder region. Diagnoses such “non-specific shoulder injury” may have an unclear diagnosis and thus account for the increased number of injury recurrences and exacerbations. In the absence of a clear clinical diagnosis along with etiological factors contributing to a clinical complaint, management is likely to be less effective and recovery may take longer.^[26]

Where just 10.6% of athletes received exercise rehabilitation and 6.4% of massage therapy this was likely a consequence of collaborative and multidisciplinary management involving strength and conditioning coaches. Where these data were not enough recorded by the physiotherapists, caution should be taken in drawing definitive conclusions regarding scope of injury management and in particular the use of exercise and massage therapy within rehabilitation.

In this study, it was unclear on termination of treatment whether the injury had fully resolved and if the athlete had successfully returned to play. This limits the accuracy of the results as the

Table 3: Rehabilitation approach

		Magnetic vibration (times)	(%)	Electrical stimulation (times)	(%)	Compression bandage (times)	(%)	Massage (times)	(%)	Exercise rehabilitation (times)	(%)	Total
Javelin	<i>n</i> =7	5	10.6	20	42.6	4	8.5	1	2.1	4	8.5	34
Male	<i>n</i> =5	5	10.6	18	38.3	4	8.5	1	2.1	2	4.3	30
Female	<i>n</i> =2			2	4.3					2	4.3	4
Weightlifting	<i>n</i> =5	2	4.3	7	14.9	1	2.1	2	4.3	1	2.1	13
Male	<i>n</i> =3			2	4.3	1	2.1	1	2.1			4
Female	<i>n</i> =2	2	4.3	5	10.6			1	2.1	1	2.1	7
Total	<i>n</i> =12	7	14.9	27	57.4	5	10.6	3	6.4	5	10.6	47
Male	<i>n</i> =8	5	10.6	20	42.6	5	10.6	2	4.3	2	4.3	29
Female	<i>n</i> =4	2	4.3	7	14.9			1	2.1	3	6.4	11

level of sporting activity that the athlete returned to and when, remains unclear.^[27] As a result, we defined injury recurrence as occurring to the next time, proposing that at this stage of tissue healing, injuries would be in the remodeling phase, and therefore, athletes are likely to have returned to play.^[28]

In summary, in the investigation of this study, electrical stimulation and magnetic vibration were most commonly used in the treatment and rehabilitation of injuries. Rehabilitation exercises and massage therapy are significantly used to accelerate the recovery process for athletes.

Missing data: Some of injury records for the 12 athletes had data missing. These included missing notes within physiotherapy documentation, no record of physiotherapy assessment, details of medical investigation, and exactly date even the medical note were written on day off.

CONCLUSION

Elite wheelchair athletes experience upper quadrant injuries, with shoulder pain and back pain the most frequently reported. Electrical stimulation and magnetic vibrations are most commonly used in the treatment and rehabilitation of injuries. Rehabilitation exercises and massage therapy are used significantly to accelerate the recovery process for athletes. The quality and consistency of the archival data approached somewhat limited the universality of the conclusions, although the findings highlight the importance of accuracy in recording, detailed description helps to monitoring injuries, post-workout status, and implementing effective injury prevention and recovery strategies.

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Research Article

Effect of ladder training on agility and speed performance of male throwball players in Sri Lanka

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ABSTRACT

This study aimed to examine the effect of ladder training on the agility and speed performance of male throwball players in Sri Lanka. Thirteen male school throwball players (age 20.2 ± 0.5) were selected as a study sample. The intervention program was carried out 3 times a week over 8 weeks. Before and after the intervention, 30 m sprint and agility *t*-test performance were assessed. Speed and agility performance were showed a significant improvement ($P < 0.005$) after the intervention. In conclusion, findings of this study suggest that ladder training is effective to improve the speed and agility performance of male throwball players.

Keywords: Agility, Speed, Ladder training

INTRODUCTION

Throwball game needs the ball throwing and catching skills and applies the space orientation, quick mobility similar to motor skills such as speed, agility, and coordination (Throwball, n.d.). Speed is a major fitness component in all sports and refers to quick movements. Agility requires the change the direction quickly with maintaining balance, strength, and speed (Mahaboobjan, 2010, Viswejan, 2017). Scholars found that ladder training is effective to improve footwork (Viswejan, 2017, Kasuma and Kardiawan, 2017, Pramod and Divya, 2019). According to Viswejan, 2017, agility ladder training is used in several sports to develop physical qualities and recently used physical education instructors to train their students. Agility ladder training should have to perform after conducting the warm-up that helps to fresh the muscles are ready the body to adaptations (Pramod and Divya, 2019). Ladder training is a multidirectional training program, includes the element of the motor component such as speed, foot speed, eye coordination, and reaction time and helps to improve those

abilities (Kasuma and Kardiawan, 2017). Therefore, this study aimed to examine the effect of ladder training on the speed and agility performance of school-level male throwball players in Sri Lanka.

METHODOLOGY

Subjects

The purpose of this study was to examine the effect of ladder training on agility and speed performance of male throwball players in Sri Lanka. To attain the objective of the study, 30 school-level male players were selected based on purposive sampling technique and participants were participated in the national schools' Western province throwball championship in 2018. All the test procedures, risk factors, benefits, and exercises were explained before the start to conduct the pretest. Team coaches were agreed to include the ladder training program before starting their normal sessions. All participants were in good physical condition throughout the training program.

Procedures

Thirty meters sprint test and agility *t*-test performance were measure before and after intervention the ladder training to assess the speed and agility, respectively. Pre-test and post-

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test and all the training sessions were conducted outdoor. Training program design based on ladder training manual authored by Phelps, 2000. All the tests are conduct based on standardizes in the 101 performance evaluation tests book of Brian Mackenzie, 2008. For each player was instructed to perform a maximal effort during both pre- and post-tests and conduct after 48 h rest and provide the same diet and advice to stop the personal training and exercise. Before starting the test participants were to perform a 15 min dynamic stretching warm-up. Give two attempts from both tests and got the best results for further analysis.

30 m Sprint Test

Instruct participants to start with standing start with their preferred foot in forward, placed on the marked on the floor. With the command “Go” participants start to run and the tester recorded the time while participants break the finishing line. Measure the performance in seconds.

Agility *t*-test

Participants started the test with the command of “Go” given by the tester and by the time start the stopwatch. Participants were run forward to the center cone (cone 01), sidesteps to the right cone (cone 02), and sidestep to the left cone (cone 03) then participants run backward as possible to the finishing line [Figure 1]. Based on Raya *et al.*, 2013, article instructs participants not to touch the cones. Once the participants cross the finishing line stopped the stopwatch and record the time. Time was measurement by seconds.

Training Intervention

After the pre-test, participants started the 8-week agility ladder training. The duration of normal throwball training was 2 h in 3 days per week. After conducting the warm-up started, the ladder training and ladder training session were conducted by the physical instructor. The researcher has supervised all the training sessions of participants to confirm all the exercises are completed in the correct technique. Tables 1 and 2 illustrated the training program with exercises, the number of repetitions, and sets.

Data Analyzing

Scores difference between pre- and post-test results for speed and agility were calculated using paired *t*-test and the significance set at the level of $P \leq 0.05$.

RESULTS AND DISCUSSION

Analysis revealed that there is a significant difference between pre- and post-test of speed and agility performance with $P = 0.000$. Agility *t*-test post-test performance (16.19 ± 15.39) showed a difference from pre-test results (17.55 ± 16.77) while speed test post-test performance (4.29 ± 0.50) showed a difference than pre-test results (5.38 ± 4.95). Table 3

Table 1: Ladder training exercises

Week	Exercise
1 and 2	Ankle skips
	Lateral high knee runs
	Lateral crossover skip
	Zig Zags
3 and 4	Lateral icky shuffle
	2 in 2 out
	Icky shuffle (2 feet in, 1 foot out)
	Icky shuffle backward
5 and 6	Front 2 in 2 out forward
	Zig Zags
	Front 2 in 2 out backward
	One in sprint
7 and 8	One in sprint
	Sprint out
	Zig Zags crossover shuffle forward
	Zig Zags crossover shuffle backward

Source: Author 2020

Table 2: Repetition, sets, and intervals of the ladder training program

Week	Repetition	Sets	Intervals between sets (S)
1	6	1	60
2	5	2	60
3	5	2	60
4	3	4	60
5	3	4	60
6	7	2	60
7	7	2	60
8	8	3	60

Source: Author 2020

Table 3: Mean and standard deviation and *P* values of pre- and post-tests

Variable	Mean±SD		<i>P</i> -value
	Pre	Post	
Speed	5.38±4.95	4.29±0.50	0.000*
Agility	17.55±16.77	16.19±15.39	0.000*

* $P \leq 0.05$. Source: Author 2020

shows the mean and standard deviation values and *P* values rest results.

DISCUSSION

The main findings of this study indicate that 8-week ladder training significantly influences the development of speed and agility performance of school-level male throwball players. Again, a part of this finding is consistent with the

findings of Viswejan, 2017; Kasuma and Kardiawan, 2017; Pramod and Divya, 2019, who found ladder training helps to improve the speed and agility performance. However, researching the effects of training with an agility ladder on sprint, agility, and dribbling performance in youth soccer players Padrón-Cabo *et al.*, 2020, found that the agility ladder does not effective to improve physical fitness of youth soccer players.

CONCLUSION

Based on the results of the data analysis and discussion above, it can be concluded that ladder training affects the speed and agility performance of male throwball players. Hence, it is expected that throwball coaches can implement ladder training in their training sessions.

Recommendations

The researcher recommended that athletes and coaches use specific intervention strategies to improve the players' speed and agility to optimize performance. In the future, the researcher hopes to conduct this research study to national level

throwball players and faith to measure the impact of ladder training on power and coordination performance.

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Research Article

Indian sports in global perspective

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ABSTRACT

Nations spend too little time and money, to prepare the youth for the future, but too much resources and energy to prepare the path for the youth. Sports being essential components of human resource development play an important role in the process of promoting public health, true sportsmanship, and personality development of participants. Thus, excellence in sports enhances a sense of achievement and national pride, providing beneficial recreation, for improving productivity, and fostering social harmony. National Education Policy-2020 encompasses a most important provision for integrating sports with educational curriculum, making it a compulsory subject of learning up to Senior Secondary School level and incorporating the same in the evaluation system for all the students. Hence, a large quantity of participation in sports is expected to improve the quality of university athletes, while throwing-up an adequate amount of trained talent in the national stream, for realization of the full potential of the younger generations of sportspersons of the modern world. The interplay of body and mind is most evident and pronounced in the areas of sports excellence and stress management. However, anxiety and stress are two unavoidable factors in the process of transparent selection; advance training and meaningful participation in intensely contested sporting competitions at all levels. Therefore, the present research paper focused on the impact of scientific support and professional approach on the sporting performance of highly talented and trained athletes in cut-throat National University Games-2020, with a pointed emphasis on the evaluation of existing university sports system, to find-out its strength, weakness, opportunity, and threat, with a view to suggest meaningful modifications, if any, for improving functioning of the existing structure, leading to an enhanced sporting performance of elite athletes, in pursuit of excellence in competitive sports at global events-Olympic Games and World Cups. Now, sport is considered to be a wonder-drug for prevention of many psycho-somatic ills and social evils.

INTRODUCTION

India's participation started in Olympic Games-1900 held at Paris, where only one athlete-Mr. Pritchard participated. This development led to the establishment of Indian Olympic Association in the year-1927, with Sir Dorab Ji Tata as its first President. Till date, India has won only 28 medals in Olympic Games from 1900 to 2016, out of which 11 medals have been in Field Hockey. In the individual events, only 17 medals have been bagged by Indian athletes. Now, it is pertinent to mention that the ranking of India in the Olympic Games-1928 was 23 and has slipped down to 67 at Rio Olympic Games-2016. A multi-dimensional research analysis indicates that India is on the move in many other fields, reflecting a substantial growth

in economic and scientific areas, but it seems to be lagging far behind many other developing countries so far as games and sports are concerned. Recently, our national sporting contingent could not make their presence felt at Olympic Games-2016 and India's run in the global competitions touched a new low in general and a disaster in the discipline of hockey in particular, as our team failed to qualify for the semifinal stage. Hence, Indian sports are passing through its worst phase at the moment.

The dismal performance of top Indian athletes at Rio Olympic Games-2016 invited a sharp criticism both from the public and parliament of India. Further, after nation-wide serious deliberations on various causes, issues, and reasons of poor performance, the Government of India constituted an Olympic Task Force to examine and suggest ways and means to enhance the standard of sporting performance of Indian sportspersons in Olympic Games from 2020 to 2028. The panel of experts suggested promoting the culture of excellence in competitive

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sports at the grass-roots level, especially in schools, with twin objectives to broad-base sports at all levels and achieves excellence at international competitions. For this purpose, a long term development plan was prepared, by the experts, with a focus on developing a wider base of sporting culture in the education sector, for effective implementation by the National Sports Federations and Indian Olympic Association. Therefore, Sports Authority of India (SAI) will continue to provide all the required facilities, appointment of foreign coaches, sporting infrastructure, logistics and technical support for fair selection, advance training, competitive exposure, meaningful participation, and critical evaluation of performance of the talented and scientifically trained superior athletes.

Purpose

The central government seeks to project India as a leading-edge, strong and vibrant sporting nation in the world of sporting excellence, within the next decade with the conviction that promoting a nation-wide, all embracing basic sporting culture is not only desirable in itself, but also critical to secure an accelerated, inclusive and sustainable economic growth. Consequently, a balanced, complete, equitable and wide-spread financial investment through public-private-partnership in sports appears to be a light at end of a dark tunnel, leading to building-up an adequate stock of human capital. Today, public health is a prime concern, with a view to secure adequate investment by developing nations, including India with its over population, rising pollution and extreme poverty, especially in rural areas, to survive and succeed in rapidly changing and highly challenging times. Over the years, it is observed with a serious concern that frequent incidents of drug abuse, by the potential athletes, for pursuing excellence in competitive sports have increasingly assumed alarming proportions all-over India, with deadly side-effects on the human health and performance.

The performance enhancing banned drugs are no longer restricted to the high-stake world of commercial and professional sports. Ministry of Youth Affairs and Sports has already launched a campaign against “Doping in Sports” and also established National Anti-Doping Agency (NADA), with a mandate to take all educative and preventive measures to eradicate the menace of drug abuse in competitive sports at all levels, in collaboration with National Sports Federations and Indian Olympic Association. Further, alarmed by the present dangerous trend of doping in games and sports, the NADA expressed its serious concern over the growing threat of doping to Indian sports. Therefore, certain effective, innovative, preventive, and scientific steps are of paramount importance, for tackling the disaster of banned drugs, with dangerous effects on human body, mind and spirit. The main thrust of the scheme is to make Indian sports totally drug free, through scientific advanced training and meaningful participation at all levels,

so as to enable the potential athletes to rise to the challenge of intensely contested sporting championships to the best of their abilities.

Hypotheses

Based on the detailed review of the related literature to pursuit of excellence in modern sports, the following hypotheses have been proposed, for conduct of the research study:

- The scientific support combined with professional approach may be effective in enhancing the performance of superior athletes during training and tournaments
- The psychological preparation may be helpful in reducing the competitive anxiety and stress level of the potential sportspersons, over a considerable period of time.
- A significant improvement in the overall performance of the potential performers, undergoing scientific training along with professional approach might take place.
- The out-come of a critical analysis of existing university sports in the country may pin-point grey areas, if any, to be plugged for immediate improvement in results.
- A well-designed and well-developed road-map of university sports may go a long way in broad-basing the sports culture in India, for achieving excellence at global level.

Objectives

It is observed that there is no dearth of natural potential in India, for pursuing excellence in competitive sports at international events. Hence, Indian sports are poised to bloom at all levels, if the essential scientific support, coupled with professional approach is provided to talented athletes in the process of selection, training, participation, and evaluation, especially at the grass-roots level, to translate the ultimate dream of winning “Gold in Olympics” into a ground reality, with a focus on the following objectives of the study:

- To develop a cadre of high quality sports scientists, with a view to inspire them to take-up research projects in competitive sports, especially in stress management.
- To utilize Indian sporting icons, who have universal appeal to inspire potential youth, to take-up sports as a lucrative career, for achieving a predefined target of results.
- To convert highly talented performers into world-beaters, by nurturing their basic potential based on scientific and professional approach, with a long-term action plan.
- To prepare a detailed road-map to educate and sensitize elite athletes, to refrain from using banned drugs for enhancing their sporting performance by unfair means.
- To pursue the case of integrating Physical Education, Sports Science, and Sports Excellence with education, as an integral part of curriculum up to Sr. Secondary level.
- To incentivize high performance of prominent sportspersons, coaches, trainers, and sports scientists in proportion to their achievements, in the pursuit of a defined goal.

- To establish sports academies and centers of excellence in education sector-schools, colleges and universities for specialized training and result-oriented desired results.
- To take into account genetic and geographical factors within India, while preparing an action plan, with effective implementation and objective evaluation of the projects.
- To realize the ultimate dream of winning a respectable number of medals in Olympic Games, which are war-like situations, wherein the mind power plays a deciding role.
- To encourage the corporate sector, for ensuring an adequate amount of financial investment in the process of promoting the culture of excellence in the youth sports.

Scope

A diagnostic and exploratory study was conducted, by applying a descriptive survey method, covering the full length and breadth of India, with a view to analyze internal and external factors of governance that can have deep impact on the organization of National University Games-2020 and performance of the potential participants. Accordingly, a systematic procedure was applied, with a view to develop a better understanding of the format and pattern of organization of National University Games-2020. Therefore, following Thrust Areas have been taken into account for successful conduct of the present research study:

- The process of decision-making for proper planning, effective implementation and objective evaluation of performance of the project, by experts, and professionals.
- Functional autonomy and financial accountability, for promoting the culture of excellence, for achieving an incredible podium finish at the Olympic Games-2028.
- Public-private-partnership as a solution to ensure an attractive perks-based high performance from highly talented university athletes, in a stipulated time-span.
- The format of funding for the conduct of National University Games and selection of competent officials and support staff, to ensure impartial and unbiased judgment.
- Application of scientific approach for developing India as a sporting nation, inspiring the youth to adopt an active and healthy lifestyle, for the holistic development of all.

Therefore, the strength of a sporting nation in the domain of competitive sports heavily depends on sound public health, quality of the task-force that is entrusted with responsibility of handling policies for promoting excellence in competitive sports at all levels.

Present Scenario

After the debacle at Rio Olympics-2016, Indian top sports management passed through a very crucial phase, when the central government faced extraordinary pressure from the opposition in the Parliament, suggesting to make existing sports system more accessible, accountable, affordable, meaningful, spectacular and transparent in the process of planning,

execution and evaluation, etc. Further, expert opinion pointed-out that there was a lack of effective monitoring mechanism in the existing sports system, to check and ensure that hard earned money of tax-payers shall not go down the drain; rather, it must be fully utilized for promotion of sporting excellence in the country. Otherwise, Indian sports will continue to be a serious victim of mismanagement by the non-technical people at the helm of affairs in the National Sports Federations (NSFs) and Sports Authority of India (SAI).

Olympic Task Force was of the opinion that most of the bosses of National Sports Federations treat and use these platforms as their personal fiefdoms, for fulfillment of their vested interests at the cost of public money and national prestige. After every 4 years, there is a hue and cry in the public and parliament on the issue of dismal performance of Indian contingent in the Olympic Games. As usual, a committee is constituted to find out the ways and means to improve the standard of Indian sports in the near future. Consequently, based on the recommendations of a hand-picked enquiry committee, some athletes and support staff are removed or sacked, as the case may be. On the other hand, administrators of National Sports Federations and Sports Authority of India had been reluctant to change their attitude towards negligence of their basic duties and passed the buck on others, making someone else a scapegoat for their own failures and poor-performance of India.

Global Trends

Based on its significant contribution in throwing-up adequate talent in the national stream, university sports are not only a life-line but also a nerve-center of a nation's spectacular achievements at global sporting events such as Olympic Games and other World Championships. In the modern era, Olympic Games are considered to be the epitome of hard work and sacrifices, making the talented athletes to undergo a test of fire during selection process and advance training, before actual participation in a highly charged environment of competitions, wherein winning at any cost remain the ultimate goal of participants. As a result, superior sportspersons, support staff, and specialized trainers tend to be in the midst of a revolution of rising expectations of all the stake-holders.

For this purpose, natural talent is identified at an appropriate age in schools, for all-round development of the athletes, followed by advanced training of the gifted sportspersons at college and university level with a scientific support and professional approach, before actual participation in World University Games. As a matter of fact, most sporting nations treat participation in the mega event of World University Games as a process of preparing elite athletes, with high potential for projecting them in future Olympic Games, as an integral part of their pursuit of excellence. Nowadays, state funding for promoting the culture of excellence in sports is found to be inadequate. Thus, a few sports with special

appeal and features have been included in National University Games-2020, to design, develop and deliver desired results, by the experts so as to create a commercial value in the mind of spectators, for fund raising to survive and succeed in the world of sports.

Action Plan

A new scheme of Target Olympic Podium (TOP) was launched, with a complete package of selection, training, exposure, participation, and evaluation of sporting performance of potential athletes in the Olympic Games-2020. The Tokyo Olympic Games were postponed due to COVID-19 pandemic worldwide. Therefore, sports being a great source of inspiration and perspiration have been taken-up, with a serious concern, for displaying unity and diversity of India, for improving national productivity and fostering social harmony.

A larger public opinion reveals that expenditure on promotion and successful conduct of sporting competitions, is considered to be an appropriate investment, with an assured return, in the form of developing active, healthy and productive lifestyle among the people of all ages, especially the youth on the top priority basis, with a view to project India as a fit and sporting nation in the world, to reduce the expenditure on the public health care.

The implementation of the National Sports Policy is not complete and leaves much to be desired. The goals and objectives laid down in National Sports Policy are yet to be substantially realized in all respects. Thus, games and sports in which India has potential and strength, with competitive advantage is being pursued vigorously at all levels. A high priority deserved to be accorded to integrate science with sports skillfully, while following a long-term development plan, based on professional approach, for raising the standard of Indian sports at international level. The main emphasis of the action plan seeks to develop the culture of active and healthy lifestyle among the younger generations, with a joy of shared struggle and a feeling of team-work, leading to a well-deserved sporting success. Therefore, important aspects of a well-designed action plan have been given below:

- Developing India as a sporting nation on the priority basis, in a short span of time.
- Promoting the culture of sports science in institutions of higher education in India.
- Creating an enabling environment for eradication of drug abuse in university sport.
- Providing secured living conditions to women athletes to avoid sexual harassment.
- Pursuing India's quest for Olympic Gold, by a scientific and professional approach.

Target Group

The young sportspersons selected on the basis of their meritorious performance during Inter University Zonal

Tournaments: 2019-20 were eligible to participate in National University Games from February 22, 2020, to March 2, 2020, held at Bhubaneswar (Odisha). Association of Indian Universities, in collaboration with Sports Authority of India and Indian Olympic Association organized the mega event successfully. The aim of the scheme is to select, train and project the gifted athletes at international level sporting events, based on the scientific support and professional approach, under close observation of the experts and professionals. Only 150 universities representing 17 disciplines of priority sports, with a total number of 3400 talented sports persons participated in National University Games-2020.

The age group of participants is between 21 and 25 years. The participating universities securing first ten positions in National University Games, along with their ranking and medal tally including Gold, Silver, Bronze with total have been presented in Table 1, with a view to demonstrate the development of much needed sporting culture in different parts of India. A panel of qualified and competent experts worked relentlessly, to select and supervise superior sportspersons, with high potential during advance training and competitions, on the basis of scientific principles and professional approach, at various centers of excellence established in various member universities, AIU, sponsored by the Government of India.

Considering the significance of games and sports in the process of promoting public health, national development and national pride in the younger generation, the Ministry of Youth Affairs and Sports approved a special scheme for development of youth sports, for its effective implementation with twin national objectives of broad-basing sports and achieving excellence at international level events. Accordingly, based on outstanding performance during National University Games-2020, a comprehensive list of top 10 universities, with all-round team championship, ranking and total medals have been presented in Table 1.

Table 1: Top 10 Universities showing their total merit, team performance, and ranking, etc.

Rank	University	Gold	Silver	Bronze	Total
1 st	Panjab University	17	18	10	45
2 nd	SPU, Pune	17	11	09	37
3 rd	Punjabi, Patiala	12	06	14	32
4 th	MDU, Rohtak	11	11	11	33
5 th	Mangalore Uny	09	07	09	25
6 th	LPU, Jalandhar	09	06	08	23
7 th	Jain University	08	05	02	15
8 th	GNDU, Amritsar	07	06	12	25
9 th	Madras University	06	09	10	25
10 th	Delhi University	02	05	13	20

METHODOLOGY

A public opinion survey was conducted on 256 top-class athletes, who secured 1st and 2nd positions during National University Games-2020, for the conduct of the present study. Further, a specially designed and standardized questionnaire, based on SWOT analysis was applied, to collect the data on the spot at the venue of competitions. The marking and scoring of points was done with the help of a three-point scale developed and validated, with the guidance of three experts, who had adequate professional experience in the field. Therefore, data were tabulated for its processing according to the established procedures.

In view of the present study, SWOT analysis was considered to be one of the best known of all theoretical frame-works in the field of professional management, especially sports management. On the perusal of review of the related literature, it is observed SWOT analysis has been extensively used more than any other piece of management theory, for an effective diagnosis and prognosis of an organization or system, indicating strength, weakness, opportunity and threat in a specific time-line. Hence, the use of SWOT analysis was preferred in the conduct of the research study, to know the efficacy of youth sports.

Data Collection

The data were collected by administering a SWOT analysis test on the respondents, in the form of answers given by the subjects, in response to various items or questions of a self-designed questionnaire. After the period of 30 min, all the completed questionnaires were collected from the subjects and a standard procedure was applied for accurate scoring. The subjects were divided into two major categories such as High Performers (Winners) and Moderate Performers (Runners-up), based on their performance during National University Games. In other words, winners and runners-up in an event or game of his or her genetic ability and personal choice, based on environmental interest.

Statistical Procedure

After scoring the responses of subjects, the data were organized in tabular form, strictly in accordance with established procedure of the test. Therefore, to compare, find-out and measure the effect of scientific support and professional approach on the sporting performance of winners and runners-up during their selection on merit, advance training and meaningful participation in National University Games, the data were analyzed by applying t-test and the results are presented in Tables 2 and 3, respectively.

RESULTS

The analysis of the data established that there was a sound correlation between high performance and scientific support,

Table 2: Mean, SD and t-ratio showing difference between Winners and Runners-up

Variables	Winners-128		Runners-up-128		t-value
	Mean	SD	Mean	SD	
Sp. Psychology	5.55	1.79	5.30	1.80	1.20
Sp. Physiology	3.59	1.54	3.53	1.61	0.32
Phy. Therapy	5.88	1.92	5.34	1.68	2.85
Sp. Biomech	2.65	1.27	3.01	1.30	2.24
Sp. Nutrition	17.77	2.65	17.18	1.80	2.12

Table 3: Mean, SD, and t-ratio indicating difference between winners and runners-up

Variables	Winners-128		Runners-up		t-value
	Mean	SD	Mean	SD	
Strength	6.28	1.42	5.69	1.40	1.68
Weakness	4.22	1.40	3.19	1.41	2.94
Opportunity	7.13	1.24	6.41	2.20	1.61
Threat	2.25	0.91	2.88	1.46	0.10

which was provided to superior athletes regularly, in the process of fair selection, advance training, and goal-oriented performance in highly competitive sporting events and championships. On the other hand, moderate performers could not utilize scientific support and professional approach, to the optimal extent during the process of selection and specialized training before actual participation in extremely tough sporting championships, posing a higher degree of anxiety, fear, and stress.

Further, analysis of variance carried out on the test scores clearly reflected that there was a significant difference between performance of Winners and Runners-up, on account of proper planning and efficient execution, with a scientific support and professional approach extended to the aspiring talents, picked-up for final selection, high-intensity training followed by meaningful participation, with an emphasis on high athletic performance.

Further, the SWOT analysis carried out on the test scores demonstrated that winners possessed an adequate amount of strength (both physical and psychological), with ample opportunities to strain and train themselves to participate in intensely contested sporting competitions, against superior athletes in advance training and competitive exposure.

Further, runners-up reflected weakness (both psychological and technical), with an intense perceived threat from the superior opponents during tough sporting matches, and posing higher levels of competitive anxiety and stress. Hence, runners-up players lost mental concentration and physical rhythm, leading to their suboptimal sporting performance.

DISCUSSION

The primary out-come of the present study significantly demonstrated that scientific support and professional approach, provided to the potential performers during the process of selection, training, and actual participation in cut-throat competitions proved to be quite effective, for raising the standard of their performance. Further, physio-therapy along with deep meditation also reduced anxiety and stress of sportspersons to a greater extent, enabling them to perform creditably well in extremely stressful sporting environments.

The findings of this investigation also revealed a marked difference in the confidence level between high performers and moderate performers, while competing in the championships, with a higher degree of difficulty. Hence, sporting performance of high performers may be possible, because of strong commitment and higher level of consistency in approach, as an integral part of their holistically developed personality including body, mind, and spirit.

The results of critical analysis reflected that there was a lack of adequate sporting infrastructure, basic facilities, and lucrative incentives in the education sector-schools, colleges and universities for attracting and motivating potential sportspersons, to take-up sports in a big way, ensuring that a good livelihood and security of the gifted athletes is maintained, with a purpose to lead respectable life, after an active playing career is over.

The review of scientific research pointed-out a glaring weakness in the supervision of advanced training of elite athletes, along with a lingering threat of financial insecurity for administrators at the helm of affairs, for survival and success in an intensely competitive and professional environment. Hence, high quality potential of young athletes could not be developed to the fullest, making university sports a vulnerable foundation of Indian sports.

CONCLUSIONS

Based on the investigation of Indian sports system, genetic endowment and training methods, it could be safely concluded that holistic development of elite athletes such as power, speed, strength, and tactics remains a prime concern and a mantra of modern sports, to perform creditably well at world's greatest sporting spectacles-Olympic Games and World Cups. The following conclusions have been drawn for effective implementation:

- A weak and vulnerable Indian sports system revealed that there is absence of specialized manpower, lack of financial resources, and effective monitoring system.
- India failed to produce world-beaters to win a respectable

number of medals at global athletic championships, due to lack of planning and poor implementation.

- A public survey confirmed that India has all the adequate resources required to be a healthy and sporting nation in a decade, if the government is prepared to act fast.
- The lack of political will and professional approach in the process of developing sporting culture at grass-roots level is reflected in the form of dismal performance.
- Based on the expert opinion, it may be concluded that marketing of sports is the sustainable solution to glamourize and revolutionize promotion of sports for youth.
- Top performing national athletes truly deserve encouraging accolades for guiding and spear-heading the nation to a remarkable sporting success at international events.
- It is noted with serious concern that many prominent educational institutions are considering to wind-up the process of promoting sports for want of adequate funds.
- Several studies confirmed that Indian population is genetically inclined towards cardiac ailments to a greater extent, due to inactive lifestyle and poor eating habits.
- Over the years, it is noticed that human performance has gone through a full circle of evolution and revolution in every walk of life, including pursuit of excellence in sport.
- If one looks at the Indian sports system, there is a serious flaw of policy-paralysis in the process of its formulation and implementation, leading to a poor performance.
- With the passage of time, it is noticed that the United Nations Organization (UNO) recognized the significance of sports in development, peace and social harmony etc.
- High performance sports need to be planned in such a way that elite athletes should be enjoying the activities and satisfying themselves to the best of their capabilities.
- Recently, a survey of the World Health Organization has demonstrated that one in every four persons, especially the youth, is over-stressed due to COVID-19 pandemic.
- A successful pursuit of excellence heavily depends on a fine process of blending science with sports, enabling top sportspersons to undergo a test of fire in training.

Recommendations

Sports play an important role in the development of an integrated personality of the youth. Therefore, it is considered to be vital tool to channelize youthful energy into constructive and productive directions, as a nation building process for achieving higher performance:

- In the developed sporting nations, youth sports are considered to be the back-bone, life-line and nerve-center of their remarkable achievements at international events. Accordingly, a long-term development plan needs to be designed, developed and implemented in its true spirit, by a panel of experts for delivering the desired results.
- National Education Policy-2020 has given sports its due place as an integral part of education, to be evaluated for

the final grades and marks of all the students. Thus, the youth is expected to take-up games and sports as a serious and lucrative profession, for winning a respectable number of medals in the Olympic Games: 2028.

- The Sports Ministry sanctioned a budget of Rs.1303.21 core only, for the year: 2017-18, for promotion of sports in India. As per the Census-2011, the population of India was 121 core only. The Central Government spent around 3 paisa only per day, per head for training, participation, and exposure before international competitions.
- Sports being a practical education needs to be implemented effectively at all levels, for holistic development of human resources, based on scientific support and professional approach, with a view to create more job opportunities for the potential and performing young sportspersons in various Departments and Ministries of India.
- In the modern era of sporting excellence, an elite athlete needs to possess a fine combination of sharp mind, strong muscles, instinct, skills, tactics, etc., to make his or her presence felt in the world of competitive sports. Thus, after undergoing a long period of high-intensity training, a top-class athlete is expected to perform well.
- The specific advanced training is a scientific process to replicate exactly what occurs in intensely contested sporting matches. Consequently, hard training of talented athletes is similar to a test of fire that makes fine steel, enabling the gifted elite athlete to rise to the highest possible level of performance, in pursuit of excellence.
- The expert opinion based on several research studies revealed that a strong immune system of sportspersons plays a vital role in the process of adaptation to high loading during specialized training, competitive exposure and meaningful participation at international level sporting competitions-Olympic Games and World Championships.
- India is on the verge of creating a sustainable landmark in pursuit of excellence, by equating academic excellence with sporting excellence, with an aim to add value to the profession of Physical Education and Sports Science in

the country. The major thrust of the Central Government should be on the development of infrastructures.

- The International Olympic Committee (IOC) and World Health Organization (WHO) signed an MOU on May 16, 2020, to promote public health and save human lives, through regular participation in games and sports. Therefore, people at all ages need to be encouraged and inspired to adopt an active, healthy, and productive lifestyles.
- Sports is a wonderful medium for providing a sense of purpose, with a continuous challenge and struggle for success, as well as a range of emotions and intensity that is very difficult to experience elsewhere. The greatest barriers in pursuit of sporting excellence can be psychological in nature that top athletes impose upon themselves.
- The youth being a great human resource have the potential to lead the nations in all sectors worldwide. However, the younger generations feel a great satisfaction from their own experience of becoming competent and meeting challenges in life. Now, the need of the hour is to empower them with appropriate professional training, etc.
- The young people are of the firm opinion that the threat from rogue non-technical heads of the National Sports Federations is too serious an issue to be left for the existing Indian sports system to deal with. Over the years, reforms for promoting sports had been put on the back burner by successive governments, with a purpose.
- For Indian sports system to gain momentum, major changes are required-more money, professional approach, scientific support, high quality training to attract really talented athletes and trained officials, for effective management of competitive sports at all levels, so as to achieve sporting excellence in the Olympic Games-2028.
- Education of elite athletes plays a key role in the process of adaptation to the higher degree of training load and fast changing environment. The background of many Indian sportspersons reflects that they emerge from small villages, whenever they are trained under foreign coaches, they cannot grasp the tactics of modern sports.



Research Article

Investigation stress level among university students

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ABSTRACT

The objective of the research was to see if stress was more manageable for university students compared to other university students. The investigation concentrated on the mental aspects of stress, namely, stress management. To meet the goal of the study 80 students volunteered to participate from the universities of Kuvempu and Davanagere, Karnataka who were taking bped courses were utilized as students or sample. Simple random approach. The researcher had developed a stress management questionnaire that was utilized to collect data. A statistically relevant portion of the data was computed as a percentage. Study results show that students are no better off with respect to stress management. It was concluded bped students at Davanagere lack the ability to manage stress because there is no substantial difference between Davanagere University and Kuvempu University. Students from Davanagere University did better in stress management, compared to the Kuvempu University students.

Keywords: Stress, Strategy, Loneliness and depression

INTRODUCTION

Modern life is full of stress, and it is common due to lots of stresses. The modern world which is said to be the world of achievements is also a world of stress. It is inevitable in human life. It has becoming a major issue as everyone feels stress, from birth to the last breath, every individual is unavoidably exposed to various stressful situations. Every event in the daily life causes some degree of stress and it is very difficult to eliminate stress totally from one's life. Majority it is due to the problems of health, the medical practitioners opine that 50–70% of physical and psychological illness is attributable to stress.

STATEMENT OF PROBLEMS

The primary goal of the research was to evaluate the stress levels of Kuvempu University and Davanagere University B.P.Ed students.

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METHODOLOGY

The questionnaire was formed with a view to make a comprehensive study of the B.P. Ed Institution has been taken include most important factors that may have directly or indirectly influences the stress management of Kuvempu University and Davanagere University B.P. Ed students.

The investigator collected the data from Kuvempu University and Davanagere University B.P. Ed students' institutions there were subjects selected by purposive random techniques out of 80 B.P. Ed students.

ANALYSIS AND INTERPRETATION OF DATA

Survey includes collecting inner expressions of respondents for the purpose of knowing their attitude toward particular aspects of subjects. The purpose of conducting the survey is to obtain the opinion of the Kuvempu University and Davanagere University students. For the purpose of the survey, questionnaire has been prepared and administered 80 respondents. The survey has been successfully carried out

and the respondents gave good and realistic answer to the questions. The information collected from the respondents is tabulated, processed, and analyzed to get some meaningful inferences. The details analysis of data collected during survey and presented. The data were analyzed using sample percentage in repute of response [Table 1].

It can be interpreted that majority of the respondents are felt great and satisfied opinion about institution. Hence, it can be perceived that the respondents are happy with the department [Tables 2-4].

It can be interpreted that majority of the respondents are not felt any stress from classroom. Hence, it can be perceived that the respondents are happy with the department [Tables 5].

Positive

Positive stress is very important in a career to improve personality and achieve the higher goals such as good

Table 1: Respondents opinion about the institutions

	Ku	(%)	Dvg	(%)
Great	10	25.00	25	62.50
Satisfied	25	62.50	10	25.00
Depressed	5	12.50	0	00.00
Frustrated	0	0.00	5	12.50
Total	40	100.00	40	100.00

Table 2: Respondents opinion toward stress are related to

	Ku	(%)	Dvg	(%)
Exam	14	35	17	42.50
Communication	06	15	10	25
Assignments	05	12.50	05	12.50
Seminars	10	25	00	00
Teaching environment	05	12.50	08	20
Total	40	100	40	100

Table 3: Respondents opinion toward themselves

	Ku	(%)	Dvg	(%)
Sleeping too much or too little	09	38	08	36
Inability to take decision or concentrate	07	14	05	10
Short tempered Eating too much or too little	00	00	00	00
Headache	09	38	15	30
Anxiety	00	00	06	12
Loneliness	00	00	00	00
Depression	09	38	00	00
Nervousness	07	14	06	12
Total	40	100	40	100

performance, increase knowledge, take new challenges, learn new subject, and know institution behavior. From the above Table 4-7, it can be clearly interpreted that positive stress is created by desirable and successful effects. It is a positive, healthy, and developmental response. Some level of stress may be led to better performance and a more adjusted personality.

Negative

Negative stress plays significant role in life that it reduces the ability of persons and it affects to personality growth. The above Table 8 shows that causes of negative stress to Kuvempu University students are lack of preparation for class, and no time to do personal work, etc. As far as Davanagere University students are concerned, the causes for negative stress are Indiscipline in the class room, Decreased commitment to work, Academic failure, Absenteeism, Increased complaints, Attending class late, etc.

The above Table 9 shows whether the Kuvempu University and Davanagere University students arousing any strategy to overcome from stress. 23 Ku and 24 Dvg students are using strategies to overcome the negative stress and remaining 17 Ku and 16dvg students not used any strategy.

Table 4: Respondents opinion toward classroom as stressor

	KU	%	DVG	%
Yes	08	32	08	32
No	32	64	32	64
Total	40	100	40	100

Source: Survey

Table 5: Respondents Opinion toward stressful seems to you

	Ku	(%)	Dvg	(%)
Vast subjects	05	10	07	14
Exams jitters and revision	00	00	00	00
Lack of communication	00	00	09	38
Separation from home	07	14	00	00
Complexity of materials	00	00	00	00
Change in sleeping habit	00	00	00	00
Demand for excellence	05	10	04	08
Arguments with others	13	26	06	12
Fear of academic pressure	00	00	00	00
Elected to leadership position	06	12	14	28
Relationship with partner, family, and friends	04	08	00	00
Feeling and mismatch between myself and others	00	00	00	00
Total	40	100	40	100

Table 6: Respondents Opinion toward consequences of stress to you

	Respondent			
	Ku	(%)	Dvg	(%)
Depression	08	16	07	14
Bad tempered	00	00	00	00
Unhappy	06	12	09	38
Headaches	00	00	00	00
Back pain	00	00	00	00
Irritation	06	12	06	24
Tired	00	00	00	00
Indiscipline	05	10	00	00
Mind upset	00	00	00	00
Loneliness	07	14	04	08
Absenteeism	00	00	00	00
Bad decision	00	00	14	28
Anger	07	14	00	00
Difficult to concentrate	00	00	00	00
Decreased my performance	00	00	00	00
Total	40	100	40	100

Table 7: Respondents opinion towards positive stress

	Respondent			
	Ku	(%)	Dvg	(%)
Positive stress				
Good performance	12	30	18	45
Increased my knowledge	07	17	08	20
Take new challenges	13	32	07	17
Accomplish task within a specified time	00	00	00	00
Career development	00	00	03	7.5
Know institution behavior	04	10	00	00
Learn new subjects	04	10	04	10
Good academic achievement	00	00	00	00
Total	40	100	40	100

It can interpret that majority of Kuvempu University and Davanagere University students were not using any strategies to overcome stress. There are many strategies available to overcome from stress. If they properly used, then they can come out of stress and convert negative stress to positive stress.

It is that majority of respondents are opine that average effective, so institute continue this program for the Kuvempu University and Davanagere University students live a normal life.

It is interpreted that the more respondent says yes, it shows that institution has to play an important role in enabling the students to overcome their stress.

Table 8: Respondents opinion toward negative stress

	Respondent			
	Ku	(%)	Dvg	(%)
Negative stress				
Indiscipline in the class room	03	7.50	06	15
Effective carrier development	00	00	13	32.5
Decreased commitment to work	09	22.50	05	12.5
Asking unnecessary questions	00	00	00	00
Academic failure	08	20	05	12.5
Absenteeism	04	10	04	10
Increased complaints	04	10	00	00
Attending class late	06	15	00	00
Poor communication	06	15	07	17
Total	40	100	40	100

Table 9: Respondents opinion toward strategies to overcome from stress

	Respondents			
	Ku	%	Dvg	%
Yes	23	57	24	60
No	17	42	16	40
Total	40	100	40	100

Table 10: Respondents opinion toward effectiveness of institution activities to overcome stress

	Respondents			
	Ku	%	Dvg	%
Slightly effective	00	00	00	00
Average effective	20	50	25	62.5
Good	06	15	05	12.5
Excellent	05	12.5	06	15
Not effective	09	22.5	04	10
Total	40	100	40	100

It is interpreting that majority of respondents like sports, it showing the organization not support to sport activity. According to researcher, other activities are all beautiful in the organization.

SUMMARY AND CONCLUSION

The results of the survey show that the respondents know much about stress management. These are some of the findings below:

- The primary source of stress for teachers is their work environment. In addition, other contributing factors include severe workload, and inadequate compensation.

Table 11: Respondents opinion toward institution help to overcome stress

	KU	%	DVG	%
Yes	19	47.5	31	77.5
No	21	52.5	09	22.5
Total	40	100	40	100

Table 12: Respondents opinion toward implementation of institution activities to overcome stress

Activities	Respondents			
	Ku	%	Dvg	%
Sports	26	65	30	75
Proper facility	04	10	00	00
Proper description of roles	07	17	07	17
Proper planning	03	7.5	03	7.5
Total	40	100	40	100

- Besides the new teaching and examination environment, including CBCS, additional assignments, seminars, and fear of examinations, students are a significant cause of stress.
- The vast majority of the teacher's stress is unpleasant, causing them to suffer from headaches, sadness, poor concentration, restlessness, and a loss in productivity
- Except for in the students, the outcomes are nearly same. The pupils are becoming bored, and their performance is dropping as a result.
- When the stress level was low and when it was positive, both teachers and students were encouraged to work harder to get higher results.
- Conversely, negative stress impeded both pupils and teachers' overall performance.
- Many techniques and strategies are being utilized by instructors and students alike in order to cope with coping strategies.
- To assist both teachers and pupils, an institution is forming a group of programmers. These programs are as stated by the respondents to be beneficial in handling stress.
- For the teachers and pupils, the tactics they have chosen and implemented have helped them both mentally and physically overcome difficulties, increased their confidence, and strengthened their energy, allowing them to forget their difficulty, focus on their task, and so on.

CONCLUSION

Positive stress is favorable and is said to enhance energy and motivation. However, negative stress is life-threatening. Stress is associated with several mental and physical

conditions, including depression, anxiety, heart attacks, stroke, hypertension, infections, autoimmune diseases, and a variety of viral illnesses such as the common cold, herpes, some malignancies, and rheumatoid arthritis. Other skin issues may also result from stress, including rashes, hives, and a dermatitis, as well as issues with the gastrointestinal system, including GERD, peptic ulcers, irritable bowel syndrome, and ulcerative colitis [Tables 10-12].

Breakdown of bodily and mental system it is a difficult, intricate problem and can be controlled with multiple strategies such as meditation, yoga, and listening to music. However, it is critical to identify the stress and use approaches that specifically deal with it to relieve it. Undisciplined, it can also impact the institution as a whole. Thus, both the individual and the institution must focus on stress management and stress-reduction measures.

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Research Article

Investigating the status of management information systems in sports and youth departments of Ardabil Province

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ABSTRACT

The purpose of this study is to investigate the status of management information systems (MISs) in sports and youth departments of Ardabil Province. The present research is descriptive-analytical due to the purpose of the applied type and in terms of the type of research data collection, which has been conducted by field method. The statistical population of this study was all managers, deputies and experts of sports and youth departments of Ardabil province, that 48 people were selected as the statistical sample of the study using Morgan table and random sampling. The measurement tool was Eidi *et al.*'s (2014) questionnaire with a reliability of 0.86. Univariate Chi-square test was used to analyze the data and Friedman test was used for ranking. The results show that the ranking of the group of obstacles to the implementation of MISs in sports and youth departments of Ardabil Province is as follows: (1) Cultural barriers, (2) environmental barriers, (3) educational barriers, (4) individual barriers, (5) barriers to change management, (6) technical barriers, (7) managerial barriers (8) economic barriers, and (9) structural barriers.

Keywords: Barriers, Management Information System, Sports and Youth Organization, Technology.

INTRODUCTION

An information system is a set of interrelated elements that collect, manipulate, and distribute data and information and provide feedback on achieving a goal.^[1] Among the most important information systems, we can mention: (1) Transaction process system; (2) Management information system (MIS); and (3) decision supply system. Among these, the role of MIS is very important.^[2]

MISs use the outputs of the transaction processing system as input. In general, in transaction processing systems, simple calculations are used to make decisions at lower levels of

the organization, and this output is used as input to MISs.^[3] In fact, MIS is a system that collects environmental data and records data of exchanges and organizational operations and then filters, organizes, and selects them and presents them as information to managers. And provides a tool for managers to generate the information they need^[4] and use them in performing organizational tasks efficiently and effectively to achieve organizational goals, increase productivity, increase competitiveness, and maintain sustainable competitive advantages.^[5]

The role of MIS is very important in today's business environment because it has evolved over time and has become an integral part of its business activities. The use of MIS has increased not only by companies organizations but also by individuals and even governments in the last few years. Due to today's global conditions where competition is high, this is the basic need of the organization to install MIS to compete in

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the market and gain more profitability, invest in innovation in its products and business growth.^[6] The importance of paying attention to the MIS is that 80% of an executive manager's daily time is spent receiving, exchanging, and using information in a wide range of tasks. Despite all the management tasks, planning is the most fundamental of them and, like a bridge, connects the present to the future. In developing countries, the lack of basic information in various fields and the inadequacy of statistics cause problems in qualitative and quantitative planning. The inadequacy of statistics and information intensifies to the point that planning with the simplest models faces difficulties.^[7] Given the important role of the information system for management and organizational planning and decision making, many organizations worldwide have made extensive investments in the field of MIS.

Kirado (2020) in a study examined the role of MISs in the management decision-making process and concluded that MIS processes that flow through computer data and integrate with other processes could provide information in a faster and more efficient way to support decision-making and other administrative tasks. Therefore, with the best possible coordination of these technologies, it is possible to achieve the highest quality decision-making at all levels of management from the highest to the lowest level.^[1] Zardoshtian *et al.* (2017) in a study examined the some obstacles in using information technology for youth and sports offices in Ardabil Province. The results of the research showed that cultural-educational obstacles, individual obstacles, technical obstacles, organizational management and planning obstacles and economical obstacles, respectively, have the most effect on using IT in youth and sport offices in Ardabil.^[8] Holding meetings, attracting experts of sport management with full knowledge about using IT and encourage personals to learn and use information technology are some strategies to improve information technology in youth and sport offices level in Ardabil. Avan (2016) in a study examined the impact of MIS on organizational performance (profitability, innovation, and growth). The purpose of this study was to show how the MIS has a positive effect on organizational performance and how to increase profitability, innovation, and organizational growth. The results showed that there is a positive relationship between the performance of the organization and the MIS.^[6] Chang (2007) concluded in a study that the use of information technology is directly related to the interaction between team function and when the organizational structure is very decentralized and low formality, the interaction between team function is very desirable.^[9] Eidi *et al.* (2014) in a study aimed at identifying the existing obstacles to the design, establishment and use of MIS in the General Directorate of Sports and Youth of Kermanshah province. They conclude that there are nine factors as barriers to the establishment and use of MISs, including managerial barriers, environmental barriers,

technical barriers, educational barriers, economic barriers, structural barriers, cultural barriers, individual barriers, and change management barriers. Where educational barriers were of the highest importance and barriers to management change were of the least importance.^[10]

According to what was stated, this study seeks to investigate the status of MISs in the Sports and Youth Organization of Ardabil Province, and tries to identify the main obstacles to the development of MIS in the sports and youth organization of Ardabil Province before starting the organization's extensive investments in this sector. By removing those obstacles, in the next step, it will be possible to design a comprehensive MIS in this organization.

METHODOLOGY

The present study is applied in terms of purpose and descriptive-analytical in terms of method. The method of data collection is a survey through a questionnaire. The statistical population of this study is all managers, deputies, and experts of the Sports and Youth Organization in different cities of Ardabil Province (Including the cities of Ardabil, Bilesvar, Garmi, Khalkhal, Kowsar, Meshkinshahr, Namin, Nayr, Parsabad, and Sarein) and also the Sports and Youth Organization of the province. Due to the size of the statistical population and the limitation of examining the opinions of all individuals, using the Morgan sample size table, 48 people were estimated and the questionnaires were distributed by random sampling. The designed questionnaire has answers in the form of a 5-choice spectrum (1 = strongly disagree, 2 = disagree, 3 = no comment, 4 = agree, and 5 = strongly agree).

To analyze this study, univariate Chi-square test was used and for ranking, Friedman test was used. The software used in this research will be SPSS. It should be noted that 48 barriers in the form of nine categories of managerial, environmental, technical, educational, economic, structural, individual, cultural, and change management barriers are classified based on the research background, which is provided to the statistical sample.

RESULTS

The study of demographic characteristics of the study shows that 43 (89.90%) of the respondents are men and 5 (10.10%) of the respondents are women. The age range of the respondents to the questionnaires was between minimum 28 years and maximum 53 years. The highest frequency is related to the age group of 40–44 years (17 people) and the lowest frequency is related to the age group of 50–54 years (3 people). According to the results of the questionnaires, the highest frequency was related to bachelors degree holders with 23 people (46.94%)

and the lowest frequency was related to diploma holders with 6 people (12.24%). Furthermore, based on the results of the questionnaires, it was determined that the range of work experience of the respondents was between at least 1 year to a maximum of 28 years of work experience. The highest frequency is related to the group of 10–14 years of work experience with 16 people (32.65%) and the lowest frequency is related to the group of 25–29 years of work experience with 3 people (6.12%).

In the following, each of the groups of obstacles will be examined.

Obstacles of the Management Group

Obstacles of the management group include 11 obstacles. Among the 11 obstacles of this group, the obstacle of “lack of long-term vision in the managers of the organization due to the high turnover of managers and the short duration of management courses” is the highest rank and the obstacle of “managers’ fear of jeopardizing the job position by making the information of the organization transparent after the implementation of the management information system” had the lowest rank. As shown in Table 1, the average response to the items in this category is 3560, the number of obstacles

with an average higher than 3 is equal to eight obstacles, and the number of obstacles with an average lower than 3 is equal to three obstacles.

Environmental Group Barriers

Obstacles of the environmental group include six obstacles. Among the six obstacles of this group, the obstacle of “lack of proper evaluation and monitoring systems to create a competitive environment between organizations” is the highest rank and the obstacle of “lack of competition for organizations and managers so that the use of MISs as a competitive advantage is necessary” had the lowest rating according to Friedman test. As shown in Table 2, the average response to the items in this category is 4.123.

Technical Group Obstacles

Obstacles of the technical group include four obstacles. Among the four obstacles of this group, the obstacle of “inability of organizations to provide technical support for hardware and software in terms of troubleshooting and updating” had the highest rank and the obstacle of “lack of integrated national network in the ministry” had the lowest rank according to Friedman test. As shown in Table 3, the average response to the items in this category is 3582.

Table 1: Results of the study of obstacles of the management group based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Managerial	Managers’ fear of jeopardizing their job position by clarifying the organization’s information after the implementation of MIS	2.327	19.878	0.001	11.4	11
	Lack of full management support for MIS implementation	3.857	30.082	0.001	27.04	3
	Lack of familiarity of managers with the applications and benefits of MIS	3.939	26.408	0.001	27.54	2
	Lack of long-term vision in the managers of the organization due to high turnover of managers and short duration of management courses	4.184	39.265	0.001	30.61	1
	There is a desire for stability in the organization and resistance to change by the managers of the organization	3.857	38.653	0.001	26.18	5
	Lack of sense of necessity and obligation to implement MIS by managers of the organization	3.796	37.837	0.001	25.03	8
	Lack of necessary knowledge and experience in managers related to computers	3.939	36.408	0.001	26.93	4
	Managers worry about reducing the information security of the organization with the implementation of MIS	2.816	3.551	0.47	15.54	9
	Lack of managers’ experience in MIS applications	3.857	43.551	0.001	25.94	6
	Lack of authority of managers of government organizations in implementing MIS	2.776	25.796	0.001	15.15	10
	Lack of motivation in managers in implementing MIS	3.816	50.898	0.001	25.51	7
	Average	3.56	-	-	-	-

Educational Group Obstacles

Obstacles of the educational group include three obstacles. Among the three obstacles of this group, the obstacle of “low quality of training courses held in the field of management information systems” had the highest rank and the obstacle of “failure to hold or lack of training courses appropriate and related to the subject of management information systems” had

the lowest rank according to Friedman test. As shown in Table 4, the average response to the items in this category is 4.122.

Economic Group Obstacles

Obstacles of the economic group include five obstacles. Among the five obstacles in this group, the obstacle of “high price of hardware and software equipment” had the highest rank and

Table 2: Results of environmental group barriers based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Environmental	Lack of competition for organizations and managers so that the use of MIS as a competitive advantage is necessary	3.898	63.327	0.001	26.12	6
	Lack of qualified service providers in areas related to the design and implementation of MIS in the country	4.041	45.592	0.001	27.92	4
	Lack of proper evaluation system to evaluate the performance of organizations	4	30.898	0.001	27.72	5
	Lack of attention to the ability to use MIS in the selection stage of managers	4.265	31.735	0.001	30.63	2
	Lack of proper evaluation and monitoring systems to create an atmosphere of competition between organizations	4.327	34.347	0.001	31.47	1
	Lack of serious and sufficient attention of the government regarding the establishment of MIS and lack of obligation of organizations to implement it	4.204	36.469	0.001	30.46	3
	Average	4.123	-	-	-	-

Table 3: Results of the study of technical group barriers based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Technical	Inability of organizations to provide technical support for hardware and software in terms of troubleshooting and updating	3.98	43.959	0.001	27.57	1
	Lack of an integrated national network in the ministry	3.204	11.306	0.023	19.36	4
	Low quality hardware and software equipment	3.694	44.776	0.001	23.89	2
	Lack of technical infrastructure in the organization (hardware, software, network, etc.)	3.449	35.388	0.001	21.65	3
	Average	3.582	-	-	-	-

Table 4: Results of the study of the barriers of the educational group based on the opinions of the respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Educational	Lack of appropriate training courses related to the subject of MIS	4.02	20.633	0.001	27.84	3
	Low quality training courses held in the field of MIS	4.265	28.143	0.001	30.84	1
	Lack of seminars and workshops to get acquainted with MIS	4.082	44.633	0.001	28.39	2
	Average	4.122	-	-	-	-

the obstacle of “lack of credit of organizations to implement management information systems” had the lowest rank according to Friedman test. As shown in Table 5, the average response to the items in this category was 3.118, three barriers had an average of less than 3 and two barriers had an average of more than 3.

Structural Group Obstacles

Obstacles of the structural group include four. Among the four obstacles of this group, the obstacle of “lack of an independent and capable unit as a trustee to design and deploy management information systems in offices” had the highest rank and the barrier of “lack of manpower with two specialties of management and computer” had the lowest rank according to Friedman test. As shown in Table 6, the average response to items in this category is 3.046.

Individual Group Obstacles

Obstacles of the individual group include seven obstacles. Among the seven obstacles of this group, the obstacle of “lack of fluency and weakness of employees in English” had the highest rank and the obstacle of “feeling of job security for the use of MISs in the organization by employees” had the lowest rank according to Friedman test. As shown in Table 7, the average response to items in this category is 3.866.

Cultural Group Obstacles

Obstacles of the cultural group include four obstacles. Among the four obstacles of this group, the obstacle of “lack

of proper culture building through holding conferences and specialized scientific exhibitions related to the subject of management information systems” has the highest rank and the obstacle of “lack of proper culture in the use of computers and management information systems in the organization” has the lowest rank according to the Friedman test. As shown in Table 8, the average response to the items in this category is 4.163.

Obstacles to Change Management Group

Obstacles to change management group include four obstacles. Among the four obstacles of this group, obstacle of “Failure to provide a clear picture of the situation of the organization if the implementation of management information systems” highest rank and obstacle of “lack of awareness of the problems of traditional methods in the organization and that there are better ways to do things” had the lowest rating according to the Friedman test.

As shown in Table 9, the average response to the items in this category is 3.668.

Based on what is seen in Tables 1-9, the ranking of the group of obstacles to the implementation of the MIS in the Sports and Youth Organization of Ardabil Province is as follows:

1. Cultural obstacles (4,163)
2. Environmental obstacles (4,123)
3. Educational obstacles (4,122)

Table 5: Results of economic group barriers based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Economic	High price of hardware and software equipment	3.755	33.367	0.001	25.43	1
	High cost of internet connection	2.939	15.592	0.004	16.15	3
	Uncertainty about the return on investment in MIS	3.51	24.367	0.001	21.02	2
	Lack of funding for organizations to implement MIS	2.51	17.02	0.002	11.78	5
	High costs of MIS implementation in the organization	2.878	8.449	0.076	15.76	4
	Average	3.118	-	-	-	-

Table 6: Results of structural group obstacles based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Structural	Lack of an independent and capable unit as a trustee to design and deploy MIS in offices	3.429	32.939	0.001	19.96	1
	Lack of manpower with two specialties of management and computer	2.674	26.816	0.001	14.16	4
	Non-compliance of the organization structure with the needs of the management information system	3.184	20.694	0.001	18.07	2
	Inflexible structure of the organization	2.898	12.939	0.012	15.2	3
	Average	3.046	-	-	-	-

Table 7: Results of the study of individual group obstacles based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Individual	Lack of familiarity of employees with management information systems and the benefits of using it	3.388	20.286	0.001	20.55	6
	Lack of motivation in employees to use MIS due to lack of motivational factors	4.041	23.571	0.001	27.84	4
	Feeling threatened by job security due to the use of MIS in the organization by employees	2.918	10.898	0.028	15.9	7
	Employees' fear of complicating work processes with the deployment of MIS	4.02	48.041	0.001	27.41	5
	Low experience of working with computers by employees	4.306	34.837	0.001	32.01	2
	Lack of fluency and weakness of staff in English	4.49	43.49	0.001	34.6	1
	Low employee job satisfaction	3.898	25.184	0.001	27.98	3
	Average	3.866	-	-	-	-

Table 8: Results of the study of cultural group obstacles based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
Cultural	Lack of proper culture in the field of computer use and MIS in the organization	3.51	12.327	0.015	22.38	4
	Managers emphasize personal experience rather than organized information when making decisions	4.143	42.735	0.001	30.69	3
	Lack of documentary and scientific planning perspective in the country	4.429	39.408	0.001	33.72	2
	Lack of proper culture through holding conferences and specialized scientific exhibitions related to the subject of MIS	4.571	27.714	0.001	35.85	1
	Average	4.163	-	-	-	-

Table 9: Results of the study of obstacles to change management group based on the opinions of respondents to the questionnaires

Group	Item	Average	Chi-square univariate test	Significance level	Friedman test	Rank in the group
change management	Lack of presentation of clear vision of the situation of the organization in case of implementation of MIS	4.592	56.061	0.001	36.28	1
	Managers' resistance to change	3.469	33.551	0.001	21.78	3
	Employee resistance to change	3.592	26.02	0.001	22.97	2
	Lack of awareness of the problems of traditional methods in the organization and that there are better ways to do things	3.02	12.939	0.012	17.79	4
	Average	3.668	-	-	-	-

4. Individual barriers (3,866)

5. Obstacles to Change Management (3,668)

6. Technical obstacles (3,582)

7. Management obstacles (3,560)

8. Economic obstacles (3,118)

9. Structural obstacles (3,046).

The ranking of 48 obstacles is also shown in Table 10.

Table 10: Ranking of obstacles examined based on Friedman test

Rank	Obstacle	Group	Friedman test
1	Lack of presentation of clear vision of the situation of the organization in case of implementation of MIS	change management	36.28
2	Lack of proper culture through holding conferences and specialized scientific exhibitions related to the subject of MIS	Cultural	35.85
3	Lack of fluency and weakness of staff in English	Individual	34.6
4	Lack of documentary and scientific planning perspective in the country	Cultural	33.72
5	Low experience of working with computers by employees	Individual	32.01
6	Lack of proper evaluation and monitoring systems to create an atmosphere of competition between organizations	Environmental	31.47
7	Low quality training courses held in the field of MIS	Educational	30.84
8	Managers emphasize personal experience rather than organized information when making decisions	Cultural	30.69
9	Lack of attention to the ability to use MIS in the selection stage of managers	Environmental	30.63
10	Lack of long-term vision in the managers of the organization due to high turnover of managers and short duration of management courses	Managerial	30.61
11	Lack of serious and sufficient attention of the government regarding the establishment of MIS and lack of obligation of organizations to implement it	Environmental	30.46
12	Lack of seminars and workshops to get acquainted with MIS	Educational	28.39
13	Low employee job satisfaction	Individual	27.98
14	Lack of qualified service providers in areas related to the design and implementation of MIS in the country	Environmental	27.92
15	Lack or lack of appropriate training courses related to the subject of MIS	Educational	27.84
15	Lack of motivation in employees to use MIS due to lack of motivational factors	Individual	27.84
17	Lack of proper evaluation system to evaluate the performance of organizations	Environmental	27.72
18	Inability of organizations to provide technical support for hardware and software in terms of troubleshooting and updating	Technical	27.57
19	Lack of familiarity of managers with the applications and benefits of MIS	Managerial	27.54
20	Employees' fear of complicating work processes with the deployment of MIS	Individual	27.41
21	Lack of full management support for MIS implementation	Managerial	27.04
22	Lack of necessary knowledge and experience in managers related to computers	Managerial	26.93
23	There is a desire for stability in the organization and resistance to change by the managers of the organization	Managerial	26.18
24	Lack of competition for organizations and managers so that the use of MIS as a competitive advantage is necessary	Environmental	26.12
25	Lack of managers' experience in MIS applications	Managerial	25.94
26	Lack of motivation in managers in implementing MIS	Managerial	25.51
27	High price of hardware and software equipment	Economic	25.43
28	Lack of sense of necessity and obligation to implement MIS by managers	Managerial	25.03
29	Low quality hardware and software equipment	Technical	23.89
30	Employee resistance to change	change management	22.97
31	Lack of proper culture in the field of computer use and MIS in the organization	Cultural	22.38
32	Managers' resistance to change	change management	21.78
33	Lack of technical infrastructure in the organization (hardware, software, network, etc.)	Technical	21.65
34	Uncertainty about the return on investment in MIS	Economic	21.02

(Contd...)

Table 10: (Continued)

Rank	Obstacle	Group	Friedman test
35	Lack of familiarity of employees with management information systems and the benefits of using it	Individual	20.55
36	Lack of an independent and capable unit as a trustee to design and deploy MIS in offices	Structural	19.96
37	Lack of an integrated national network in the ministry	Technical	19.36
38	Non-compliance of the organization structure with the needs of the management information system	Structural	18.07
39	Lack of awareness of the problems of traditional methods in the organization and that there are better ways to do things	change management	17.79
40	High cost of internet connection	Economic	16.15
41	Feeling threatened by job security due to the use of MIS in the organization by employees	Individual	15.9
42	High costs of MIS implementation in the organization	Economic	15.76
43	Managers worry about reducing the information security of the organization with the implementation of MIS	Managerial	15.54
44	Inflexible structure of the organization	Structural	15.2
45	Lack of authority of managers of government organizations in implementing MIS	Managerial	15.15
46	Lack of manpower with two specialties of management and computer	Structural	14.16
47	Lack of funding for organizations to implement MIS	Economic	11.78
48	Managers' fear of jeopardizing their job position by clarifying the organization's information after the implementation of MIS	Managerial	11.4

DISCUSSION AND CONCLUSION

MISs are among the most important information systems, which are: An integrated system consisting of user and machine to provide information in support of operations, management, and decision-making in the organization. This system uses computer software and hardware, guides and instructions, models for analysis, planning, control, and decision-making and a database.^[11] Given the important role of the information system for management and organizational planning and decision-making, many organizations worldwide have made extensive investments in the field of MIS. In view of what has been said, the present study examines the status of MISs in the Sports and Youth Organization of Ardabil Province. Before starting the organization's extensive investments in this sector, first identify the main obstacles to the development of MIS in the Sports and Youth Organization of Ardabil Province. By removing those obstacles, in the next step, we can design a comprehensive MIS in this organization. Based on this, 48 obstacles in the form of nine categories of managerial, environmental, technical, educational, economic, structural, individual, cultural, and change management barriers were classified based on the research background, which was provided to the statistical sample. To determine the status of the province's Sports and Youth Organization in relation to the above-mentioned obstacles to provide reasonable recommendations for the development of the MIS in it.

Based on the results extracted from the questionnaires that were completed by 49 managers, deputies and experts of the Ardabil Sports and Youth Organization, it was determined that the ranking of the group of obstacles to the implementation of MIS in the Ardabil Youth and Sports Organization is as follows: (1) Cultural barriers; (2) environmental barriers; (3) educational barriers; (4) individual barriers; (5) barriers to change management; (6) technical barriers; (7) managerial barriers; (8) economic barriers; and (9) structural barriers.

The results also indicate that among the 48 obstacles studied in this study, three obstacles (1) lack of clear vision of the situation of the organization in the implementation of MISs (change management), (2) lack of proper culture through holding conferences and specialized scientific exhibitions related to the subject of MISs (cultural), and (3) lack of mastery and weakness of employees in English (individual) highest rank and obstacles (1) managers' fear of jeopardizing the job position by making the information of the organization transparent after the implementation of management (management) information systems, (2) lack of funding for organizations to implement management (economic) information systems, and (3) lack of manpower with two specialties of management and computer (structural) have the lowest rank among the obstacles studied for the Sports and Youth Organization of Ardabil province.

The results of the present study are contrary to the findings of Hosseini and Rahimi Baghmalek (2017)^[12] and Bhatnagar

(1991)^[13] who consider the lack of skilled manpower of the information system and professional management specialists as a critical challenge of MISs in developing countries. In this study, it is ranked 46th among 48 barriers and there are much more important factors as an obstacle to the development of MIS in organizations in developing countries.

Considering the similarity of the research questions of Eidi *et al.* (2015)^[11] with this research, (in the present study, due to the comprehensiveness of Eidi *et al.*'s research questions, their questions have been used) comparing the results of this research with the results obtained from the mentioned research gives interesting results. In the study of Eidi *et al.* (2014)^[10] The ranking of obstacles in the Sports and Youth Organization of Kermanshah province was as follows: (1) Educational barriers; (2) environmental barriers; (3) technical barriers; (4) individual barriers; (5) cultural barriers; (6) structural barriers; (7) economic barriers; (8) managerial barriers; and (9) Barriers to change management. While in the present study, the ranking of barriers is as follows: (1) Cultural barriers; (2) environmental barriers; (3) educational barriers; (4) individual barriers; (5) barriers to change management; (6) technical barriers; (7) managerial barriers; (8) economic barriers; and (9) structural barriers.

As can be seen, there were no similarities between the two sports and youth organizations in Kermanshah and Ardabil Provinces, except in the rank of environmental barriers. However, combining the results obtained of these two studies can be concluded that the two groups of educational and cultural barriers along with environmental barriers can be considered as three main groups of major barriers to the development of sports and youth organizations in the country.

The results obtained in the present study, contrary to the conclusion of Mehrara and Marzban (2013)^[14] that managers' lack of familiarity with MIS, lack of specialized manpower to support the implementation of MIS, employee resistance to change as effective factors in the lack of MISs. In this study, these three barriers are ranked 19th, 46th, and 30th among the 48 barriers studied, respectively. Therefore, there is not much alignment between the results obtained from this study and Mehrara and Marzban (2013)^[14] research.

Also in the research of Hamidi *et al.* (2006)^[15] it is stated that there is a phenomenon of resistance to the establishment and use of MISs in sports federations, but in the Sports and Youth Organization of Ardabil Province, among the 48 obstacles examined, this obstacle was ranked 32nd. Therefore, there was not much alignment between the results of the present study and the results of Hamidi *et al.* The discrepancy between the results of the present study and the research conducted by Ghazizadeh Fard (1996)^[16] is also observed.

In general, it should be said that fortunately in the Sports and Youth Organization of Ardabil Province, management barriers do not play a significant role and the view of the managers of this organization is to implement a positive MIS. However, the main obstacles facing the Sports and Youth Organization of Ardabil Province are cultural, environmental and educational barriers.

According to the results of this study, the following strategies are proposed to implement the MIS in the Sports and Youth Organization of Ardabil Province:

1. Establishment of the annual performance evaluation system of the organization in order to achieve the development of MISs in the Sports and Youth Organization of Ardabil province
2. Holding deputy positions and high-ranking organizational positions by people with the necessary skills and knowledge in the field of MISs
3. Holding various conferences, seminars and seminars to develop MISs in sports and youth organizations
4. Holding training courses for the staff of the Sports and Youth Organization of the cities of Ardabil Province and also the Sports and Youth Organization of the center of the province in the field of MISs
5. Preparing educational brochures and providing them to the employees of Ardabil Sports and Youth Organization to introduce the importance and necessity of using MISs at the organization level.

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Research Article

Constraints in physical recreation activities participation and its implication to the selected variables

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ABSTRACT

Nowadays, where technology took over the usual daily physical activities, lifestyles become more sedentary and make work less demanding. Participation in physical recreation activities has become more important and opportunities for individuals to participate have considerably increased in the present days. However, a high percentage of those individuals who do not participate in any form of physical recreation activities have steadily increased year after year. This study determines the constraints that inhibit individuals to participate in physical recreation activities. From the randomly selected 177 respondents the results implied that of the seven indicators of constraints, time is the most agreed to have limited the respondents' participation. The results of the study also signified that the indicators of constraints of individual/psychological, lack of knowledge, accessibility/financial, and time are significantly related to age, monthly gross income, location of stay, and marital status, respectively. Hence, the study concluded that the significant relationships of those variables affect and inhibited the participation of the respondents in physical recreation activities. Conclusion and recommendations were also provided in the study.

Keywords: Constraints, Physical recreation activities, Time constraint.

INTRODUCTION

Contemporary society and lifestyle, electronic and technological advancement often minimizes physical effort in most aspects of life. The impact of social media and virtual reality reverberates across all generations. Gone are the days when people's engagement in active physical activities in the neighborhood is the norm. Gadgets and the internet took part huge amount of one's time. Even the daily commute and normal office works and routines are affected significantly by the upgrade brought about by the ever changing world. It is very obvious that mechanization and computerization at work have increased physical inactivity in the workplace. Physical activity, for some, is no longer part of their daily routines, cars have replaced walking, elevators have taken the place of stairs, while washing machines have replaced manual laundry, mobile communication and various remote controls have reduced the general movement of people. This, in turn, influences

an individual's opportunity to persist in active living styles that makes the pace of life-situation becomes unnoticeable and lifestyle becomes passive. It is an undeniable fact that physical activities greatly help in promoting individual's health and healthy living, especially in this sophisticated world. Participation in physical activities is considered as a fulfilling domain of healthy lifestyles (Wee, 2010). The maintenance of physically active, recreationally-oriented lifestyles has become increasingly important in developed societies as it become one of the most vital facets of an individual toward the development of personality and social aspects. Involvement in physical activities changes individuals with regard to their health and well-being, social networks, sense of social connection, and skills. It affects communities in terms of social cohesion and the social capital of communities (Nicholson *et al.*, 2010).

Various studies have explored and pointed out differences in constraints to physical activities participation in different age groups, different sex and profession but none of them focused on office workers such as teachers as sub-group. As far as the researcher's effort of looking into the local research setting using various keywords in searching, exploring local journals

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through available search engines and databases, there was no research conducted (so far) that give attention to the teachers with regards to their constraints in participating physical recreation activities. There is a need, therefore, for this pursuit to provide greater understanding of the constraints that impel them from. Hence, the current study investigated the constraints in physical activity participation among the teachers (faculty members) of Mindanao State University (MSU), Marawi City. In particular, this study focused on recreational activity participation of the selected respondents. This study is believed to be significant among policy makers as it will provide information in strengthening significant policies that widen awareness of the importance of healthy lifestyle and provide facilities for greater participation in the university. Moreover, this study is significant to the body of knowledge for this kind of study was given less attention among researchers in this field in the local setting. Thus, it contributed to the limited literature in the setting where this study was conducted. It also provided empirical based information for authorities in developing programs to provide greater opportunities that encourage every constituent of the university to participate in physical recreation activities.

Review of Literature

Understanding why individuals are constrained in participating physical activities, Crawford and Godbey (1987) categorized three types of barriers or what would be later considered constraints. The first constraint is categories as intrapersonal constraints which involve psychological states and attributes which interact with leisure preferences rather than intervening in preferences and participation. Intrapersonal constraints refer to those psychological conditions that arise internal to the individual such as personality factors, attitudes, or more temporary psychological states such as moods. Examples of intrapersonal constraints include stress, anxiety, depression, prior socialization in specific leisure activities, perceived self-skill, and subjective evaluations of the appropriateness and availability of various leisure activities (Crawford and Godbey, 1987). The second constraint is interpersonal constraints are the results of interpersonal interaction or the relationship between individuals' characteristics (Crawford *et al.*, 1991). These constraints arise from the interactions with other people, or the concept of interpersonal relations in general. A person who feels he or she lacks a friend with whom he or she shares an interest in a common activity may encounter an interpersonal constraint if he or she is unable to locate a partner with whom to participate in a specific leisure activity. Moreover, structural constraints include such factors as the lack of opportunities or the cost of activities that result from the external conditions in the environment (Crawford and Godbey, 1987). These constraints are commonly conceptualized as intervening factors in leisure preferences and participation. Examples of structural constraints include availability of opportunity, financial resources, family life-cycle stage, season, climate,

the scheduling of work time, and reference group attitudes concerning the appropriateness of certain activities (Crawford and Godbey, 1987). For example, a structural constraint could describe a young child not being able to attend a professional sporting event because of his or her family's inability to afford a ticket. Structural constraints demand social action to create situations providing better opportunities for those who may not have equal access.

Moreover, Henderson, Uhler and Greer (1990) defined physical recreation as "freely chosen, enjoyable activity, which involves movement of the body and includes active sport, exercise, fitness, dance, and outdoor activities." When considering constraints in physical recreation activity participation, there were many definitions on constraints, nevertheless, they all shared the similar ideas (Cheung, 2005). Constraints have been defined as those factors that make physical recreation activity participation unattractive and impede consistent participation (Burton and Raedeke, 1997). In spite of the different constraints, it has been widely presumed in the early researches that there was a negative relationship between constraints and physical recreation activity participation, while constraints inhibited people's participation in physical activity. Researchers had identified common physical recreation activity constraints, including perceived lack of time, lack of motivation, inconvenience, and lack of social support (Boothby *et al.*, 1981; Godin *et al.*, 1986). In addition, Jackson (1993) defined constraints as the factors that perceived by individuals to inhibit or prohibit participation and enjoyment in leisure. A variety of constraint categories also exists in the literature, such as internal and external, blocking and inhibiting, intrapersonal, interpersonal, and structural (Alexandris and Carroll, 1999).

METHODOLOGY

The purpose of this study was to determine the constraints of physical recreation activity participation from the perspectives of the randomly selected 177 MSU Marawi faculty members as respondents. To determine these investigations, a descriptive–correlation type of research was employed. This research design aimed to describe the observations based on the data collected and how it implied to the selected variables affecting participation. The research data were collected and evaluated through leisure constraints questionnaire adapted from Carroll and Alexandris (1997).

RESULTS AND DISCUSSION

The data in Table 1 present the ranking of the constraint indicators that inhibited the respondents in participating physical recreation activities.

The data showed that the factor constraints the most among the respondents from participating physical recreation activities

are time. With a mean score of 3.847, the respondents agree that the most reason of their non-participation is because they lack or they do not have time. Whereby, life obligations may limit the respondents for other activities such as participating physical recreation activities. Considering also that majority of the respondents are full time teachers, thus, teaching responsibilities hinder the respondents for extra commitments other than teaching. Hence, it is evident that the respondents do not have the luxury of time for extra-curricular activities and participate in physical recreation activities.

The previous studies (e.g., Coalter, 1993; Jackson, 1993) reported that time-related constraints were the most intensively experienced. Work, family, and social commitments all contribute to the limited availability of free time. In like manner, Andajani-Sutjahjo, Ball, Warren, Inglis and Crawford (2004) revealed in their study that the main constraint reported is related to time. It was suggested in their research that they were lack of time due to work commitments.

The lack of partners is the second most constraint factor that restricts the respondents in participating physical recreation activities. With a mean score of 3.356, it suggest that because they have nobody to participate with, or because they do not have common time with their friends or their friends do not like participating, thus it restrict them to participate as well. According to Crawford *et al.* (1991), constraints related to lack of partners are experienced inter-personally and consist of the inability to find partners for physical activity participation. Prospective participants especially women are usually reluctant to take part in individual activities (e.g., jogging and walking) without a partner.

Another contributing factor that hinders the respondents in participating physical recreation activities is the facilities and services. With a mean score of 3.068 the respondents feel the constraint of inadequate and poorly maintained facilities in venues where they supposed to participate. In the study of Bopp *et al.* (2007) among African American men and women indicated that not having facilities with equipment would be

a deterrent to being physically active. Lack of knowledge (mean score of 3.042) as to where to participate, whom to contact with or having no enough knowledge of the skill is at rank four and can be considered among the top of the list that restrict the respondents in participating physical recreation activities. In addition, lack of interest with the activity or too engrossed with daily routine is the fifth factor that restrict the respondents in participating.

Moreover, accessibility/financial (mean score of 3.006) factor such reasons like, no opportunity to participate in nearby places, transportation problem, and no enough monetary to afford for the services is at rank sixth. This result was also found in Bopp *et al.* (2007) research on African American men and women which indicated that not having a convenient place to walk, and an unaffordable fee restraint to participate in physical activities. Finally, individual or psychological (mean score of 2.822) factor is the least constraint for the respondents in participating physical recreation activities. Such factor includes personal constraints as feeling tired, not confident, fear of getting hurt or health issues. Stavropoulou (2008) also stated that the personal constraints in physical recreation activity participation include lack of self-confidence, lack of body image, lack of knowledge, the health problems, and fatigue.

Impact of Constraint Indicators to the Selected Variables

The following illustrations and discussions below elaborate the impact of the constraint indicators to the selected variables.

Individual/Psychological

The results in Table 2 indicate that “*individual/psychological*” constraint is significantly correlated with age with $P = 0.043$. The results imply that the age of the respondents may influence in ones “*individual/psychological*” constraints. Whereby, developmental growth or maturity of an individual may differ in distinguishing “*individual/psychological*” constraints such as, not feeling confident or afraid of being hurt. In like manner, age may also be a factor in one’s health status or capability in participating physical recreation activities.

On the other hand, the respondents’ constraint in terms of “*individual/psychological*” showed no significant relationship with the variables of sex, marital status, location of stay, monthly gross income, and college work designation with the following values of 0.962; 0.585; 0.938; 0.669; and 0.918, respectively. Carroll and Alexandris (1997) reported that individual/psychological constraints are among the most powerful predictors of sport participation. A wide range of constraints was included in the individual/psychological dimension. They are mainly related to the following dimensions: Perceived fitness level, perceived health condition, and perceived self-competence; mainly, women and the elderly are affected by psychological constraints.

Table 1: Constraints of the respondents in physical recreation activities participation

Indicators	Mean ($n=177$)	Qualitative description	Rank
Time	3.847	Agree	1
Lack of Partners	3.356	Undecided	2
Facilities/Services	3.068	Undecided	3
Lack of Knowledge	3.042	Undecided	4
Lack of Interest	3.011	Undecided	5
Accessibility/Financial	3.006	Undecided	6
Individual/Psychological	2.822	Undecided	7

Lack of Knowledge

Table 3 is a presentation of the relationship between the respondents' constraints in terms of "lack of knowledge" and the variables of age, sex, marital status, location of stay, monthly gross income, and college work designation.

The results indicate that the constraint in terms of "lack of knowledge" of the respondents showed no significant relationship with the variables of age, sex, marital, status, location of stay, and college work designation with the following *P*-values of 0.570; 0.436; 0.152; 0.369; and 0.835, respectively. However, the indicator of constraint in terms of "lack of knowledge" showed a significant relationship with the variable of monthly gross income with a *p*-value of 0.019. This result suggests that the respondents' monthly gross income has an effect to gain knowledge to participate. Either with enough income made the respondents inactive or with lower income made the respondents uninterested. Thus, resulted to lack of knowledge due to lack of exposure with respect to opportunities of participation.

Facilities/Services

The relationship between constraint in terms of "facilities/services" and the variables of age, sex, marital status, location of stay, monthly gross income, and college work designation is presented in Table 4.

The results showed no significant relationship for all the variables with the *p*-values obtained. These results indicate that the availability or unavailability of facilities and services for physical recreation activities is not a hindrance for the respondents to participate regardless of their age, sex, marital status, monthly gross income and college work designation.

Accessibility/Financial

Table 5 indicate the results that "accessibility/financial" has no significant relationship with the variables of age, sex, marital status, monthly gross income, and college work designation with an obtained *P*-values of 0.105, 0.702, 0.576, 0.635, and 0.980, respectively. Conversely, constraints in terms of "accessibility/financial" showed a significant relationship with the variable of location of stay with an obtained *P* = 0.003.

This data indicate that accessibility/financial is an impediment for the respondents to take part in physical recreation activities considering the place where they reside. For "in-campus" respondents, it possible that their preferred activity is not available within the school premises. Or for the "off-campus" respondents, there are no opportunity for participation within their community. Moreover, the respondents may not be able to afford the facilities and services being offered near their place of stay. According to Scott and Munson (1994), low income limits access to the resources and skills necessary to participate in a range of recreation activities. Finance is positively related to participation in many forms of recreation activities and use of public park and recreation resources. However, these constraints are also related to the poor quality of sport and recreation provision. A significant proportion of the respondents stated that they did not have the opportunity to participate in their homes, which result in a considerable amount of time spent traveling in order to get to the nearest facility. Gratton and Taylor (1995) also added that a significant proportion of the respondents also reported financial constraints. The total cost for sport participation consists of the following elements: entrance charges to facilities, travel costs, costs of participation-related food and drink and equipment

Table 2: Relationship between individual/psychological and the selected variables

Selected variables	Indicator	Correlation coefficient	<i>P</i> -value	Relationship
Age	Individual/Psychological	$\chi^2=13.025$	0.043	Significant
Sex		$\chi^2=0.078$	0.962	Not significant
Marital Status		$\chi^2=1.073$	0.585	Not significant
Location of Stay		$\chi^2=0.128$	0.938	Not significant
Monthly Gross Income		$\chi^2=4.054$	0.669	Not significant
College Work Designation		$\chi^2=0.171$	0.918	Not significant

Table 3: Relationship between lack of knowledge and the selected variables

Selected Variables	Indicator	Correlation Coefficient	<i>P</i> -value	Relationship
Age	Lack of Knowledge	$\chi^2=4.796$	0.570	Not significant
Sex		$\chi^2=1.661$	0.436	Not significant
Marital Status		$\chi^2=3.771$	0.152	Not significant
Location of Stay		$\chi^2=1.993$	0.369	Not significant
Monthly Gross Income		$\chi^2=15.165$	0.019	Significant
College Work Designation		$\chi^2=0.360$	0.835	Not significant

rental, time costs, membership and subscription fees, and the cost of equipment and clothing.

Lack of Partners

The relationship between constraint in terms of “*lack of partners*” and the variables of age, sex, marital status, location of stay, monthly gross income, and college work designation is presented in Table 6.

The results showed no significant relationship with the all the variables with the obtained *P*-values. The lack of partners is not cited by the respondents as a constraint in their involvement in physical recreation activities. This could mean that they have partners or support groups in their leisure pursuits having friends with the same interests’ increases physical activity.

Time

Table 7 showed the results that “*time*” is not significantly correlated with the variables with an obtained *P*-values of age (0.396); sex (0.59); location (0.834); monthly gross income (0.974); and college work designation (0.545). On the other hand, “*time*” showed a significant relationship with marital status with an obtained *P* = 0.004.

Time scarcity is the feeling that one lacks enough time to do all the things that one would like to do and has become one of the great problems facing males and females. Various studies have documented that time constraints are most frequently mentioned reasons for ceasing participation in recreational activities (Jackson, 1993). Lack of time is also noted as the most constraining factor to many people who want to participate in a variety of recreational activities and for not using local park and recreation services (Wee, 2010). A feeling of time scarcity is likely to mean that people will limit the amount of time spent participating in any one activity. Raymore, Godbey and Crawford (1994) also found that lack of time was the strongest barrier. Time budget studies have shown both employed and unemployed married women have less time for recreation than their husbands (Shaw, 1985). In a later study, Shaw (1994) found that lack of time was the most frequently reported “objective” constraint to recreation. Henderson *et al.* (1999) found that lack of time because of family obligations was noted by women as a primary barriers in early and later family stages.

Lack of Interest

The relationship between constraint in terms of “*lack of interest*” and the variables of age, sex, marital status, location of stay, monthly gross income, and college work designation is presented in Table 8.

Table 4: Relationship between facilities/services and the selected variables

Selected variables	Indicator	Correlation coefficient	<i>P</i> -value	Relationship
Age	Facilities/Services	$\chi^2=3.905$	0.690	Not significant
Sex		$\chi^2=2.872$	0.238	Not significant
Marital status		$\chi^2=1.781$	0.410	Not significant
Location of stay		$\chi^2=4.293$	0.117	Not significant
Monthly gross income		$\chi^2=6.833$	0.337	Not significant
College work designation		$\chi^2=1.763$	0.414	Not significant

Table 5: Relationship between accessibility/financial and the selected variables

Selected variables	Indicator	Correlation Coefficient	<i>P</i> -value	Relationship
Age	Accessibility/Financial	$\chi^2=10.510$	0.105	Not significant
Sex		$\chi^2=0.707$	0.702	Not significant
Marital Status		$\chi^2=1.103$	0.576	Not significant
Location of Stay		$\chi^2=11.771$	0.003	Significant
Monthly Gross Income		$\chi^2=4.306$	0.635	Not significant
College Work Designation		$\chi^2=0.040$	0.980	Not significant

Table 6: Relationship between lack of partners and the selected variables

Selected variables	Indicator	Correlation Coefficient	<i>P</i> -value	Relationship
Age	Lack of Partners	$\chi^2=12.547$	0.051	Not Significant
Sex		$\chi^2=4.095$	0.129	Not significant
Marital Status		$\chi^2=1.919$	0.383	Not significant
Location of Stay		$\chi^2=2.108$	0.349	Not significant
Monthly Gross Income		$\chi^2=10.026$	0.124	Not significant
College Work Designation		$\chi^2=2.015$	0.365	Not significant

Table 7: Relationship between time and the selected variables

Selected variables	Indicator	Correlation Coefficient	P-value	Relationship
Age	Time	$\chi^2=6.249$	0.396	Not significant
Sex		$\chi^2=1.051$	0.591	Not significant
Marital Status		$\chi^2=11.026$	0.004	Significant
Location of Stay		$\chi^2=0.362$	0.834	Not significant
Monthly Gross Income		$\chi^2=1.263$	0.974	Not significant
College Work Designation		$\chi^2=1.213$	0.545	Not significant

Table 8: Relationship between lack of interest and the selected variables

Selected variables	Indicator	Correlation Coefficient	P-value	Relationship
Age	Lack of Interest	$\chi^2=10.591$	0.102	Not significant
Sex		$\chi^2=0.837$	0.658	Not significant
Marital status		$\chi^2=2.596$	0.273	Not significant
Location of stay		$\chi^2=0.095$	0.954	Not significant
Monthly gross income		$\chi^2=2.052$	0.915	Not significant
College work designation		$\chi^2=1.053$	0.591	Not significant

The results showed no significant relationship with the variables with obtained p-values of age (0.102); sex (0.658); marital status (0.273); location of stay (0.954); monthly gross income (0.915); and college work designation (0.591). These results suggest that the age, sex, marital status and where the respondents reside has no influence on their lack of interest in the activities available to them.

CONCLUSION AND RECOMMENDATIONS

Getting fit and staying healthy are a personal investment. It should rather be an individual responsibility to take extra effort to invest. Considering the high number of respondents who do not participate in physical recreation activities, one should foster positive perception and optimistic attitude toward the value of participating physical recreation activities. Sustaining in participating physical recreation activities requires support and motivation. It is recommended that parents, spouses, children, siblings and friends should provide support in all aspects to sustain the level of participation.

Since most of the respondents are residing inside the campus, it is worthwhile that authorities and experts in conducting such activities such as the College of Sports, Physical Education, and Recreation should offer more programs related to exercise that attract and help encourage the whole university constituents to participate in participating physical recreation activities. Moreover, time factor is the most constraints among the respondents. It is recommended that the university can offer hostels or dormitories inside the university for the employees. In this way, many will be attracted staying inside

the campus, thus, able to find opportunity to participate in physical recreation activities. Thus, this serves as baseline information in the local setting of the research. It is, therefore, recommended that further research should be conducted to address specific concerns and issues for a particular group of population.

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Review Article

Prevention of children obesity through physical activity

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INTRODUCTION

Physical activity, fitness, and exercise are critically important for the health and well-being of people of all ages. Research has demonstrated that virtually all individuals can benefit from regular physical activity; whether they participate in vigorous exercise or some type of moderate health-enhancing physical activity. Even among frail and very old adults, mobility, and functioning can be improved through physical activity. Therefore, physical fitness should be a priority for people of all ages in modern life. Although obesity has been defined as the most common health problem in modern societies; currently, it is a problem with gradually increasing frequency both in developed and developing countries. Different studies conducted in India also showed similar results. Obesity is also considered one of the most common chronic diseases in childhood. In treatment of childhood obesity is considerably difficult. Poor patient motivation and inability of parents to spare time for their children have been reported as the most important factors that cause low treatment efficiency in children and adolescents. Children who are stuck among courses/classes in an examination marathon with career anxiety cannot find time for physical activity and even for referring to healthcare institutions for these problems. For successful treatment, the causes of obesity should primarily be identified accurately, and good teamwork is essential. In the treatment of obese children, cooperation of pediatricians, psychiatrists, dieticians, and sports physicians, if possible, will provide an increase in treatment compliance and positive outcomes. In addition to teamwork, another way to enhance treatment compliance includes adjusting nutrition and providing psychological support together with physical activity. Moreover,

cooperation with families, social circles, and teachers is also essential in establishing permanent and positive behavioral changes in children.

THE IMPORTANCE OF EXERCISE FOR CHILDREN

As the studies mentioned, being obese means having a large accumulation of fat in our body. The best way to keep ourselves fit and healthy is by exercising. Getting a child to exercise for the purpose of losing weight is not going to happen, but children love to play have fun.

THE BENEFITS OF REGULAR EXERCISE FOR CHILDREN

Many researches shows that a sedentary lifestyle is a predictor of overweight and obesity. Physical activity is critical not only for optimal weight but also for physical and cognitive development in childhood. Current recommendations are for children to engage in physical activity at least 60 min/day; this includes any physical activity accumulated throughout the day, such as playing, walking to school, and exercise. However, many children are not that active. Number of Centers for Disease Control and Prevention survey found that 61.5% of children aged 9–17 did not participate in any organized physical activity during their nonschool hours and that 22.6% did not engage in any free-time physical activity. These findings reflect marked increases during the past several decades in sedentary activities of daily living among children. This more sedentary lifestyle is the result of increased reliance on technology and labor-saving devices, such as the use of automobiles rather than walking or biking, attributable in part to community designs that favor this mode of

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transport; the use of washing machines and dishwashers in the household; less physical activity in the workplace because of computers and automated equipment; increased use of television and computers for entertainment and leisure activities; and use of elevators and escalators rather than stairs. In addition, increased concern about crime has reduced the likelihood of outdoor playing; and decreased walking and bicycling, and increased driving in response to community design that favors car. These activities reduce the need for daily physical activity or make it more difficult to be physically active.

PHYSICAL ACTIVITY TO DECREASE THE OBESITY

Aspects of what researchers call the “built environment” are important determinants of physical activity for children and therefore of rates of childhood obesity. The built environment encompasses all of the man-made elements of the physical environment, including buildings, infrastructure, and other physical elements created or modified by people as well as the functional use, arrangement in space, and aesthetic qualities of these elements.

THE ROLE OF PROMOTE THE PHYSICAL ACTIVITY

Governments can support physical activity in other ways as well. Parks and recreation departments, for example, often run sports leagues or offer dance, gymnastics, or other active classes. Many cities have worked with school districts to promote walking and bicycling to school through Safe Routes to School programs and related initiatives. In addition, Governments can provide support and resources to local organizations that want to create healthy environments.

For the entire year, children and youth spend most of their waking hours at school, so the availability of regular physical activity in that setting is critical. Although the healthy people report recommends increasing the amount of daily physical education (PE) for all students in a larger proportion of schools, such tand program, study looked at a nationally representative sample of private and public schools and found that only 8% of primary schools, 6.4% of middle schools, and 5.8% of high schools with existing PE requirements provided daily PE classes for students.



Encourage general physical activity.



Decrease sedentary behavior.



Raise awareness about the importance of increasing physical awareness about the importance of increasing physical activity.



Physical Activities in Schools.

RESULTS

The analysis of the researches shows that even there was a moderate scarcity of equipment and facilities students have

significance in their sports activities toward children physical, mental, emotional, and social development and helpful to reduce their obesity.

CONCLUSION

Physical activities help the children development such as cooperation, participation, sportsmanship, socialization, coordination, and competition. However, sports activates have effect on the development of children. Physical activities and sports are interrelated which was important medium for optimum child development of social, mental, emotional as well as physical.

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Research Article

Enhancing academic achievement of school students through meditation

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ABSTRACT

This study is helpful to determine the effect of Meditation program on academic achievement of Zilla Perished High School (boys) Manthani students with the age group of 14–17 years. The selected students were randomly assigned into two equal groups. The experimental group (A-20) and the control group (B-20) for the experiment. After the S.A-1 of the school students of the 10th class, Meditation practice was given in morning 40 min to the experimental group for 12 weeks, during this time control group was not participated in Meditation Practice. After 12 weeks of Meditation practice the spectacular effect was found. The mean scores of control and experimental groups were 73.0134 (standard deviation [SD] 19.986) and 70.8272 (SD17.987) respectively. Whereas, the mean deference was 1.49 and the “*t*” value pretest was 0.256 which were not significant. The post-test of Academic achievement, the mean score of control and experimental groups were 76.1324 (18.982) and 91.3321 (19.124) respectively significant of control group and experimental group was differ significantly. Therefore, this experimental was differing significantly. Therefore, the experimental study suggests that, daily Meditation practice helps to improve academic achievement of school students.

INTRODUCTION

Meditation is a practice in which an individual trains the mind or induces a mode of consciousness, either to realize some benefits or as an end in itself. The term Meditation refers to broad variety of practices that includes techniques designed to promote relaxation, build internal energy or life force and develop compassion, love, generosity and forgiveness. The word Meditation carries different meanings in different contexts. Meditation has been practiced since antiquity as component of numerous religious tradition and beliefs. Meditation may involve generating an emotional state for the purpose of analyzing that state such as anger, hatred or cultivating particular mental response to various phenomena, such as the term meditation can refers to the state itself, as well as to practices or techniques employed to cultivate to the state.

Mindfulness Meditation has now entered the health care demine because of evidence subjecting a positive correlation between the practice, emotional and physical health. Example of such benefits includes reduction in stress, anxiety, depression, headaches and elevated blood pressure, etc., The term Meditation refers to a group of techniques, as mantra meditation, relaxation response, mindfulness Meditation. Most Meditative techniques started in Eastern religious or spiritual traditions. These techniques have been used by many different cultures throughout the world for thousands of years. Today many people use Meditation outside of its traditional religious for health.

METHODOLOGY

Forty school students (N-40) from Zilla Perished High School (boys) Manthani were randomly selected. The selected students randomly assigned in to equal groups. The experimental group A-20 and the control group B-20 for the experiment. After the S.A-1 examination, Meditation practice was given in morning 40 min to the experimental group for 12 weeks. During this time control

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Mean, Standard Deviation, Mean difference and “t” value of academic achievement of the student

	Group	n	Mean	Standard deviation	Mean difference	“t”
Pre-test academic achievement	A	20	73.0134	19.986	1.49	0.256
	B	20	70.8272	17.987		
Post-test academic achievement	A	20	76.1324	18.982	15.13	2.129
	B	20	91.3321	19.124		

group was not participated in Meditation Practice. Experimental and control groups were not controlled for their activity. The marks of the S.A-1 examinations were conceded as pre- and post-test data for the investigation of academic achievement of the students.

After review of many research literatures, it was found that the very few researches were conducted but the area of academic achievement through Meditation is ignored.

Statistical Procedure

As per the research design, the collected data were analyzed by employing standard statistical technique “t”-test. Further the result have been interpreted and discussed logically to conclude.

It is seem from table- Pre test of Academic Achievement the mean score of control and experimental groups were 73.013 and 70.8272, respectively. Whereas, the mean difference was 1.49 and the values of pre test was 0.256 which were not significant. It reflects that the mean score pre test of Academic achievement of control group and experimental group do not differ significantly. This result indicates that the pre-test means of Meditation training group and control group in test were more or less similar.

The post-test of academic achievement, the mean scores of control and experimental group were 76.1324 and 91.3321, respectively. The mean difference is 15.13 and “t” value of posttest was 2.129, which was significant. It reflects that the mean score of post-test of academic achievement of control group and experimental group differed significantly.

DISCUSSION

In the academic achievement of the mean and the “t” value of pretest were not significant. It reflects that the mean

score of pretest academic achievement of control group and experimental group of school students did not differ significantly. The post-test of academic achievement of mean and “t” value was significant. It reflects the mean score of post-test of academic achievement of control group and experimental group differ significantly. The result reveals that, the subject of experimental group (Mediation practices group) could show higher score in Academic achievement, as measured by test than the control group. The gain in Academic achievement has increased significantly in experimental group as compared to control group. The meditation practices were not statistically significant effect to increase the overall level of Academic achievement of school student. “There was no significant difference in mean gain score Academic achievement, as measured by assessment between control and experimental groups due to specific”, has been rejected.

CONCLUSION

This experimental study suggests that, daily Meditation practice helps to improve Academic achievements of the school students.

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Research Article

Comparison of state anxiety between cricket players and baseball players of Adikavi Nannaya University

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ABSTRACT

The purpose of the present study to find out the state anxiety among cricket players and baseball players of Adikavi Nannaya University East Godavari District Andhra Pradesh. The sample for the present study consists of N=20 Male cricket players N=20 Male baseball players of Adikavi Nannaya University Cricket Players age about 20–23 years. To assess the state anxiety, Sports Completion Anxiety test Questionnaires by martens (1977) was administered to obtain the data among cricket players and Baseball players. It was found that cricket players having more state anxiety compare to the Baseball players. Hence, it is also concluded that cricketers having more state anxiety compared to baseball. It is recommended the mental training must be given to cricket players and baseball players.

Keywords: State anxiety, Baseball cricket, Mental training

INTRODUCTION

The sports community now recognizes that mental factors such as confidence, composure, focus, and motivation are highly significant to athletic performance. As a result, over the year's performance enhancement has become an emerging career track within the field of sport psychology. Sport psychology (or sports psychology) is the study of the psychological factors that affect participation and performance in sports. Sport psychology professionals who focus on performance enhancement aim to increase athletic performance by minimizing the psychological effects of poor performance and instilling the mental skill needed to attain peak performance. In order for the field of sport psychology to advance professionals must educate the sports community on the value and benefits of mental training.

Suman Mahadevan Savitribai Phule pune university, Prajakta Halankar (2021) study was Competitive state anxiety that

occurs prior to the competitive situation is referred to as Pre-Competitive Anxiety. The purpose of this descriptive comparative study was to find out the Pre-Competitive Anxiety level between male and female intercollegiate baseball players of Goa. For which 200 samples were selected. The sample for the study had been selected based on non probability-based purposive sampling technique out of which 100 male and 100 female intercollegiate baseball players who had participated in intercollegiate baseball tournament organized by Goa University in the year 2019–20, the age of the player is 18–25 years and the one who had 2 years playing experience in intercollegiate baseball tournament. The data were collected with the help of the Sports Competitive Anxiety Test (SCAT) standardized by Martens (1977) in the form of paper-pencil test. The test contains 10 items, 10 of which measures symptoms associated with the anxiety of the players. In which the score is normalized on the 3-point scale (rarely 1, sometimes 2, and often 3) wherein (0–17) being the low competitive anxiety and (24–40) being the highly competitive anxiety. Further, the data was analyzed, the calculated mean value of comparing pre-competitive anxiety among male and female intercollegiate baseball players was 33.32 and 35.11. Further for analyzing data independent sample T-test was computed. The calculated

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t value is 2.994, the result shows the calculated t value has a significant difference at 0.05 level of significance ($P=0.003$); hence, this study can be concluded that there is a significant difference in pre-competitive anxiety of male and female intercollegiate baseball players of Goa. The study concludes that men baseball players had less anxiety than that of women interuniversity baseball players of Goa.

OBJECTIVE OF THE STUDY

Objective of the study finds out the comparison of state anxiety between cricket players and baseball players of Adikavi Nannaya University, East Godavari District.

METHODOLOGY

The purpose of the present study to find out the state anxiety among cricket players and baseball players of Adikavi Nannaya University East Godavari District Andhra Pradesh. The sample for the present study consists of N=20 male cricket players N=20 male baseball players of Adikavi Nannaya University cricket players age about 20–23 years. To assess state anxiety, sports competition anxiety test were conducted among cricket players and baseball players.

Tool Anxiety (Psychological Factor)

Sport Competition Anxiety Test (SCAT) Questionnaires Prepared by the Rainer Martens was used in the study, this questionnaire of a series of fifteen statement in which the individual must respond by answering either “hardly or ever” or “Something” OR “Often”, which includes five spurious items, two negative item, and eight positive items.

Purpose of the Test

To purpose of the test is to find the level of state anxiety.

Procedure

The author observed all the players N=40 for maximum of 8 weeks, the author look after the cricket players and baseball players during their practices and tournaments, he observed their behavior, attitude, emotions through 8 weeks after that he explained about the sports completion state anxiety test, organized the test as per norms given by Marten and collected the data, it was found that cricketers having more state anxiety level then baseball players, the reason is that more spectators, while baseball tournaments had less spectators

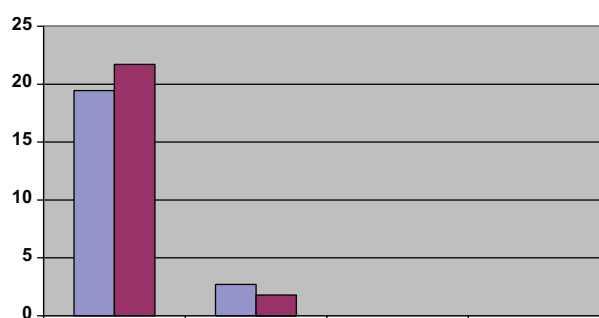
RESULTS AND DISCUSSION

This study shows that cricketers are having average state anxiety compare to baseball players the reason due to a greater number of spectators in cricket tournament and very less spectators in baseball tournament.

Table 1: Mean values and Independent Samples sports completion anxiety between Cricket players and baseball players

Variables	Group	Mean	SD	t	df
Sports competition anxiety test	Baseball players	19.44	2.71	0.888	38
	Cricket players	21.7	1.79		

*Significant at 0.05 level



Sports competition anxiety test 1

In Table 1 the mean values of sports competition anxiety test of cricketers is 21.7 and baseball players is 19.44.

It was found that baseball players having less level of anxiety compare to cricket players. The reason behind this more spectators in cricket tournaments and less spectators in baseball tournaments. in the graph blue bar showing the anxiety level of baseball players and the brown bar showing the anxiety level of cricket players.

CONCLUSION

It was concluded that baseball players having less anxiety level compare to cricket players, because of more spectators, it was clearly mentioned that sports players need autogenic training to achieve the specific goals, players need optimum level of anxiety to win. If it crosses the peak level it leads to loss and depression, hence author feels autogenic, mental training is very important to perform well in the tournaments.

Recommendations

1. Similar studies can be conducted on other events and among others games.
2. This study also helps the physical educators and coaches to improve their training regime to excel in cricketer and baseball.

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Research Article

The effect of physical fitness on hockey and football players

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ABSTRACT

Health and physical fitness have a vital role in the life of men from time immemorial. The progress of the Nation lies in the hands of the people, who are healthy and physically fit. Every individual should develop physical fitness for a happy and effective living. In order to get physical fitness one has to involve in physical activities. Physical activity is essential for the development of wholesome personality of a child which would depend on the opportunities provided for wholesome development of the mental, physical, social, and spiritual aspects. Hence a well-organized and properly administered physical education program for school children is very essential. Physical activity throughout the ages has been acclaimed for health and recreation. It provided fun and enjoyment. It also provided youthful exuberance and the elderly care. Physical activity and movements are as old as human existence. It played numerous roles from struggle for existence to struggle for excellence. A sport is an activity in our lives where pursuits of different movements achieved through the total investigation of Neuromuscular coordination. In this modern era, we can see that each and every individual directly or indirectly related to sports. Modern Physical Education is commonly known as there are sports where pursuit of discipline freely formed such as biological, social, and physical sciences.

INTRODUCTION

Health, fitness, and performance are poorly correlated phenomena. Health is generally defined as the freedom from disease, fitness strictly relates to a man's ability to meet the demands of his environment and excellence in performance. Most authors define "physical fitness's the capacity to carry out everyday activities without excessive fatigue and with enough energy in reserve for emergencies. Emphatically this definition is inadequate for a modern way of life. By such a definition almost anyone can classify himself as physically fit Gatchell (1977) Fitness is a broad term denoting dynamic qualities that allow to satisfy the needs regarding mental, emotional stability special consciousness and adoptability spiritual and oral fear and organic health are consistent with heredity. Physical fitness means that the organic systems of the body are healthy and

function efficiently vigorous tasks and leisure activities beyond organic development, muscular strength, and stamina. Physical fitness implies efficient performance in exercises Bucher and Prentice (1985).

STATEMENT OF THE PROBLEM

To study the effects of physical fitness and psychological factors on goal shooting performance on hockey and football players.

OBJECTIVES OF THE STUDY

1. To study the physical fitness and goal shooting performance among hockey and football players.
2. To study the influence of aggression and goal shooting performance among hockey and football players.
3. To assess the role of self-confidence on goal shooting performance among Hockey and foot ball players.
4. To compare the performance between hockey and football sample sub groups.

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To study the effect of demographic factors on goal shooting performance

VARIABLES

Independent Variables

1. Aggression.
2. Self confidence
3. Age
4. Games

DEPENDENT VARIABLES

1. Physical fitness test.
2. Goal shooting

Hypothesis

The following are the hypothesis of the present study:

1. There is an effect of physical fitness on goal shooting performance among hockey and football players.
2. There is an influence of aggression on goal shooting performance among hockey and football players. There is an impact of self-confidence on goal shooting among hockey and football players.
3. The demographic factor-like age has significant bearing on goal shooting performance of the sample sub-groups.
4. There is a significant correlation between independent and dependent variables.

Delimitation of the Study

The present study was delimited to psychological factors and physical fitness test. As it was not possible to study all the psychological variables which help the sportspersons to become superior athlete or player and to train them for higher sports. Second, the study has been delimited to age.

Limitation

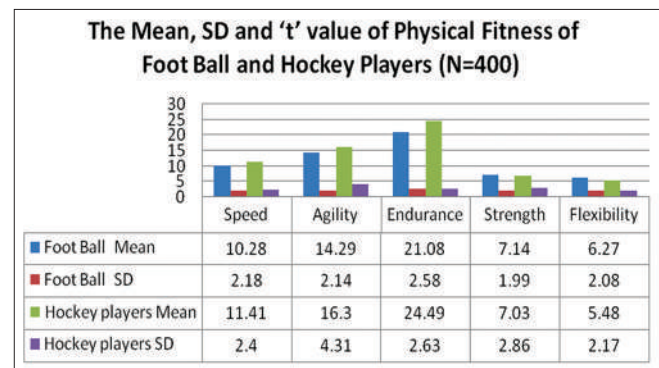
The study is limited to the hockey and foot ballplayers who have participated at inter-university level competitions only.

Sample

The sample of the study consists of 400 sportspersons (200 Hockey players and 200 foot ballplayers). The age range of the sample was 18–25 years. Initially, the large number of players were chosen for the administration of tests such as aggression and self-confidence to classify in equal number of high and low self-confidence and aggression similarly an equal number of players from hockey and football, two age groups (18–21) and age group (22–25) were selected finally. Thus, the sample to match for age, game (hockey and football) aggression, and self-confidence. Thus, the finally selected sample of 400 subjected to Physical Fitness test and sports performance (goal shooting) in respective games. The distribution is as under:

Analysis of Data

Table 1 gives mean scores, SD, and 't' values of physical fitness test of both hockey and football players. It is observed that football players have taken less time (10.28 s) than hockey players (11.41 s) in speed test. This shows that the physical fitness of the football players is significantly higher than the hockey players. The 't' value 7.72 is significant, to reveal significant differences in speed test between these two game players. Thus, the speed ability is more in football players. Similarly, football players have exhibited higher performance in both agility and endurance test than hockey players by consuming lesser time. The 't' value of these two tests is significant to indicate the significant differences between the sample subgroups. In flexibility test, the higher score is of football players (6.27) than the Hockey players (5.48) and the 't' value is (5.64) significant at 0.01 level. This speaks that there are significant differences between these players, but in the test of strength there are no significant differences. Therefore, the football players are found to be more physically fit than the hockey players in all the physical fitness as the scores indicate.



Graph 1: Conclusion of the study

Table 1: The Mean, SD and 't' value of Physical Fitness of Foot Ball and Hockey Players (N=400)

Game	Speed	Agility	Endurance	Strength	Flexibility
Foot Ball Players					
Mean	10.28	14.29	21.08	7.14	6.27
SD	2.18	2.14	2.58	1.99	2.08
't' value	7.72**	5.91**	13.36**	0.78	5.64**
Hockey players					
Mean	11.41	16.30	24.49	7.03	5.48
SD	2.4	4.31	2.63	2.86	2.17

** Significant at 0.01 level.

CONCLUSIONS

- There is a significant difference between foot ball and hockey players in physical fitness - in all the physical fitness test except in strength test where foot ball players have significantly higher strength than hockey.
 - The players with lower age have significantly higher fitness than the higher age in all the tests of the physical fitness.
 - The high aggressive players have shown higher performance in speed, agility, strength and flexibility while the low aggressive players have shown higher performance in endurance.
- The high confident players have significantly higher scores in speed, agility, strength and flexibility tests and lower scores in endurance test than the low confident players.

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Review Article

Impact of Coronavirus disease-19 in 2020 and 2021 (Effecting Future of Sports Events and Health)

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ABSTRACT

During the Pandemic its unprecedented movements almost in all over the world to face all the challenges not even in the field of sports as well as all other aspects of life to affect them directly since its detection in Wuhan in December 2019 in China and team sports have been no stranger to this reality from 2019 to date. In this Confinement period Strategies should be developed to control body composition. Mental fatigue should be anticipated and mental controlled. Adequate methods of recovery should be provided. Daily monitoring should be established. This is an ideal situation in which to rethink personal life, understanding the situation, and impact of Coronavirus disease-19 on future sports events as well as athlete's performance that can be promoted in these difficult times that affect practically the whole world.

Keywords: Confinement, Coronavirus disease-19, Future of Sports, Strategies, World Health Organization

INTRODUCTION

According to the World Health Organization (WHO) Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. Most people infected with the COVID-19 virus will experience mild to

moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems such as cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

The best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol-based rub frequently and not touching your face. The COVID-19

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virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). It is also known as the "Wuhan coronavirus," is an illness caused by the enveloped RNA severe acute respiratory syndrome coronavirus (SARS-CoV)-2 virus identified in Wuhan (China), a causative agent of a potentially fatal condition that has become a significant public health concern worldwide.^[1] The SARS-CoV-2, a member of the beta coronavirus genus, is capable of infecting humans and animals. Coronaviruses are common viruses in nature, and several of them can infect humans, causing mild diseases in the form of colds.^[2] However, genetic differences between this virus and others from the same family makes it more contagious and aggressive. As a consequence, on January 30, 2020, the WHO determined that the outbreak of COVID-19 became a Public Health Emergency at the international level.^[3] The WHO Member States were the advised to consider options to prevent the introduction of the disease to new areas or to reduce human-to-human transmission in zones where the virus COVID-19 was already circulating. Following the WHO recommendations, many countries imposed social distance measures to contain the spread of COVID-19 such as restricting travel from abroad, quarantining citizens returning to their home countries, limiting internal movement, massive testing, and in some cases of countries severely hit by the epidemic, a major lockdown, confining all the population and maintaining only essential services.

SPORTING EVENTS DURING THE COVID-19 OUTBREAK

The spread of COVID-19 and the measures taken by the governments have forced the relocation, interruption, partial or total cancellation of an endless list of sports competitions since January 2020.^[6] Two Olympic qualifying tournaments were the first sporting events affected by the virus: The women's football qualifiers and the boxing qualifiers. Both were initially taking place in Wuhan (China), the original epicenter of the COVID-19 pandemic. Since then, virtually all sports leagues and competitions around the globe have suffered the impact of the SARS-CoV-2 in one way or another. National Basketball Association, National Hockey League, Union of European Football Association Champions League, the English Premier League, or Spain's "La Liga," to put only some examples of internationally renowned team sport competitions, were suspended. Basketball Euro League and Australia's National Rugby League 2019–2020 seasons were canceled, the Major League Baseball competition was delayed, and the International Olympic Committee announced on March 30, 2020, that the Tokyo Olympics were postponed for a year and will take place in July 2021. As a consequence of these alterations and restrictions imposed by the governments,

almost all teams and athletes ceased their daily activity. Those constraints affected professional and amateur sports equally.

HEALTH ISSUES IN THE ATHLETES DERIVED FROM COVID-19

COVID-19 can be transmitted by close contact with respiratory droplets and touching inanimate objects or materials with relevant virus existence as the primary sources of infection. The virus can remain on surfaces such as metal, glass or plastic up to nine days if no prior disinfection procedure occurs. Once a person is infected, the incubation period for the illness can reach 14 days, but 95% of the cases occur in just 5 days. Main symptoms can be divided into two groups; systemic disorders (fever, cough, fatigue, sputum production, and headache as the typical cases) and respiratory disorders such as rhinorrhea, sneezing, a sore throat, and pneumonia.¹ Fever is the most common sign of this medical condition, and it is present in the vast majority of the cases, followed by fatigue (70%), dry cough (59%), and myalgias (35%) other common clinical presentations. However, some people will experience loss of smell (anosmia), altered taste (dysgeusia), labored breathing (dyspnea), or gastrointestinal manifestations.^[7] Dyspnea seems to affect only severe COVID-19 cases, 1 and pneumonia with bilateral infiltrates is the most severe condition arising from the illness. Approximately 20% of the diagnosed cases will develop into severe or critical cases.

The COVID-19 pandemic is associated with high morbidity rates in older people (>60 years). Many young individuals infected appear to develop a mild disease and recover over 5–7 days, but some will still have a risk of later deterioration (between days 7 and 9), with the lower respiratory tract manifestations, requiring intensive medical care.^[8] It is relevant to highlight that although many studies show that physical activity has a positive effect on improving the effects of the immune system against viral infections,^[9] athletes per se are not protected from COVID-19.2 In case of a high fever (over 37°C) or severe shortness of breath, all physical activity must be suspended immediately to avoid further complications^[10,11] and, it is more than recommended to seek expert medical health to find out the underlying causes.

To determine the level of physical activity that an individual can perform after upper respiratory tract infection, if the fever can be contained, the "neck check rule" is useful.^[9] According to that rule, if symptoms are limited over the neck (coughing, sneezing, and sore throat), the individual is asked to jog for 10 min. Deteriorated conditions and signs after this time "raise" a red flag until full recovery. If the condition does not change, moderate physical activity under 80% of VO₂max is allowed. Nevertheless, if the symptoms are below the neck (myalgia, gastrointestinal symptoms, or persistent fever), physical activity should be prohibited until recovery. In the case of pneumonia,

return to physical activity should be slow and gradual in all cases, taking at least 4 weeks to resume it at a moderate level.

Besides, the above-mentioned medical problems derived from an eventual COVID-19 infection, many collateral physical and psychological problems arise due to the confinement situation. A relevant consequence of home isolation is reduced exposure to daylight, essential to induce Vitamin D synthesis and the avoidance of physical activity and sleep patterns, as well as meal timing perturbations. Confinement also decreases physical activity levels and increases sedentary behavior. Individuals under lockdown spend more time sitting and doing activities with low rates of energy expenditure, such as office work, social networking, and watching television. To avoid undesired increases in body mass due to reduced energy expenditure, nutritional advice can be necessary in some cases. Numerous emotional problems, including stress, depression, irritability, insomnia, fear, confusion, anger, frustration, boredom, and stigma, are associated with quarantine. Some of these mental health issues persisted after the quarantine was over. The duration of the confinement and medical problems are specific stressors to be considered. Athletes appear to be at a comparable risk of mental disorders relative to the general population. Athletes who are going through particular difficulties, such as injuries or recent poor game performances, may be at a higher risk of experiencing mental problems. The anomalous situation resulting from the COVID-19 pandemic is undoubtedly an element to consider.

Lockdown is also distancing athletes from their daily training and competition routines and is increasing the uncertainties about the future. Reduced training and the loss of performance capacity reduces their future competitiveness, damaging their physical, technical, and psychological capacities. Two main strategies are acknowledged as the most effective to avoid a SARS-CoV-2 infection.^[2] To prevent this coronavirus from entering in our organisms, physical distancing and hand washing for at least 20 s with soap or using hand sanitizer (at least 60 percent alcohol),^[18] and not touching our face or nose seems to be the most relevant measures. If we become infected, a healthy lifestyle can be an essential immune system booster.^[2] Bodies such as the American CDC (Centers for Disease Control and Prevention) recommend wearing masks in public, especially if social distancing is challenging to maintain. They also encourage to be careful after touching door handles, shopping carts, or elevator buttons in public places. If we have to cough or sneeze, we should do it in the bend of the elbow.

EFFECTS OF DETRAINING INDUCED BY COVID-19

During the COVID-19 lockdown, regular training routines of athletes around the world have been discontinued. These

unexpected breaks damage the quality and quantity of training, distancing the athlete from their daily routines in regular sports facilities. Training reversibility, also known as detraining, is crucial to understand many of the changes that athletes undergo during training cessation, impairing their future performance. Detraining can be defined as the partial or complete reversal of previously developed training adaptations. The consequences of prolonged physical inactivity at a muscular level are well-known. Initial studies about long rest periods in healthy subjects found nitrogen, phosphorus, and calcium losses on skeletal muscle due to inactivity. Cardiac response with 28% average losses of VO₂max and 11% in heart volume also seems to be impaired by long resting periods.^[20] The rate of loss is unequal in each physical capacity, being higher for endurance and strength endurance than in speed or maximal strength. An accepted convention is that each week of inactivity brings up to 10% overall loss in fitness.^[10] Declines of approximately 90% daily activity levels in healthy young men, assessed in steps/day, entailed a 17% decline in muscle insulin sensitivity, a 7% reduction in cardiovascular fitness, and a 3% decrease in lean leg mass levels, with reduced myofibrillar protein synthesis rates.^[14] Other expected adverse effects of lockdown include an increase in body mass, body fat percentage, loss of mental sharpness and toughness, insomnia and depression. Not only adults have had relevant movement restrictions during the COVID-19 pandemic. Young athletes have also been severely affected, making it necessary to understand if detraining follows the general behavior described in the literature in this population. Upper and lower explosive strength can be retained in teenagers during 16 weeks of reduced training if sports-specific loads (with jumps, frequents accelerations, decelerations, and change of direction) are maintained.^[30] The problem is that it was not the case for the vast majority of athletes during the lockdown. By the consulted studies, it is also clear that metabolic parameters and specially aerobic-anaerobic resistance training may worsen in 15 ± 1-year-old athletes for periods of complete rest over 15 days.^[31] In younger athletes (7 years old), an 8-week detraining period maintained gains on the curl-up and single-leg hop exercises, while long jump levels and balance performance regressed toward baseline.^[32] We need to consider that in youth, neural adaptations to resistance training play a significant role^[33] with a different type of stimuli when compared to adults needed.

During the lockdown, not only the physical fitness of team sports athletes was affected but also effected the future of sports among the athlete's performance as well as effecting the events to organize these regularly in these years especially in the year 2020 and 2021.

As we know, the array of abilities needed to practice sports from this family is varied, with technical and tactical components, game-understanding, and decision making^[34] as paradigmatic aspects. Improve, or even maintaining the level

of these skills has not been an easy task during confinement. Furthermore, the recommendations regarding how to work in individualized conditions are much less specific for physical fitness. We are talking about a group of skills behaving not linearly, and therefore it is even hard to find some guidelines. When it comes to memory-retention, selective attention, and prediction measures, elite team-sport players seem to be better than control groups. Three variables are relevant to improve athlete retention of audio and video feedback, tools that can be used at this time of limited access to team activities. Thus, athlete practice level, attention to coaches' feedback, and the number of ideas conveyed by coaches explained the amount of information retained (63% per-episode). Regarding technical skills, high contextual interference tasks (repeating a sequence of skills, only twice before moving on to the next ability) leads to superior performance on retention and transfer tests than random, blocked, and serial practice in sports such as volleyball. Variable and random practice, small-sided games (if possible, in family units) and problem-solving drills also show effectiveness developing skill acquisition.

LACK OF ORGANIZED TRAINING AND BOOST THE IMMUNE SYSTEM

During the COVID-19 lockdown, many teams have designed home workouts for their athletes to minimize the effects of detraining and physical inactivity and maintain the health and well-being of their athletes. Some staff had gone even further, proposing activities to preserve other skills such as game-understanding, or technical and tactical specific abilities. In other cases, psychological and nutritional advice has also been provided, taking special care of the players who were injured or undergoing sports rehabilitation. However, one of the pandemic's main problems is that containment measures could be extended for weeks or months, 39 increasing the inactivity time unusually compared to what happens in professional sports during the off-season, with shorter transition periods. Confinement training faces relevant issues such as the absence of organized training, lack of direct communication between athletes and coaches, movement restriction, and more critical, inappropriate training conditions. However, a substantial effect on the immune system of moderate-intensity physical activity is reported, showing the importance of these practices. Thus, an increase in neutrophil and natural killer (NK) cell counts, salivary IgA, and stress hormones is reported, with changes in Th1/Th2 cell responses reducing upper respiratory tract infections (30%). Acute exercise seems to stimulate the interchange of immune system cells between lymphoid tissues and blood.^[40] Conversely, intense training can impair the immune system, increasing the risk of eventual COVID-19 infection.¹⁰ After an acute bout of exercise, temporary suppression of

circulating NK cells occurs, restoring average values within 24 h except for prolonged, intense, and stressful exercise.^[41] For the reasons mentioned above, it is essential that coaches have not exceeded reasonable amounts of training in their home workouts, taking advantage of athletes with greater availability due to the confinement.

LOCK DOWN

Although lockdown limits the opportunity to do sport outdoors, home workouts, when adequately designed, seem to provide sufficient stimuli to stay fit and healthy. These home-based activities can include bodyweight training, aerobic exercise, and aerobic high-intensity exercise using stationary bikes or rowing ergometers.^[39] The implementation of online sessions using the internet, media broadcasts, or phone calls to add a social element that can improve adherence is highly recommendable.^[2] Physically active people can use without problem routines with exercises demanding up to 90% of their maximum heart rate (HRmax), with ratings of perceived exertion between five and 10.39. When the workouts are based on high-intensity training (HIT), increases in health markers (cardiovascular fitness, skeletal muscle mitochondrial density, and insulin sensitivity) just after six HIT sessions in 15 days^[14] are observed in healthy individuals. Improvements in fitness and exercise capacity, prevention of sedentary behavior, and reduced risk of cardiovascular mortality have also been attributed to home-based physical activity.^[15] Aerobic physical activity prevents mitochondrial dysfunction and oxidative damage to motoneuron and neuromuscular junction, maintaining neurotrophic release. The advice to protect the neuromuscular system is to use a combination of both high-intensity resistive exercises and aerobic exercise.²⁰ Under confinement, exercises involving large muscle groups (rope-skipping, jogging, burpees, or mountain climbers), alternated with some sort of resistance training in the form of circuits seem to be a suitable formula.

As many athletes are going to train at home under equipment constraints, bodyweight training can be a suitable way to induce strength adaptations. Bodyweight training produced improvement in muscle strength, endurance, agility, cardiovascular endurance, and flexibility in young, healthy males that trained 5 days a week for 10 weeks. Although without nutrition control, bodyweight training seemed to have a small impact on 21–23-year-old women's body composition, it was effective in improving general physical fitness, muscle strength, and endurance. This form of training also increased the participants' flexibility. When used with high frequency and intensity, bodyweight training is recommended for young, healthy people with high motivation for training. As muscle power is particularly susceptible to detraining, even in athletes with experience, plyometric training⁴⁴ and a maintenance program of resistance training are necessary to avoid excessive

declines in neuromuscular function in breaks longer than two or three weeks. The use of inexpensive equipment such as elastic bands or small weights is also an outstanding alternative to the unavailability of bulky traditional strength equipment during the confinement. Bands are affordable, can be used almost everywhere; many exercises can increase their resistance with them and show a similar effect in prime movers, antagonists, synergists, and stabilizing muscles to is inertial resistance training. Kettlebells, for instance, show viability increasing strength and power, and may also show postural control enhancement. Suspension training can also be used without any problems in small places. The invention of some branded devices is attributed to American soldiers looking to do exercise in boats and submarines, where significant space constraints exist. Research with a high-level of scientific evidence shows that muscle activation using suspended exercises is higher to comparable traditional resistance exercises.

Some work oriented to maintain the range of motion can be included in the workouts of home-confined team sport athletes. To be effective, the training plans should include major muscle groups (prime mover of relevant kinetic chains) and at least two or three specific sessions per week, with static and dynamic exercises. The use of recovery strategies is also a practice that can be implemented in home activities during the COVID-19 lockdown. Several methods, such as cold-water immersion, contrast water therapy, compression garments, stretching, psychological techniques, or proper management of sleeping times, can enhance subsequent physical performance while diminishing the impact of HIT on the immune system.

Exercise can help to avoid some of the issues of home isolation, such as depression, stress and anxiety. Evidence shows that regular activity improves mood and sleep quality. Active people are more likely to show mental well-being^[51] with several studies suggesting that mindfulness and yoga can be good practices to decrease depressive and anxious symptoms, being effective strategies to improve mood.

RECOMMENDATIONS

1. Daily health check of the athletes, including regular temperature checks
2. Hand washing, alcohol-based hand gel, and hygiene facilities in the event facility and accommodation
3. Provide medical masks to athletes, technical staffs, medical staff, organizers, media staff, and sick individuals
4. Ensure proper hygiene signage across all venues, changing rooms, and training facilities
5. Physical (at least 1 m) distancing of competitors, officials, audience and support staff
6. Thorough disinfection and cleaning after and between practices and competitions of all the facilities
7. Prohibition of sharing equipment, in particular towels, water bottles, and cups
8. Safe utilization of containers for disposable and reusable hygiene materials
9. Ensure capacity to isolate suspected cases
10. Provide first aid and medical services which can triage and refer suspected cases for COVID-19 testing
11. The International Olympic Committee must ask to all National and International Sports Federation to give awareness to their teams about covid 19 before they go to any sport event at international level
12. WADA the World Anti-Doping Agency must help to athletes specially in emerging nations for their COVID tests to make sure the clean sports events and the Safety of all Athletes.

CONCLUSIONS

The COVID-19 pandemic has hit all substrates of society hard among the team sports events impacting directly and individually the performance of athletes. Nevertheless, most teams and Athletes have been active during government-imposed lockdowns, working with their players to maintain a certain degree of normality to avoiding detraining to reduce the impact of this pandemic on their sports performance. During the COVID-19 pandemic, many studies with recommendations have been published to help athletes and organizers among coaches of the teams and athletes. However, to the best of our knowledge, those providing verified information are scarce so that the pandemic effect could be reduced for the athletes and teams for their future performance as well as all sports events.

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Research Article

Comparison of handgrip strength performance on difference rest interval after 1RM deadlift trial in varsity male rugby players

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ABSTRACT

The purpose of the study was to assess the handgrip strength performance in three different rest intervals after the 1RM deadlift trial among varsity male rugby players. The previous studies reported that different length in the rest interval impacts the performance and outcome of any given exercise or maximal effort trial. In this study, we recruited 15 varsity male rugby players (age: 24.93 ± 2.60 years, height: 171.27 ± 4.18 cm, and weight 84.69 ± 11.37 kg) to test their handgrip strength after performing 1RM deadlift trail. The participants performed three trails on one repetition maximum (1RM) deadlift exercise and they were tested on their handgrip strength in three different intervals: 1-min, 3-min, and 5-min after each trail. Results revealed that handgrip strength after 5-min rest interval ($M = 58.00 \pm 5.06$ kg-force) increased significantly if compared with 1-min ($M = 47.73 \pm 3.61$) and 3-min rest intervals ($M = 53.07 \pm 3.17$ kg-force). A repeated-measures ANOVA with a Greenhouse-Geisser correction showed that mean handgrip strength differed significantly between time points [$F(1.78, 24.95) = 98.93, P < 0.001$]. *Post hoc* tests using the Bonferroni correction revealed that handgrip strength increased by an average of 5.33 kg between 1-min and 3-min rest interval ($P < 0.001$) and then increased by an average of 4.93 kg between 3-min and 5-min rest interval ($P = 0.003$). In conclusion, handgrip strength during 1RM deadlift trial with 1-min rest interval resulted in decreasing force of handgrip compared to 3-min and 5-min rest interval length with 5-min produces the highest amount of force.

Keywords: Rest interval, Handgrip strength, Deadlift, Male rugby players

INTRODUCTION

Muscular strength is one of the health fitness components. It is referred to as the amount of force production in a single maximal effort (Kenny *et al.*, 2015). Inclusion of resistance training in the training program helps to improve muscular strength. It has also been part of the training program for sports that require strength in performing their games. Rugby involves a combination of fitness components; hence, one of it is muscular strength. Strength of the upper body helps rugby players perform well during training and game time. Improving this will help in enhancing the performance not only for the individuals but also will benefit the team. Measurement of muscular strength

stands as a benchmark for a person to improve performance. This muscular strength can be measured using one repetition maximal (1RM) approach. This approach required to perform one specific type of exercise-related, in this case, deadlift, with a particular load in a single full range of motion trial. There is a set of protocols that need to be followed before the test. There are two methods in performing this 1RM, either using the direct maximal testing or indirectly using submaximal effort.

In the 1RM protocol, there is a specific rest interval time that has been recommended. Resting in between one repetition maximum trial always be part of the protocol. Fatigue while performing the test trial can be recovered by having rest in between trials. The suggested rest interval will always be a factor considered as part of the recovery.

Handgrip strength in performing this test is essential as it is part of the test. Performing deadlift requires a right handgrip

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to lift and hold the load prescript. By measuring the handgrip strength during the rest interval, hopefully, we can determine the muscle contraction in performing the test after a certain period. Evaluation of this handgrip strength is essential in assessing the readiness in performing the 1RM test in between trials.

Objective of Study

The main objective of this study is to assess the influence of three different rest intervals on handgrip strength performance after the 1RM deadlift trials among varsity male rugby players using the handgrip test.

METHODS

Subjects

Fifteen varsity male rugby players (age: 24.93 ± 2.60 years, height: 171.27 ± 4.18 cm, weight 84.69 ± 11.37 kg) volunteered to participate in this research. All subjects were trained athletes with at least 1-year resistance training experience and without any musculoskeletal disorder. Before the study, all participants have been briefed on the objectives and risks of the research and agreed to answer the Physical Activity Readiness Questionnaire, PAR-Q, and signed an informed consent form before participation in the study. The exclusion criteria (a) subjects with a chronic cardiac, respiratory, renal, or metabolic disease and (b) subjects with an orthopedic limitation. No participant was taking any medication or nutritional supplement known to affect resistance exercise performance.

Before the assessment, participants' attributes such as weight, height and grip strength were recorded. The relative deadlift 1RM for each participant was calculated based on at least 1.5 times of their body weight (2.0 ± 0.3 kg.kg⁻¹) (Ruf *et al.*, 2017). Testing apparatus, Jamar handgrip dynamometer introduced to the participants and shown on the usage. The positioning of the tool followed the protocol suggested by Roberts *et al.* (2011), which is in the standing position with the upper hand hanging straight down. Participants were instructed to use their dominant hand in executing the test. Familiarization on 1RM deadlift session using a 20-kg barbell performed by all the participants.

Procedures

Three trial sessions separated by an interval of 48 h executed by each participant. The session performed at the same time of the day for all the sessions. The first session was the 1-min rest interval between test trials, followed by 3 min rest interval in the second session and 5 min rest interval for the third session. After each rest interval, the participant's handgrip strength was measured and recorded. The 1RM deadlift assessment for this study followed the protocol and guidelines that have been used by Ruf *et al.* (2017).

Before each assessment, participants were required to perform 5 min dynamic mobilization warm-up and stretching, followed by three sets of 25-kg deadlift routine. Six attempts need to be completed, with the first three attempts at 20%, 40%, and 60% of 1RM with three repetitions each and subsequent three attempts at 80%, 90% of 1RM and 1RM with one repetition. Incremental of between 1 and 5 kg of load added after each successive effort based on the suggestion by the tester. The rest interval between trials was set according to the session as described before. After each prescribed rest interval, participant's handgrip strength was measured and recorded, and they continued to the next intended 1RM trial until completed the whole protocol.

Statistical Analysis

Means and standard deviations calculated for all variables. A one-way repeated measures ANOVA was conducted to determine whether there were statistically significant differences in the detected variables throughout measurements. All statistical analyses were performed using SPSS v.22 (SPSS, Chicago, IL) and GraphPad Prism 8 version 8.0.2 (263). The significance level was set at $P \leq 0.05$.

RESULTS

The performance of the Handgrip performance in the 5 min interval ($M = 58.00 \pm 5.06$) reported higher than the 3 min ($M = 53.07 \pm 3.17$) and 1-min interval ($M = 47.73 \pm 3.61$) after the 1RM Deadlift trial as Table 1.

A one-way repeated-measures analysis of variance (ANOVA) conducted to evaluate the handgrip strength when measured at a rest interval of 1, 3, and 5 min in rugby male varsity players ($N = 15$). The results of ANOVA indicate a significant handgrip effect, Wilks' Lambda = .01, $F(3, 12) = 508.23$, $P < 0.05$, partial $\eta^2 = .99$. Thus, there was a significant between these scores.

Participants went for the 1RM Deadlift trial. Their 1RM relative to their weight was calculated and their 1RM for each session was recorded. Their handgrip strength is measured after 1-min, 3-min, and 5-min rest intervals between tests. Normality checks were carried out on the residuals, which were approximately normally distributed.

A repeated-measures ANOVA with a Greenhouse-Geisser correction showed that mean handgrip strength differed

Table 1: Mean of handgrip strength performance in difference rest interval

Stage	N	Mean	Std. deviation
1 min after	15	47.73	3.61
3 min after	15	53.07	3.17
5 min after	15	58.00	5.06

significantly between time points [$F(1.78, 24.95) = 98.93$, $P < 0.001$]. *Post hoc* tests using the Bonferroni correction revealed that handgrip strength increased by an average of 5.33 kg between 1-min and 3-min rest interval ($P < 0.001$) and then increased by an average of 4.93 kg between 3-min and 5-min rest interval ($P = 0.003$).

DISCUSSION

The main finding of the present study was that 1-min rest intervals resulted in significantly lower handgrip strength during the 1RM deadlift trial compared with the 3-min and 5-min rest interval. There was no similar study the same as the present study, but the method and goal are identical. Rest interval influences the number of repetitions performed during the examination in most of the previous research. The influence relates to the recovery period before another set of exercises or trials can be executed. The recovery period is crucial in performing any maximal effort trial as it is among factors contributing to the improvement of performance and result. Hence, the increase in the number of repetitions performed during the previous study can be related to the growth of the handgrip strength as both depend on the muscle recovery factor.

When comparing the number of repetitions between one and 3-min rest intervals during resistance exercise by Arazi *et al.* (2016), the outcome showed comparability with the present study. In their research, the two experimental sessions were designed for 12 trained men to perform six lower body exercises composed of 3 sets with 8RM loads in the sequence of squat, leg press, leg extension, leg curl, standing calf raise, and seated calf raise. Rest interval of 1 and 3-min in the session is the only factor differentiating the experimental setup.

Based on the results, there is a significant difference between 1 and 3-min rest interval, where less number of repetition in all exercise occurred during the 1-min rest interval. Comparison between sets also shows that there is a significant reduction in the number of repetition where a 1-min rest interval between sets two and three shows significantly decreased in the number of repetition performed.

Faigenbaum *et al.* (2008) evaluate three rest interval times for their study on bench press performance among boys, teens, and men and the result based on the rest interval quite similar to present study findings. Twelve boys, 13 teens, and 17 men were involved in this study, performing ten repetitions of 10RM load bench press in three sets with rest intervals set at 1, 2, and 3 min long. The result showed an increase in the number of repetition in all the groups when we compare the rest interval. Age also influenced the number of repetitions performed between sets where the boys' participant group with all the same test protocol completed with the highest number of repetition compared to the other two groups.

Discussion on physiological aspects by Abdessemed *et al.* (1999) associated the reduction in the total number of repetitions with the simultaneous effects of the lactate accumulation and insufficient time for a total creatine phosphate (CP) store resynthesize. Ten physical education students performed ten sets of six repetitions with 70% of their 1RM and their blood lactate profile taken and analyzed. Knowing that the strength performance is highly dependent on the anaerobic energetic metabolism (especially ATP-PC), rest interval length in each exercise or session, determines fatigue development. Hence, the rest interval between sets and exercises effectively result in different physiological responses, which causes an impact in resistance training programs, according to the aimed objective (Abdessemed *et al.*, 1999).

From the present study result, comparison of both handgrip strength and 1RM value according to the rest interval time shows that the 5-min rest interval increased the performance of the participants. We can associate the increase in handgrip strength, and 1RM performance during the 1RM test is related to the rest interval factor. The study by Senna *et al.* (2009) on 14 men performing three sets of the lower body and upper body exercise in a rest interval of 2 and 5 min in 4 training sessions with a load of 10RM revealed some similarity with the present study. Similar results found with current research where there is an increase in the number of repetition when it is performed with a more extended rest interval period. This research emphasized that rest interval variable consideration when working on the volume of repetitions as to achieve specific volume, longer rest intervals is necessary.

Further studies using other exercises, different intensities and populations should be carried out. Additional studies are also necessary to determine the explanation mechanisms for the decrease in muscular performance using different Rest Interval between sets in various populations. Study with consideration on the type of rest such as active and passive rest. The physiological and psychological factor can be part of the future study to prove the effect of rest interval length biologically. Encouragement and motivation factor also influence the performance when performing a maximal effort trial.

In conclusion, the rest interval promotes recovery during exercise and helps in improving performance, but it all depends on the objective that we need to achieve.

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Research Article

Effect of plyometric training for the development of general motor ability among the kabaddi players of Osmania University, Hyderabad, Telangana state

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ABSTRACT

This study was concluded to find out the effect of plyometric training for the development of general motor ability (muscular endurance). This was an experimental study. For concluded this study, $n = 40$ university players were selected as subject age about 21–23 years. Two equivalent groups of 40 members as one experimental Group I, that is, plyometric training group ($n = 20$) and a control group ($n = 20$) passing through plyometric training for 8 weeks furthermore 3 days out of every week plyometric training were given to experimental Group I and a control which has normal training apart from which they were not involved in any special training. The experimental group's performance on sit ups test improved from pre-test to post-test mean S.D. After 8 weeks of plyometric training, it is concluded that significant effect in experimental Group I whereas the control group exhibits a stagnation in their performance.

Keywords: Muscular endurance, Plyometric training, Sit-ups

INTRODUCTION

Muscular endurance describes your muscles' ability to fight against fatigue locally during a longer exercise. In short, it teaches your muscles to continuously contract efficiently even in high-intensity situations. While that sounds pretty similar to cardiovascular endurance, they have a few differences that really set them apart. You see, cardiovascular endurance, also known as *aerobic fitness* or "*cardio*," describes your hearts and lungs' ability to deliver oxygen to your muscle tissue.

Muscular endurance, on the other hand, refers to the muscle's ability to contract as efficiently as possible for as long as possible. It is often trained in higher intensity exercises with shorter rest periods between sets. In a way, muscle endurance is a combination of strength and endurance. It describes how

long you can maintain a high level of muscle activation and still perform without fatigue. Therefore, muscular endurance training has little effect on the strength or size of the muscle.

Beato, M Binchi, M, Coratella, G, Merlini, M, and Drust, B Effects of plyometric and directional training on speed and jump performance in elite youth soccer players. J Strength Cond Res 32(2): 289-296,2018 – soccer players perform approximately. One thousand three hundred and fifty activities (every 4–6 s), such as accelerations/deceleration and changes of direction (COD) during matches. It is well established that COD and plyometric training have a positive impact on fitness parameters in football players. This study analyzed the effect of a complex COD and plyometric protocol (CODJ-G) compared with an isolated COD protocol (COD-G) training on elite football players. A randomized pre-post parallel group trial was used in this study. Twenty-one youth players were enrolled in this study (mean \pm SD; age 17 ± 0.8 years, mass 70.1 ± 6.4 kg, and height 177.4 ± 6.2 cm) players were randomized into two different groups: CODj-G ($n = 11$) and COD-G ($n = 10$) training frequency of 2 times a week more than 6 weeks. Sprint 10,

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30, and 40 m, long jump, triple hop jump, and 505 COD test were considered. Exercise-induced within-group changes in performance for both CODJ-G and COD-G: Long jump (effect of size [ES] = 0.32 and ES = 0.26, respectively) and sprint 10M (ES = 0.22, respectively) after 6 weeks of training. Moreover, CODJ_G reported substantially better results (between-group changes) in long jump test and (ES = 0.32). In conclusion and able to give a meaningful improvement on power and speed parameters in a specific soccer population. CODJ_G showed a large effect in sprint and jump parameters implication for designing COD and jumps training in elite soccer.

Objectives of the Study

The objective of the study is to find out the effect of effect of plyometric training for the development general motor ability (muscular endurance).

Hypothesis

It was hypothesized that there would be significant difference in effect of plyometric training for the development of general motor ability (muscular endurance).

METHODOLOGY

This study was concluded to find out the effect of plyometric training for the development general motor ability (muscular endurance). This was an experimental study. For concluded this study, $n = 40$ university players aged about 21–23 years were selected as subjects' = 40 divided into two groups experimental Group I and controlled Group II.

Assessment of Performance

The experimental groups were engaged with an intervention based on plyometric, which was employed for 8 weeks with three sessions per week. At the same time, the controlled group engaged in general training, they were tested on sit-ups before the intervention and the performance variable was retested again after the 8-week intervention

Tools

Sit-ups

Purpose of the test

The purpose of the study was to measure the muscular endurance.

Equipment required

Flat, clean, cushioned surface, stopwatch, recording sheets, pen. Some variations will also require the following: Curl up strips, a tempo device (a metronome, drums, a sit-up beep test mp3, the PACER test cd which includes cadences for a sit-up test).

Scoring

The completion of one complete curl-up (up and back) counts as one. The sit-up must be performed correctly for it to be counted. For the tempo tests, the test is continued until the subject cannot maintain the rhythm or has reached the target number for the test.

RESULTS

The experimental group and the controlled group were given pre- and post-tests to see if there was an improvement in

T-test								
Paired samples statistics								
Sit-ups sprinters	Mean	N	Std. deviation	Std. error mean				
Control group								
Pre-test	32.4500	20	0.97198	0.21734				
Post-test	32.7500	20	0.98006	0.21915				
Experimental group								
Pre-test	32.8750	20	1.02437	0.22906				
Post-test	36.4000	20	1.48324	0.33166				
Paired samples test	Paired differences					t	df	Sig. (two tailed)
	Mean	Std. deviation	Std. error mean	95% confidence interval of the difference				
				Lower	Upper			
Control group								
Pre-test	−0.30000	0.61559	0.13765	−0.58810	−0.01190	−2.179	19	0.042
Post-test								
Experimental group								
Pre-test	−3.52500	0.78598	0.17575	−3.89285	−3.15715	−20.057	19	0.000
Post-test								

muscular endurance after 8 weeks of plyometric training, while the controlled group received general training.

The analysis of the data reveals that the subjects with the plyometric training have shown improvement in the performance of sit up test from pre- to post-test mean SD. Experimental group pre-test result shown (32.8750) and controlled group (32.4500) after 8 weeks of specific of plyometric training. There is improvement in the subject's experimental group (36.4000) plyometric training and controlled group (32.7500).

CONCLUSION AND DISCUSSION

Based on our study results, it was concluded that there was significant alteration in muscular endurance due to 8 weeks of plyometric training compared with controlled group. Further, there is significant improvement in muscular endurance. I concluded that the assessment process can be conducted every 3 and 6 months to update the progress of players performance and to ensure that it is up to date with the players training needs requirements. It is recommended that coaches assess their player's performance on a regular basis to ensure better compliance with the training program.

RECOMMENDATIONS

Based on the findings of the present study, the following recommendations have been made.

1. Similar studies may be conduct in female section
2. Similar studies may be conduct between individual and team sports
3. The researcher suggests the part of the coach to use the above-said development of the plyometric training program for kabaddi players. The study helps the physical educationist and coaches for selecting the players.

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Research Article

A comparative study of sport competition anxiety between junior and senior Kho-Kho players of Kashmir

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ABSTRACT

The purpose of the study was to compare the sport competition anxiety between junior and senior Kho-Kho players of Kashmir. For this study total ($n = 50$) samples were taken. Twenty five samples in each group junior age group 14–18 years and senior age group 20–30 years Kho-Kho players respectively. Sport competition anxiety questionnaire (SCAT) by Martin *et al.* (1990) was used for assessing the sport competition anxiety. To analysis the data Mean, SD was used. *T*-test at 0.05 level of statistical significance was used to determine the statistical significance difference between junior and senior Kho-Kho players of Kashmir. The result of the study revealed that there is a statistically significant difference between junior and senior Kho-Kho players in the sports competition anxiety level. The result shows that senior Kho-Kho players have less sport competition anxiety when compared with junior Kho-Kho players.

Keywords: Junior, Kho-Kho, Senior, Sport competition anxiety

INTRODUCTION

Anxiety is a negative emotional state in which feeling of fear, nervousness, uneasiness, and apprehension is associated with activation of arousal of body (Weinberg and Gould 2007). Anxiety is a huge issue for many athletes. The logic is that, the better you become the higher level of competition, the more anxiety you experience. Anxiety has a devastating effect on performance of an athlete (Athan and Sampson 2013). Schofield *et al.* (2001) is having the same opinion that anxiety may adversely affect athlete's well-being and also have adverse effect on sports performance. Athletes cannot perform their best such as they usually do due to anxiety. Consequently their performance is affected during the competition and they seldom achieve victory (Papanikolaou *et al.* 2008). Anxiety has a temporal relationship to performance. The level of anxiety evident before performance may be different from arousal during performance. During performance anxiety is often

lessened, since the individual must concentrate on his own actions rather than his internal fear.

In sports pre competitive anxiety refers to an unpleasant emotion which is characterized by imprecise but persistent feeling of uneasiness and fear before competition. Anxiety is a reaction of impending, danger real or imaginary. It contains of two sub components namely cognitive (mental) and somatic (physiological) which influence the performance before and after competition. Cognitive is a mental component characterized by negative expectation about success or self-evaluation, negative self-talk, inability to cope, fear of failure, in ability to concentrate, and attention narrowing (Jervis, 2002). Somatic is a physiological element which is related to automatic arousal a negative symptoms such as feeling of nervousness, increased muscle tension, profuse sweating, high blood pressure, dry throat, rapid heart rate, and butterflies in the stomach (Martin *et al.* 1990).

Pre-competitive cognitive anxiety starts relatively high and stable as the time of event approaches (Cox, 2007). Conversely, somatic anxiety remains relatively low until approximately 24 h before the event, and increases rapidly

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as the event approaches. Once performance begins, somatic anxiety dissipates rapidly. Whereas cognitive state anxiety fluctuates throughout the contest as the probability of success/failure changes (Cox, 1998). Parfitt and Pates (1999) studied shows that high experienced players would show lower level of anxiety than the low experienced players.

PURPOSE OF THE STUDY

The purpose of the present study is to compare sport competition anxiety between junior and senior Kho-Kho players of Kashmir.

METHODOLOGY

The study was conducted on total 50 male Kho-Kho players of Kashmir. The subjects were divided into two groups 25 junior age group 14–18 years, and 25 senior age group 20–30 years.

Dependent Variable

Anxiety.

Independent Variable

Sport competition anxiety questionnaire (SCAT) by Martin *et al.* 1990.

Statistical Methods Used

Mean, standard deviation (SD), and *t*-test.

RESULTS

The mean, SD and *t*-test were calculated to find out the statistically significant differences. The mean and SD of junior Kho-Kho players in sport competitive anxiety was 22.8 and 2.97 respectively. The mean and SD of senior Kho-Kho players in sport competitive anxiety was 20.4 and 3.12 respectively. The calculated *t*-value is 2.73 which were statistically significant [Figure 1].

DISCUSSION

The findings of the present study reveals that the mean of junior Kho-Kho players in sport competition anxiety test (SCAT) is (22.8) and senior Kho-Kho players is (20.4). This indicates that junior Kho-Kho players found more sports competition anxiety as compared to senior Kho-Kho players as per their mean difference, but found average level of anxiety in both junior Kho-Kho players and senior Kho-Kho players as per the interpretation of scores in sports competition anxiety test (SCAT). Result of the Table 1 shows that there is a statistically significant difference between

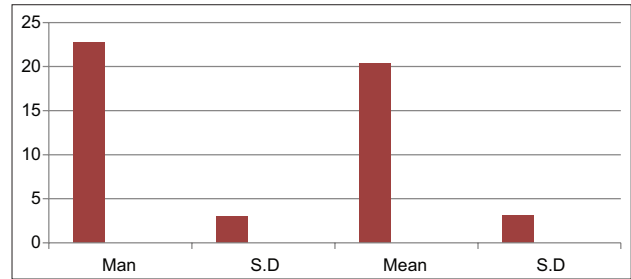


Figure 1: Graphical representation of mean and SD scores of junior and senior Kho-Kho players of Kashmir in relation to sports competitive anxiety

Table 1: Mean, standard deviation and *t*-test values of junior, and senior Kho-Kho players

Variable	Junior Kho-Kho players <i>n</i> =25		Senior Kho-Kho players <i>n</i> =25		Calculated <i>t</i> -value
	Mean	SD	Mean	SD	
Sport competitive anxiety	22.8	2.97	20.4	3.12	2.73*

**P*=0.05 levels, *Tabulated value 2.00

junior and senior Kho-Kho players in the sports competition anxiety level. Findings of the researcher are well supported by Debnath *et al.* (1986) and Virender Kumar (2017). The result shows that senior Kho-Kho players have less sport competition anxiety as compared to junior Kho-Kho players. Sport competition anxiety has shown statistically significant impact between junior and senior Kho-Kho players. It may be due to psychological maturity of the senior Kho-Kho players at advance level of competition is higher than the junior Kho-Kho players.

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Research Article

Effect of yogic practices on selected physiological parameters among university male students

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ABSTRACT

The present study was undertaken to analyze the effect of yogic practices on selected physiological parameters among university male students. The investigator has selected sixty hostel students at random from Pondicherry University, their ages ranged from 18 to 25 years. The participants chosen for the study were divided into three equal groups and designated as experimental group "A" experimental group "B" and control group "C." Asana alone was given to group "A" Asana along with Pranayama and Meditation was given to group "B." The control group "C" was restricted to participate in any of the yogic practices. The yogic practices were given for a period of ten weeks. The obtained data's were analyzed by Analysis of Covariance and which was further subject of Scheffe's *Post hoc* test, wherever the F-Ratio was found significant, practicing Asanas and the combined practice of asana, pranayama, and meditation have significantly increased the aerobic capacity and anaerobic power.

Keywords: Yogic practices, Physiological, Aerobic capacity, Anaerobic power.

INTRODUCTION

Yoga is one of the most ancient cultural heritage of India. The word *yoga* in Sanskrit means "to unite," and so *yoga* can be said to connote a unitive discipline. In this sense, it is an exercise in moral and mental cultivation that generates good health (*arogya*), contributes to longevity (*chirayu*), and the total intrinsic discipline culminates into positive and perennial happiness and peace. Yoga is one of the orthodox systems of Indian philosophy. It was collated, coordinated, and systematized by Patanjali in his classical work, the Yoga Sutras, which consists of 185 terse aphorisms. Yoga is a complete science of life that originated in India many thousands of years ago. It is the oldest system of personal development in the world, encompassing body, mind, and spirit. Yoga is a scientific and systematic discipline for a successful organization of all energies and faculties of the internal human being with a view

to attaining the highest ecstatic communion with the cosmic reality of God. Yoga is India's major contribution to the world culture and a number of its variations were developed by saints and philosophers in various cultural epochs. It is well-known fact that obesity adversely affects health and physical fitness Angel *et al.*, (1978) Fox *et al.*, (1981). Statement of the Problems: The purpose of the study was to find out the effect of yogic practices on selected physiological parameters among university male students. Hypotheses: It was hypothesized that yogic practice asanas and combined practice of asana, pranayama and meditation would significantly improve the aerobic capacity and anaerobic power.

METHODOLOGY

Investigator has selected sixty hostel students at random from Pondicherry University, their age ranged from 18 to 25 years. They were divided into three equal groups experimental group A, experimental group B, and control group C. Each group consisted of twenty boys. Asanas were given to experimental group "A." Asanas along with pranayama and

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Table 1: Analysis of covariance on aerobic capacity (Cooper's 12 minutes Run/Walk) of scores of the experimental group "A", experimental group "B", and control group "C"

	Experimental Group "A"	Experimental Group "B"	Control Group "C"	Sources of variance	Sum of square	df	Mean square	"F" ratio
Pre-test Mean	2516.75	2288.50	2405.25	B	521072.50	2	260536.25	4.30*
				W	3452142.50	57	60563.90	
Post-test Mean	2803.00	2700.00	2306.00	B	2752360.00	2	1376180.00	23.85*
				W	3288100.00	57	57685.96	
Adjusted Post-test Mean	2683.96	2810.71	2304.31	B	2792636.35	2	1396318.17	884.34*
				W	88419.81	56	1578.93	

*Significant at 0.05 level. Table value required for significance at 0.05 level with df 2 and 57 and 2 and 56 is 3.16

meditation were given to group "B", and control group "C" was not allowed to participate in any of the yogic practice. Yogic practices were given 6 days for a week for a period of ten weeks. The participants were tested on the selected physiological parameters at the beginning (pre-test) and at the end of the experimental period (Post-test). To measure the selected physiological parameters the following tests were chosen aerobic capacity (Cooper's 12 min Run/Walk) and anaerobic power (Margaria - Kalamen Power test) because of their simplicity and availability of necessary facilities, instruments, and equipments. The collected data were analyzed by analysis of covariance. The obtained "F" ratio was found to be significant Scheffe's post hoc test was used to assess the significant difference between the adjusted paired mean.

It was observed from that Table 1 that there is a significant difference in pre-test ($F = 4.30 > 3.16$) at 0.05 level of confidence level. It also observed, however, the training effects are clearly evident in post-test ($F = 23.85 > 3.16$) at 0.05 level and in adjusted post-test ($F = 884.34 > 3.16$) at 0.05 level, respectively. It clearly indicated that the experimental groups showed significantly higher improvement than the control group.

The Table 2 shows that there is a significant difference among the three groups in aerobic capacity in favor of experimental groups. It was also observed that combined practitioners of asanas, pranayama, and meditation than the practitioners of asana alone [Figure 1].

It was observed that from Table 3 shows that there is no significant difference in pre-test ($F = 0.24 < 3.16$) and in post-test ($F = 0.68 < 3.16$) at 0.05 level of confidence level. It also observed, however, the training effects are clearly evident in adjusted post-test ($F = 124.17 > 3.16$) at 0.05 level, respectively. It clearly indicated that the experimental groups showed significantly higher improvement than the control group.

The Table 4 shows that there is a significant difference among the three groups in anaerobic power in favor of experimental groups. It was also observed that combined practitioners of

Table 2: Scheffe's Post hoc test for the difference between the adjusted post-test paired means of aerobic capacity

Experimental Group "A"	Experimental Group "B"	Control Group "C"	MD	CD
2693.97	2810.72	—	116.75	31.64*
2693.97	—	2304.32	389.65	
—	2810.72	2304.32	506.40	

*Significant at 0.05 level

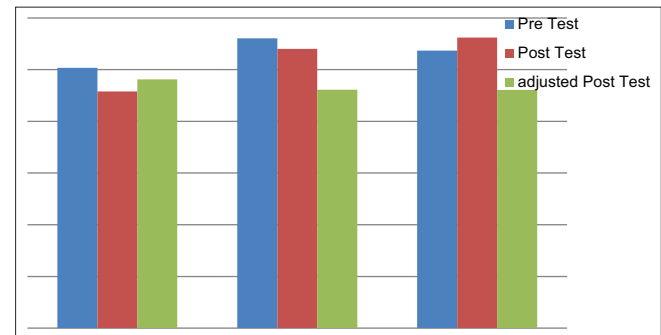
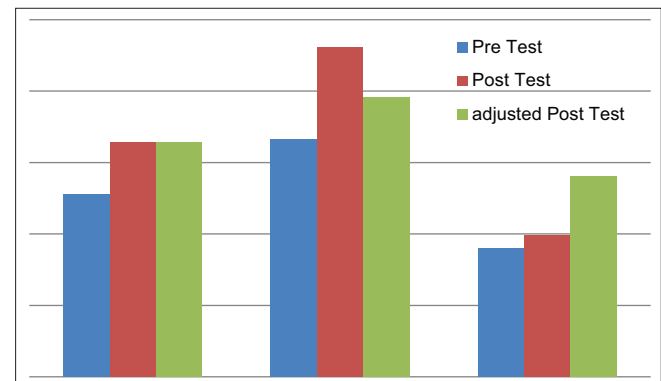
**Figure 1: Mean score of pre-test, post-test and Adjusted post-test of Experimental group "A", Experimental group "B" and Control group "C" on Aerobic capacity****Figure 2: Mean score of pre-test, post-test and adjusted post-test of Experimental group "A", Experimental group "B", and control group (CG) on anaerobic power**

Table 3: Analysis of covariance on anaerobic power (Margaria - Kalamen Power test) of Scores of experimental group “A”, experimental group “B” and control group “C”

	Experimental Group “A”	Experimental Group “B”	Control Group “C”	Sources of variance	Sum of square	df	Mean square	“F” ratio
Pre-test	127.78	131.64	123.96	B	589.14	2	294.57	0.24
Mean				W	68139	57	1195.43	
Post-test	131.41	138.07	124.94	B	1887.11	2	943.56	0.68
Mean				W	78372.83	57	1374.96	
Adjusted	131.42	134.56	129.03	B	305.22	2	152.61	13.41*
Post-test				W	637.16	56	11.38	
Mean								

*Significant at 0.05 level, (Table value required for significance at 0.05 level with df 2 and 57 and 2 and 56 is 3.16)

Table 4: Scheffe’s *post hoc* test for the difference between the adjusted post-tests paired means of anaerobic power

Experimental Group “A”	Experimental Group “B”	Control Group “C”	MD	CD
131.42	134.56	—	3.14	2.65*
131.42	—	129.03	2.39	
—	134.56	129.03	5.53	

*Significant at 0.05 level.

asanas, pranayama, and meditation than the practitioners of asana alone [Figure 2].

CONCLUSION

From the study, it was concluded that there was a significant improvement on aerobic capacity and anaerobic power due to the experimental treatment, further, it has been concluded that combined practitioners of asanas, pranayama, and meditation than the practitioners of asana alone.

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Research Article

Effect of an athletic training program on selected motor fitness variables on girls athletes of Kakatiya University Warangal

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ABSTRACT

Athletic performance has dramatically progressed over the past few years. Performance levels unimaginable before are now commonplace and the number of athletes levels of outstanding result is increasing all athletic programs should incorporate the fundamental factors of training, namely, physical, technical, tactical, psychological, and theoretical training. They are an essential part of any training program regardless of the athlete's age individual potential, training level, or training phase, and the relative emphasis placed on each factor varies, however, according to these features and the characteristics of the sport or event. In the frame of training, exercise is a motor act repeated systematically. Exercise represents the main training method to increase performance. Exercises vary in effect from simple to complex. Performing an exercise develops an athlete to physically and psychologically (Bucher, 1972).

INTRODUCTION

Participation in an athletic training program along with other types of physical activity give children yet another opportunity to improve their health and quality of life. Science evidence indicates that youth athletic training programs are no more risky than other sports and activities in which children regularly participating. Medical and fitness organizations now support participation in well-designed and properly instructed youth athletic training programs.

Regular participation in youth athletic training program can favorable influence selected motor abilities measures for all Kakatiya university college girls and can improve the preparedness of aspiring young athletes for the demands of sports practice and competition. Parents, teachers, and coaches should realize that athletic training is a specialized method of condition that can offer many benefits, but at the same time can result in injury if age-appropriate training guidelines are not followed, when conducted by competent instructors who possess a found understanding of athletic training principles and development

needs of girls. Athletic training can have many benefits and lead to a lifelong interest in physical activity, it helps to improve skill and performance. In such a scenario athletic training ensure the overall development of women sportspersons.

METHODOLOGY

To achieve the purpose of the study, 50 KU college girls were selected randomly as participants their age ranged from 16 to 18 years. They were assigned to experiments group (group 1) and control group (group 2) of each. The experimental groups were subjected to their respective training programs during evening hours, namely athletic training over the period of 5 days in a week in addition to their regular activities, the control group did not participate any specific training but they participated in the regular schedule.

All the participants of five groups were tested on selected dependent variables before and after the treatment. The data pertaining to the variables in the study were examined using mean and "t" test to find out significant improvement and analysis of covariance (ANCOVA) for each variable separately in order to determine the difference if any among the pre-and post-test mean. The level of significance was fixed at 0.05 level of confidence for all the cases.

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Table 1: Summary of mean and “t” test for the pre-and post-test on criterion variables of athletic training and control groups

Criterion variables	Mean and “t” test	Athletic training group	Control group
Speed	Pre-test	8.9	9.10
	Post-test	7.87	9.14
	“t” test	8.17*	1.02*
Endurance	Pre-test	2150	2222B
	Post-test	2606	2207B
Respective strength	Pre-test	21.41	22.24
	Post-test	27.2	21.04
	“t” test	31.1*	1.8*
Static strength	Pre-test	29.01	26.32
	Post-test	46.02	26.02
	“t” test	16.03*	1.89*

According to more house and miller define “cardio respiratory endurance is the ability to carry a work load for a relatively [Table 1].

Prolonged Period

The endurance is that enables the heart, blood, vessels, and lungs to receive oxygen and take it to the muscular and to do it as often and effortless as possible.

RESULTS

For cardiorespiratory endurance, the calculated F-value for pre-test (0.002) is < 4.03 at 0.05 levels, and hence it is not significant difference among pre-test scores of endurance on the control group and experimental group before the training period. The calculated F-value for pre-test (2.528) is higher than the value of 4.03 at 0.05 levels and hence it is significant. Therefore, there is a significant difference among post-test

scores of endurance on the control group and experimental group after the training period. The results of one-way ANOVA for pre and post-test score of cardiorespiratory endurance. It can be seen that “F” = 33.138 for the post-test among control and the experimental group found to be significant at 0.05 level. Thus, the significant “F” value indicates that the training has a positive influence on the endurance of the participants.

CONCLUSIONS

It was concluded potential opportunity for the importance of fartlek training on cardiorespiratory endurance among the basketball players, basketball players aim is to achieve the highest goal as much as possible stipulated period for that one has to run here and there with full effort. Fartlek training makes the basketball player to run up and down and sideward with the full effort according to situation. Fartlek is a speed play. Fartlek vastly reduces boredom, increases post-exercises energy expenditure, and stimulates the respiratory system. Fartlek training gives cardiovascular and nervous systems to a greater degree. Hence, the fartlek training may be included as one of the important training in the basketball training.

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Research Article

Impact of combined strength and endurance training on muscular strength endurance on Basket Ball Intercollegiate players

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ABSTRACT

The present study was to find out the impact of simultaneous quality and continuance preparing on muscular quality perseverance on basketball intercollegiate players. To accomplish this reason for the review, degree Colleges in twin cities of Hyderabad men from Osmania University, Telangana, were randomly chosen as participants. The age of the participants extended between 18 and 21 years. They chose participants were separated into three gatherings of ten participants each. Amass - I outlined quality preparing before continuance preparing, Group - II planned quality preparing after perseverance preparing and Group - III went about as control gathering did not take an interest in any extraordinary preparing program separated from their consistent exercises. The information was gathered before and after the preparation program of six weeks. Solid quality perseverance was picked as a foundation variable. The investigation of covariance (ANCOVA) was utilized to break down the information. The aftereffects of the review demonstrated that the muscular quality continuance was altogether enhanced because of the simultaneous quality and perseverance preparing.

Keywords: Concurrent strength, Endurance, Muscular strength endurance, Bent knee sit-up

INTRODUCTION

Simultaneous quality and continuance preparing is attempted by various competitors in basketball with an end goal to accomplish adjustments particular to both types of preparing. Writing discoveries to date, researching the neuromuscular adjustments and execution changes related with simultaneous quality and continuance preparing (alluded to as simultaneous preparing) have delivered conflicting outcomes. A few reviews have demonstrated that simultaneous preparing restrains the improvement of quality and power, yet does not influence the advancement of high-impact wellness when contrasted with either method of preparing alone. Different reviews have demonstrated that simultaneous preparing has no inhibitory impact on the improvement of quality and perseverance.

Strength and endurance adaptations. Strength and endurance training regimes represent and induced is tinctly different adaptive responses when performed individually. Typically, quality preparing programs include expansive muscle gather initiation of high-resistance low-reiteration activities to build the compel yield capacity of skeletal muscle (Sale *et al.*, 1990). Conversely, perseverance preparing is characterized as rehashed sub-maximal compressions with heaps of low resistance This adjustment is licensed to increments in moderate jerk fiber range and muscle mitochondria and vigorous catalyst movement In this review an endeavor is made to discover the simultaneous quality and perseverance preparing on muscular quality continuance.

METHODOLOGY

The preparation time frame, the trial bunches experienced their individual preparing program. Test aggregates, in particular, experimental gathering - I quality preparing

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before perseverance preparing, exploratory gathering - II quality preparing after continuance preparing and bunch - III went about as a control assemble, experienced their separate preparing program 3 days for every week for 6 weeks. Every day the preparation timetable was led just at night session that went on for 120 min. Earlier and after each instructional course participants of exploratory gatherings had 20 min of warm-up and 20 min of warm down activities including running, portability, and extending works out. Solid quality continuance measured by twisted knee sit-ups test and the unit of estimation was scores in the number of sit-ups played out the participants.

Table 1 demonstrates the dissected information on muscular strength endurance. The pre-test method for muscular strength endurance were 35.30 for trial amass I, 34.10 for exploratory gathering II, and 34.90 for control assemble. They got F² proportion of 0.14 was lesser than the table F-proportion 3.35. Consequently, the pre-test was not noteworthy at 0.05 level of certainty for the degrees of flexibility 2 and 27. The post-test method for muscular strength endurance were 41.50 for trial amass I, 36.20 for trial bunch II, and 35.20 for control aggregate. They got “F” proportion of 63.36 was higher than the table F-proportion 3.35. Consequently the post-test was huge at 0.05 level of certainty for the degrees of opportunity 2 and 27. The balanced post-test method for Muscular Strength Endurance were 42.34 for exploratory gathering I, 36.20 for and trial bunch II, and 34.36 for control aggregate. They got “F” proportion of 264.78 was higher than the table F-proportion 3.37. Consequently, the balanced post-test was critical at 0.05 level of certainty for the degrees of flexibility 2 and 26. Since, three gatherings were looked at, at whatever point they got “F” proportion for balanced post-test was found to be significant, the Scheffe’s test to find out the paired mean differences and it was presented in Table-(B).

Table 2 demonstrates the scheffe’s *Post-hoc* test comes about. The requested balanced final mean distinction for Muscular Strength Endurance of test gatherings I, II, and control gathering were tried for importance at 0.05 level of certainty

against classified interim esteem. The mean contrasts between tests assemble I and test aggregate II, exploratory gathering I and control amass and test bunch II and control gathering were 5.14, 7.95, and 1.84 separately and it supposedly was more noteworthy than the classified interim estimation of 0.18. Thus every one of the examinations was huge.

Discourse on discoveries the most vital purpose behind checking quality execution is to aid the assessment and movement of resistance-preparing programs. The measure of quality improvement relies on upon the underlying level of strong wellness, practice remedy, time accessible, and targets of the program. Standard appraisal of solid quality empowers legitimate assessment of the practice medicine and adjustments when proper. The rate of quality increment contrasts impressively amongst untrained and prepared people, with prepared people indicating much slower rates of change. Performing practices that include a low number of reiterations on a heap that is of high resistance adequately expands quality. (Dudley *et al.*, 1985; Sale *et al.*, 1990) It is of significance that competitors have elevated amounts of quality as well as perseverance. Hence many competitors’ preparation programs include synchronous quality and perseverance preparing. Various reviews have been directed to research the conceivable obstruction impacts of performing quality preparing and continuance preparing simultaneously. Most have demonstrated that simultaneous quality and continuance preparing does in truth affect the advancement of quality or drive creation. Nelson *et al.* (1990) directed a review on already untrained participants in which one gathering; quality prepared 4 days/wk for 20 weeks while another gathering played out a similar routine additionally performed perseverance on that days. The outcomes demonstrated that albeit both gatherings indicated increments in constrain generation, yet the quality preparing bunch indicated more prominent upgrades. Similar outcomes were found by Kraemer *et al.* (1995). Participants in both the quality and simultaneous gathering demonstrated increments in muscle quality, however, the quality just gathering indicated essentially more prominent increments

Table 1: Analysis of covariance of pre-test post-test and adjusted post-test on muscular strength endurance of experimental group I experimental group II and control group (Scores in numbers)

Test	Exp. Group 1	Exp. Group II	Control Group	SV	SS	df	MS	F value
Pre-test	35.30	34.10	34.90	Between	0.80	2	0.40	0.15
Mean								
SD	1.73	1.58	1.51	Within	77.90	27	2.89	
Post test	41.50	36.20	35.20	Between	284.60	2	142.30	63.36*
Mean								
SD	1.43	1.54	1.25	Within	59.70	27	2.21	
Adjusted post test	42.34	36.20	34.36	Between	258.92	2	128.96	264.78*
Mean								
---				Within	12.71	26	0.49	

Table 2: Scheffe's *Post hoc* test-mean differences on muscular strength endurance among three groups (Scores in numbers)

Experimental Group I	Experimental Group II	Control group	Mean differences	Confidence interval value
41.34	36.20	--	5.14*	0.18
42.34	--	34.36	7.95*	0.18
--	36.20	34.36	1.84*	0.18

*Significant at .05 level of significance.

than that of the simultaneous gathering. In addition, in a 10-week think about by Hickson *et al.* (1980), participants in both the quality and simultaneous gatherings demonstrated increments in constrain generation. These reviews display that preparation simultaneously for quality and perseverance affects the improvement of quality. Dudley *et al.* (1985), Table 2 demonstrates the scheffe's *Post-hoc* test comes about.

The requested balanced final mean distinction for muscular strength endurance of trial gatherings I, II, and control gathering were tried for centrality at 0.05 level of certainty against private interim esteem. The mean contrasts between test bunch I and test assemble II, trial aggregate I and control amass, and test gather II and control gathering were 5.14, 7.95, and 1.84 separately and it apparently was more noteworthy than the private interim estimation of 0.18. Consequently, every one of the examinations was huge.

CONCLUSION

The simultaneous quality perseverance preparing has delivered critical change on solid quality continuance more noteworthy than control gathering of school young men. Solid quality perseverance exceedingly supported to quality preparing before continuance preparing more prominent than quality preparing after continuance preparing and control gathering of school young men. Quality preparing after perseverance preparing

likewise creates little impact on strong quality continuance when contrast and control amass.

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Research Article

Evaluation of coaches and managers through performance management in competitive sports

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ABSTRACT

Performance management is required to achieve impressive performance in organizations and teams. The purpose of this review is to frame a structure for coaches or managers to achieve high-level performance in sports and focused domains. The need to evaluate performance management in sports for coaches/managers is by making an accurate and optimum, dimensional performance management system with distributing objectives. This system is used to discern, calculate, and developing the performance in individuals and teams and aligning their performance for impressive results. The purpose is to elaborate evaluation criteria for sport coaches and managers so that their evaluation is made according to performance management, by measuring and comparing results, by their physical, mental, professional, and management potential according to the objectives and requirements of the position held.

Keywords: Evaluation criteria, Subjectivism, Managerial, Optimum, Management potential

INTRODUCTION

Performance management is a way of distinctive measuring and developing the performance of groups which leads the organizations toward success by developing the work efficiency of an individual. In India, the ministry of sports promotes sports for national interest and supports the practicing of physical activities for all population categories, as an element for health improvement, social integration, and development of human personality. Performance is related to two factors: management and measurement. These factors cannot be separated from each other since performance management is both a positive and a negative aspect of performance measurement.

The development of a sports performance management system implies its orientation toward efficiency. An efficient performance management system focuses on each athlete's success. It offers sufficient support to know what the team expects from the athlete and what performance is concerned.

Performance management provides a defined plan for developing, managing, and continuous improvement in athlete performance. Accurate documentation consistently maintained for each athlete, tracks growth, and development. Performance management offers three basic phases or stages for athlete development: Coach/Manager, correct plan, and application. In the early phase, the Coach/Manager includes orientation, training, and motivating athlete. Now Coach/Manager, expectations and performance standards are outlined, effective performance management creates an environment that encourages the rapid development of new skills.

Search for Evaluation Criteria of Performance Management

To achieve better in sports a well-planned effective performance management process is required, which can ensure that objectives are achieved. In both competitive and recreational sports, the effectiveness of an activity has to be related to a relation between the planning and result obtained, which has to satisfy the acceptations. Relation between planning and results represents the sportive system efficiency of an organization. Both planning and results are a time component, where the results become variable in time. They depend on various factors: training quality, performance management, and

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life quality. Goals are set in advance and the task is planned accordingly. Result toward these goals is measured and athlete receives feedback related to their performance. The aim is to set high standards, but extra precautions are taken to work on learning advanced skills needed to achieve the best performance of life. Formal and informal rewards are awarded to the athlete that accomplishes better results over the time period. All the component works together to achieve effective performance management. Organizational development, performance can be thought of as results achieved versus. expected results. Any discrepancy, where achieved is less than expected makes a significant difference in achieving performance improvement.

Importance of Coach/Manager in Performance Management

Coach/Manager is a person on whom athletes do blind faith. A coach/manager is a person who, with the help of his knowledge, experience, arose a kind of awareness in his athlete and prepares them for all competition. Thus, it can be said that he works as a leader who inspires players to work in the attainment of a particular result. There, but Coach/Manager must have some qualities and it should be followed specialization in a particular field, the knowledge required for professional competence, as well as knowledge in psychology, selflessness, time management, interactive, and ability to combine professional goals with personal goals, apart from strategies, planning, team meetings, etc. A good Coach/Manager must know the potential of his athlete, also how to motivate them. A Coach/Manager must develop a flexible structure with the help of his team, as well as encouraging his team's development and creativity.

Coach/Manager at Different Levels

1. Expert at National level (National Coach/Manager) - Those who have a plan and work for the betterment of the country.

There must be one person who works at the country level where he must set up a team of specialists in different fields and come with a plan for the development of sports in the country. The number of people working on the country level varies according to the size of the country, for a particular period and level of its development, as well as the objectives of the program. The work must be reviewed at proper intervals for upgradation of the plan if needed.

The team must (a) know sports present situation in the country, (b) analyze how sport is in that respective stage (c) identify the existing needs and interests, (d) contribute toward the implementation of the "Sports for All" as a National Program, (9) attract the media to support and develop the program, (d) plan and carry out activities which can make a national impact, (e) review at least twice a year with specialists working on the field to improve collaboration, perfect training, assess, adapt and improve the programs.

2. Expert at State level (State Coach/Manager) - Those who work on a state level.

The efficiency of the country plan formulated by the specialist at the national level is based on the existence of some support points in the counties. The county-level team should dedicate a job and a certain number of specialists to the state for the organization and development of the sports. Apart from the promotion of the sport through the actions, the most important part shall be the elaboration and performance of programs ensuring the physical activities dedicated to health, education, and recreation, for all population categories and, especially, for the disadvantaged categories. One of the priorities of their activity should be involved through training methods, designed by the expert in the relevant field.

3. Expert at District/Block level (P.E Teachers/Private Coach/Manager)

The efficacy of the sports program of a country depends on the P.E. teachers and private coaches/managers who work in cities, villages, colleges, schools, or sports organizations. These can be trained people having a physical education degree, certified from sports organizations, national, or state players. The national sports program can be made successful if these people are kept motivated in their work and regularly trained. Various people that are interested and having different qualifications and special interests and training, can be certified to serve a group of children, young people, adults, old people, or families and want to take over a facility and another similar task.

Objectives of Evaluation

- (1) The Assertion

The perspective has as a premise the fact that sports for all specific activities optimization are influenced by the performance management level of sports instructor- managers, which has to be evaluated based on criteria.

- (2) Methods to improve evaluation of performance management system

The review of evaluation of efforts and achievements of the sports coach/manager, to improve performance are identifying the activities which lead to a successful result, identifying the bad results, the causes and solutions, identifying the methods to develop, and improving management within sports.

Changes in the period of evaluation to be made after completing an activity, not in the intervals of 6 months or a year.

Change in the evaluation process in which performance analysis does not replace the performing or non-performing



Figure 1: Structure for evaluation criteria

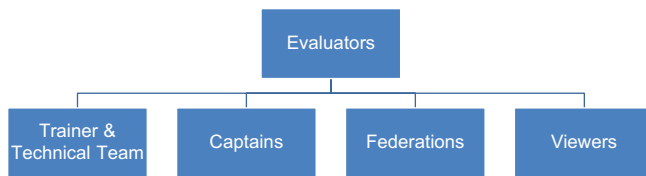


Figure 3: Evaluators in sports

behaviors management. The two processes are complementary [Table 1].

(3) Performance evaluation in sport
a. Evaluation parameters

Evaluation of coach/manager can be done based on personal qualification, training qualification, and team achievements. Personal Qualification: The coach's qualification consists of coaching time and gender because the gender of coaches can be divided into male and female, we should consider the difference of gender. Coaching time could reflect the coach's time consumption on their career developments. Professional Qualification: should consist of organizational capability, management capability. Team Achievements: Team achievements are the results of coaches' performance and they directly reflect coaches' capability. People usually pay more attention to the team achievements compared with other factors. Wins, win-loss percentage, and performance in league matches can well reflect team achievements. Feedback from players and people associated with them is as much important evaluation criteria [Figures 1-4].

b. Records to be maintained by the coaches/managers for evaluation

Evaluation of coaches/managers becomes easier for the evaluator if the following record is maintained by the coaches in regular interval of time are training plan for

every individual, according to sex, age and abilities, selection and training of young players, technical and tactical training of sportsmen, psychical and theoretical training of sportsmen, training of children to participate in competitions, training and performance record of players participating in competitions.

c. Evaluation criteria for coaches/managers

- Planning and organization of sports activities according to age and sex
- Young talent selection and Involving more and more participants and volunteers
- Developing the motor skill of participants
- Activities for participants and volunteers
- Physical and theoretical training of participants
- Communication, teamwork, analysis capacity, and creativity
- Capacity to develop co-workers and volunteer abilities
- Advising and counseling capacity
- Capacity to organize, lead, coordinate, and control
- Competence and ability to manage resources

d. Outcomes through performance management

The outcomes of performance management can be determined as per the organizational objectives achieved. Sports engages to all categories of population, thus evaluation is recommended to be evaluated through grades, in an objective and stimulating manner. The criteria for achieving objectives can be defined through successful, not successful, and failure. The factors influencing a coach/manager's contribution to achieving success can be professionalism, flexibility, concentration, seriousness to the task. A coach/manager's contribution towards the failure of the given task is based on the lack in conducting motivational activities, lack of honesty towards the goal, lack in the use of resources or inadequate administration, and not adapting to competition with others.

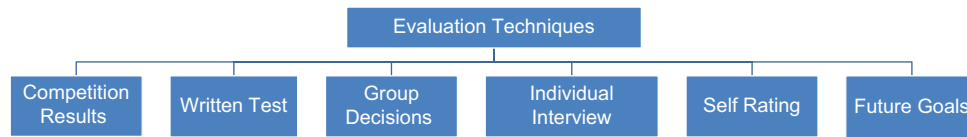


Figure 4: Evaluation techniques

Table 1: Performance analysis versus performance management

Performance analysis	Performance management
Must be done at regular intervals	Must be done after each event
Measures outcome	Measures efforts
Feedback to improve results	Feedback to improve efforts

CONCLUSION

Sports are types of activity which act as a life development tool of all, coach and managers act as a catalyst to in it, that is why the development and implementation of the evaluation system are needed to be framed for the coach/manager. Performance management in sport cannot be achieved without the use of scientific methods and techniques. Performance management is used to improve team performance, based on the principles of improvement, appraisal, action, and observation. However, it can be manifest in very different forms depending on whether the aim is to further improve the sports instructors or deal with underperformance. Performance management is needed for the organization for a fair way to determine the performance of the performer. Its time for performance management to improve performance and to do that, individual needs to self-question where your performance currently stands, where it wants to be, and how it will get there.

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Research Article

A study on reactions to the frustration of physical education teachers working various syllabi schools in Kerala

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ABSTRACT

The present study has been undertaken to investigate reactions to frustration among male and female physical education teachers working in Government, Aided, and CBSE schools in Kerala. Five hundred and thirty-two physical education teachers working in secondary schools in Kerala state were participated in this study. The reactions to frustration scale by Dixit and Srivastava (2011) was used to measure reactions to frustration among the Physical education teachers. There is a significant difference found between type of schools on reactions to frustration sub-scale aggression, resignation, and regression and the mean value indicates that CBSE teachers were having high aggression and government school teachers are having low aggression and aided school teachers were having high regression, than Government school teachers and CBSE school teachers showed low regression score.

Keywords: Aggression, Fixation, Frustration, Physical education teachers, Regression, Resignation, Types of school

INTRODUCTION

Frustration can be defined as a state of emotional stress characterized by confusion, annoyance, and anger. Interruption to goal-seeking behavior causes frustration (Stagner, 1961). The observations of behavior of people in various frustrating situations, whether, experimentally induced or occurring in actual life situation, have displayed marked individual differences in the way people react to frustration with each person learning a pattern of behavior best suited to needs, and thereby developing his own coping up processor the mal adjustive forms of behavior resulting from the frustrating situations (Hurlock, 1974). According to Eysenck (1972) there are three different meanings of the term frustration.^[1] Frustration situation, strict definitions have been used by Maier (1949), for whom the essential characteristics are an insoluble problem situation, the impossibility of moving out of the situation, and high motivation to respond, and by Amsel (1962)

for whom a frustrating situation is one which non-rewarded trials are inter spread with, or follow, rewarded trials;^[2] Frustration state, the frustrating situation will induce a state of frustration in the organism, the degree of frustration varying between individuals; and^[3] Reaction to frustration, the principal reactions to the frustration state which have been studied in detail are aggression, regression, fixation, and resignation. Frustration has a different set of behavior mechanism. It is expressed in various modes aggression, resignation, fixation, and regression.

The purpose of the study was to investigate reactions to frustration among physical education teachers working in different syllabi schools in Kerala (Government, Aided, and CBSE schools).

METHODOLOGY

The participants of the study were 532 Physical education teachers currently working in various schools in Kerala State. Out of which 243 male and 289 female teachers were selected randomly from 14 districts of Kerala State. To

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achieve the purpose of the research the data were collected by administering Reaction to Frustration Scale (Dixit and Srivastava 2011) in person by the scholar. The data were analyzed using SPSS Version 25.0 (SPSS Inc., Chicago, IL) Descriptive statistics, and ANOVA were conducted to find out if any significant differences exists between the groups and type of schools. The level of significance was 0.05 levels.

RESULTS OF THE STUDY

Table 1 reveals the descriptive statistics on reaction to frustration sub scale aggression, resignation, fixation, and regression among the physical education teachers working in various syllabi schools in Kerala. In case of reactions to frustration sub scale aggression, it is observed that the mean score of physical education teachers working in government school was 20.60 (SD = 4.550), that of the aided school was 21.44 (SD = 5.492) and CBSE schools was 22.40 (SD = 3.978). The mean score on sub scale resignation among the physical education teachers working in government school was 22.43 (SD = 5.697) aided school was 22.10 (SD = 6.188) and that of CBSE school was 23.82 (SD = 4.953). The mean score on sub

Table 1: Descriptive statistics of reactions to frustration subscale aggression, resignation, regression, and fixation among the school physical education teachers working in various syllabi schools in Kerala

Variable	Type of School	Mean	Std. Deviation	n
Aggression	Government	20.60	4.550	157
	Aided	21.44	5.492	196
	CBSE	22.40	3.978	179
Resignation	Government	23.43	5.697	157
	Aided	22.10	6.188	196
	CBSE	23.82	4.953	179
Fixation	Government	26.82	3.312	157
	Aided	27.31	4.608	196
	CBSE	26.61	3.439	179
Regression	Government	28.74	4.789	157
	Aided	31.01	6.043	196
	CBSE	29.27	4.629	179

scale fixation among the school physical education teachers in government school was 26.82 (SD = 3.312), whereas in aided school was 27.31 (SD = 4.608), whereas in aided school was 27.31 (SD = 4.608) and that of CBSE school was 26.61 (SD = 3.439). The mean score on sub scale regression among physical education teachers in government School was 28.74 (SD = 4.789), whereas in aided school was 31.01 (SD = 4.629) and that of CBSE School physical education teacher's was 29.27 (SD = 4.629).

Table 2 indicates that the dependent variable reaction to frustration sub scale such as aggression ($F = 4.232$, $P < 0.00915$) resignation ($F = 5.649$, $P < 0.0004$), regression ($F = 7.505$, $P < 0.001$) differ significantly with independent variable type of school. The dependent variable of reactions to frustration sub scale fixation were not found significant. Pairwise comparison and *post-hoc* test (LSD) was performed on dependent variable reaction to frustration sub scale aggression, resignation, and regression to find out which are the groups in independent variable type of schools differ each other.

Table 3 reveals the result of the pair wise comparison of reactions to frustration with respect to types of school. The dependent variable reaction to frustration sub scale aggression of school physical education teachers differ significantly with government schools versus CBSE schools ($MD = -1.520$), CBSE versus Government schools ($MD = 1.520$). The mean value indicate that CBSE teachers are having high aggression (M-22.332) and government school teachers are having low aggression (20.812). Sub scale resignation differ significantly with government schools versus CBSE schools ($MD = -1.241$), aided schools versus CBSE schools ($MD = -1.832$) CBSE schools versus Government schools ($MD = -1.241$). CBSE schools versus aided schools ($MD = -1.832$) Sub scale regression differ significantly with government schools versus aided schools ($MD = -1.768$), aided schools versus Government schools ($MD = 1.768$). Aided schools versus CBSE schools ($MD = 1.851$), CBSE schools versus aided schools ($MD = -1.851$). The mean value indicate that aided teachers are having high regression (M-31.015), Government school teachers mean score was (M-29.246) and CBSE school teachers showed low regression score (M-29.164).

Table 2: Univariate ANOVA on Type of school with dependent variables reaction to frustration of school physical education teachers in Kerala

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig	Partial Eta Squared
type of schools	Aggression	188.049	1	94.025	4.232	0.015*	0.016
	Resignation	320.030	1	160.015	5.649	0.004*	0.021
	Fixation	55.271	1	27.635	1.903	0.150	0.007
	Regression	398.405	1	199.203	7.505	0.001*	0.028

*Significant at 0.05 level

Table 3: Scheffe's *post-hoc* test comparison of reactions to frustration with respect to physical education teachers working in various types of school

Dependent Variable	(I) Type of School	(J) Type of School	Mean Difference (I-J)	Std. Error	Sig.b
Aggression	Government 20.812	Aided	-0.598	0.523	0.254
		CBSE	-1.520*	0.534	0.005
	Aided 21.409	Government	0.598	0.523	0.254
		CBSE	-0.923	0.489	0.06
	CBSE 22.332	Government	1.520*	0.534	0.005
		Aided	0.923	0.489	0.06
Resignation	Government 22.567	Aided	0.59	0.59	0.318
		CBSE	-1.241*	0.603	0.04
	Aided 21.976	Government	-0.59	0.59	0.318
		CBSE	-1.832*	0.552	0.001
	CBSE 23.808	Government	1.241*	0.603	0.04
		Aided	1.832*	0.552	0.001
Fixation	Government 26.542	Aided	-0.715	0.423	0.091
		CBSE	-0.073	0.432	0.865
	Aided 27.256	Government	0.715	0.423	0.091
		CBSE	0.641	0.395	0.105
	CBSE 26.615	Government	0.073	0.432	0.865
		Aided	-0.641	0.395	0.105
Regression	Government 29.246	Aided	-1.768*	0.571	0.002
		CBSE	0.082	0.583	0.888
	Aided 21.976	Government	1.768*	0.571	0.002
		CBSE	1.851*	0.534	0.001
	CBSE 23.808	Government	-0.082	0.583	0.888
		Aided	-1.851*	0.534	0.001

CONCLUSION

1. The dependent variable reaction to frustration sub variable aggression differs significantly with government schools versus CBSE schools, CBSE versus Government schools
2. The mean value indicates that CBSE teachers are having high aggression and Government school teachers are having low aggression
3. Subscale resignation differs significantly with government schools versus CBSE schools, aided schools versus CBSE schools, CBSE schools versus Government schools
4. The subscale regression between CBSE schools versus aided schools differs significantly with government schools versus aided schools, aided schools versus Government schools. Aided schools versus CBSE schools, CBSE schools versus aided schools
5. The mean value indicates that aided school teachers were having high regression, than Government school teachers and CBSE school teachers showed low regression score.

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Research Article

Assessment of body type, characteristics of male basketball, football, and cricket Indian university level participation players

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ABSTRACT

Aims: The purpose of this study was assessment of body type, characteristics of male basketball, football, and cricket Indian university-level participation players. **Materials and Methods:** There were seventy-five ($n = 75$) trained male basketball, football, and cricket players between the ages of 17 and 25 years who volunteered for this study. In other words, twenty-five players participated in the study from each game, i.e. basketball, football, and cricket. Little is done to observe the effects of the training of each game on anthropometric profile or body size of male basketball, football, and cricket players. **Results:** The mean age, height, and weight of male basketball, football, and cricket players was 22.12 ± 1.61 years, 183.32 ± 12.82 cm and 78.08 ± 12.18 kg, 22.12 ± 1.61 years, 183.32 ± 12.82 cm and 78.08 ± 12.18 kg, and 21.12 ± 1.66 years, 174.40 ± 6.66 cm and 63.28 ± 3.92 kg, respectively. It was observed that the mean arm length of basketball players was 34.76 ± 5.91 cm, cricket players was 32.10 ± 1.79 cm, and football players was 31.12 ± 1.34 cm. It was observed that the mean forearm length of basketball players was 27.62 ± 2.48 cm, cricket players was 26.54 ± 1.71 cm, and football players was 25.60 ± 1.40 cm. It was observed that the mean hand length of basketball players was 20.00 ± 1.79 cm, cricket players was 19.70 ± 1.35 cm, and football players was 18.73 ± 0.80 cm. It was observed that the mean tibial length of basketball players was 37.90 ± 5.58 cm, cricket players was 36.54 ± 2.05 cm, and football players was 35.12 ± 1.79 cm. It was observed that the mean iliospinale base height of basketball players was 43.08 ± 3.55 cm, cricket players was 42.48 ± 3.33 cm, and football players was 40.70 ± 2.42 cm. It was observed that the mean trochanterion base height of basketball players was 35.00 ± 3.86 cm, cricket players was 33.42 ± 2.00 cm, and football players was 32.20 ± 2.50 cm. It was observed that the mean arm thigh length of basketball players was 46.60 ± 5.63 cm, cricket players was 46.26 ± 2.21 cm, and football players was 44.56 ± 3.24 cm. It was observed that the mean tibiale laterale-base height of basketball players was 49.38 ± 5.16 cm, cricket players was 45.98 ± 2.69 cm, and football players was 45.10 ± 2.32 cm. It was observed that the mean foot length of basketball players was 27.22 ± 2.06 cm, cricket players was 24.86 ± 1.92 cm, and football players was 26.00 ± 1.15 cm, respectively. **Conclusion:** The physique characteristics mainly arm length, forearm length, hand length, tibial length, foot length, and thigh length are significantly distinct in basketball, cricket, and football players performance.

Keywords: Length, Circumferences, Body Size, Tibial Length, Foot Length

INTRODUCTION

Kinanthropometry is an emerging scientific specialization concerned with the application of measurement to appraise human size, shape, proportion, composition, maturation,

and gross function (Ross and Marfell, 1991). It is a primary discipline for solving problems in matters related to growth, exercise, performance, and nutrition. The area has been defined as the quantitative interface between anatomy and physiology. It puts individual athlete into objective focus and provides a clear appraisal of his/her structural status at any given time. More importantly, it provides for quantification of differential growth and training influences (Norton *et al.*, 1996). Without an understanding of the growth of children and youth and

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their structural evolution, selection of talent and monitoring of training is largely a matter of imagination and illusion. Kinanthropometry provides the essential structural basis for the consideration of athletic performance, having thousands of athletes and fans all around the world (Ross and Marfell, 1991).

Basketball, football, and cricket are defined as two team's competition to gain and maintain a superior position on ground, in a specific size using their technique, skill set, strength, and intelligence without any tool in accordance with rules set out by International Federation. To meet the optimal energy need of the body and to withstand fatigue due to competition, the human body systems need to be operating in full potential. (Calvert *et al.*, 1976). Basketball, football, and cricket are games that are performed at very high tempo. In recent years, it has been seen that trainings have become pains takingly planned and programmed. It is no longer enough to have technical capacity and tactical competency on paper in order to come out on top. Amendments in rules by the International Federation have led to revisions in training methods as well. Being able to adjust to new rules requires a decent preparatory period for all players. What lies behind the significant increase in the performance of an athlete is to discover superior abilities at a young age and to challenge them regularly and reasonably through training. Modern coaches can evaluate the efficiency of training schedules through scientific tests whilst having their athletes prepare for championships. They can compare test results with previous one, see positive and negative changes in anatomical and functional qualities of players, and further based on all observations can reorganize training schedules (Ziyagil *et al.*, 1996).

Physical and physiological characteristics of elite athletes are different among sports. During the selection of athletes for any sport, focus should be given to those traits and abilities which have the most significant influence on sport performance, such as anthropometric and physiological characteristics (Markoviæ *et al.*, 2005). Physical structure is an important factor that contributes to the success of an athlete (Shephard 1998) and evidences indicate that anthropometric characteristics also have certain influence on athlete's performance (Dimakopoulou *et al.*, 2007). The profile of male and female athlete can be used in evaluating for talent identification (Claessens 1999) thus result of the studies that investigate and evaluate this traits can be important for coaches at all levels. Few studies have been reported in the literature about anthropometric characteristics such as height, lean body weight, and limb lengths of athletes (Kaloupsis *et al.*, 2008; Mikuliæ 2008; Bourgois *et al.*, 2001; Piotrowski *et al.*, 1992). These studies showed that elite rowers are usually taller and heavier than athletes of other sports. However, if rower's anthropometric profiles are to be used as talent identification at all levels, then more knowledge is required about the anthropometric characteristics of the elite rowers either male or female as the information till now is very

limited. Moreover, the increasing level of professionalism in the sport and existing competitions schedule emphasizes on the need for quantitative research on general physiological variables (Fell and Gaffney, 2001). Therefore, the aim of the present study was to observe anthropometric profiles of basketball, football, and cricket players.

MATERIALS AND METHODS

There were seventy-five ($n = 75$) trained male basketball, football, and cricket players between the ages of 17 and 25 years who volunteered for this study. In other words, twenty-five players participated in the study from each game, i.e. basketball, football, and cricket. Little is done to observe the effects of the training of each game on anthropometric profile or body size of male basketball, football, and cricket players.

RESULTS

The mean age, height, and weight of male basketball, football, and cricket players was 22.12 ± 1.61 year, 183.32 ± 12.82 cm and 78.08 ± 12.18 kg, 22.12 ± 1.61 year, 183.32 ± 12.82 cm and 78.08 ± 12.18 kg and 21.12 ± 1.66 year, 174.40 ± 6.66 cm and 63.28 ± 3.92 kg, respectively [Table 1].

Comparison of Body Segment Lengths of Basketball, Cricket, and Football Players

Arm length

It was observed that the mean arm length of basketball players was 34.76 ± 5.91 cm, cricket players were 32.10 ± 1.79 cm, and football players were 31.12 ± 1.34 cm [Table 2].

The variance in the mean values of arm length among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of arm length between different groups (basketball, cricket, and football players) was statistically significant.

Table 1: Mean \pm SD of Age, height, and weight of male Basketball, Football, and Cricket Indian university level participation players

Player's playing experience	n	Age, (year)	Height (cm)	Body weight (kg)
Basketball Players	25	22.12 \pm 1.61	183.32 \pm 12.82	78.08 \pm 12.18
Football Players	25	20.96 \pm 1.90	169.76 \pm 20.63	64.80 \pm 5.07
Cricket Players	25	21.12 \pm 1.66	174.40 \pm 6.66	64.80 \pm 5.07
Total	75	21.40 \pm 1.78	177.16 \pm 10.07	68.72 \pm 10.30

Table 2: Mean±SD of body segment lengths of basketball, cricket, and football players

Variable(s)	Group	Mean±SD
Arm length,cm	1 (Basketball)	34.76±5.91
	2 (Cricket)	32.10±1.79
	3 (Football)	31.12±1.34
	Total	32.66±3.92
Forearm length, cm	1 (Basketball)	27.62±2.48
	2 (Cricket)	26.54±1.71
	3 (Football)	25.60±1.40
	Total	26.58±2.07
Hand length, cm	1 (Basketball)	20.00±1.79
	2 (Cricket)	19.70±1.35
	3 (Football)	18.73±0.80
	Total	19.48±1.46
Tibial length, cm	1 (Basketball)	37.90±5.58
	2 (Cricket)	36.54±2.05
	3 (Football)	35.12±1.79
	Total	36.52±3.72
Iliospinale base height,cm	1 (Basketball)	43.08±3.55
	2 (Cricket)	42.48±3.33
	3 (Football)	40.70±2.42
	Total	42.08±3.26
Trochanterion base height, cm	1 (Basketball)	35.00±3.86
	2 (Cricket)	33.42±2.00
	3 (Football)	32.20±2.50
	Total	33.54±3.08
Thigh length, cm	1 (Basketball)	46.60±5.63
	2 (Cricket)	46.26±2.21
	3 (Football)	44.56±3.24
	Total	45.80±4.01
Tibialelateralebase height, cm	1 (Basketball)	49.38±5.16
	2 (Cricket)	45.98±2.69
	3 (Football)	45.10±2.32
	Total	46.82±4.02
Foot length,cm	1 (Basketball)	27.22±2.06
	2 (Cricket)	24.86±1.92
	3 (Football)	26.00±1.15
	Total	26.02±1.99

Further, the results of scheffe posthoc [Table 4] showed that basketball players showed the statistically significant difference in arm length at $P < 0.05$ when compared with the cricket and football players.

Table 3: Analysis of variance of (ANOVA) body segment lengths among different groups

Variable(s)	Sum of squares	Mean square	F	Sig.
Arm length				
Between Groups	177.380	88.690	6.650	.002
Within Groups	960.200	13.336		
Forearm length				
Between Groups	51.087	25.543	6.911	.002
Within Groups	266.100	3.696		
Hand length				
Between Groups	22.047	11.024	5.791	.005
Within Groups	137.053	1.904		
Tibial length				
Between Groups	96.620	48.310	3.746	.028
Within Groups	928.600	12.897		
Iliospinale base height				
Between Groups	76.765	38.383	3.885	.025
Within Groups	711.426	9.881		
Trochanterion base height				
Between Groups	98.540	49.270	5.860	.004
Within Groups	605.340	8.408		
Thigh length				
Between Groups	59.727	29.863	1.897	.158
Within Groups	1133.720	15.746		
Tibialelaterale base height				
Between Groups	255.440	127.720	9.722	.000
Within Groups	945.880	13.137		
Foot length				
Between Groups	69.886	34.943	11.247	.000
Within Groups	223.686	3.107		

*Significant at the 0.05 level

Forearm Length

It was observed that the mean forearm length of basketball players was 27.62 ± 2.48 cm, cricket players were 26.54 ± 1.71 cm, and football players was 25.60 ± 1.40 cm [Table 2].

The variance in the mean values of forearm length among different sports disciplines was statistical analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of forearm length between different groups (basketball, cricket, and football players) was statistically significant.

Further, the results of scheffe posthoc [Table 4] showed that basketball players showed the statistically significant difference

Table 4: Scheffe *post hoc* multiple comparisons of body segment lengths among different groups

Dependent Variable	(I)	(J)	Mean Difference (I-J)	Sig.
	1-Basketball; 2-Cricket; 3-Football	1-Basketball; 2-Cricket; 3-Football		
Arm length	1	2	2.660*	.042
		3	3.640*	.003
	2	3	.980	.639
Forearm length	1	2	1.080	.147
		3	2.020*	.002
	2	3	.940	.231
Hand length	1	2	.292	.757
		3	1.268*	.007
	2	3	.976*	.050
Tibial length	1	2	1.360	.413
		3	2.780*	.028
	2	3	1.420	.381
Iliospinale base height	1	2	.592	.802
		3	2.380*	.033
	2	3	1.788	.140
Trochanterion base height	1	2	1.580	.164
		3	2.800*	.005
	2	3	1.220	.336
Thigh length	1	2	.340	.955
		3	2.040	.199
	2	3	1.700	.323
Tibialelaterale base height	1	2	3.400*	.006
		3	4.280*	.000
	2	3	.880	.693
Foot length	1	2	2.364*	.000
		3	1.224	.055
	2	3	-1.140	.080

*Significant at the 0.05 level

in forearm length at $P < 0.05$ when compared with the football players.

Hand Length

It was observed that the mean hand length of basketball players was 20.00 ± 1.79 cm, cricket players was 19.70 ± 1.35 cm, and football players was 18.73 ± 0.80 cm [Table 2].

The variance in the mean values of hand length among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of hand length between different groups (basketball, cricket, and football players) was statistically significant.

Further, the results of scheffeposthoc [Table 4] showed that basketball players showed the statistically significant difference in hand length at $P < 0.05$ when compared with the football players. The cricket players also showed the significant difference in hand length at $P < 0.05$ when compared with the football players.

Tibial Length

It was observed that the mean tibial length of basketball players was 37.90 ± 5.58 cm, cricket players was 36.54 ± 2.05 cm, and football players was 35.12 ± 1.79 cm [Table 2].

The variance in the mean values of tibial length among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of tibial length between different groups (basketball, cricket, and football players) was statistically significant.

Further, the results of scheffe post-hoc [Table 4] showed that basketball players showed the significant difference in tibial length at $P < 0.05$ when compared with the football players.

Iliospinale base height

It was observed that the mean iliospinale base height of basketball players was 43.08 ± 3.55 cm, cricket players was 42.48 ± 3.33 cm, and football players was 40.70 ± 2.42 cm [Table 2].

The variance in the mean values of iliospinale base height among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of iliospinale base height between different groups (basketball, cricket, and football players) was statistically significant.

Further, results of scheffe post-hoc [Table 4] showed that basketball players showed the significant difference in iliospinale base height at $P < 0.05$ when compared with the football players.

Trochanterion base height

It was observed that the mean trochanterion base height of basketball players was 35.00 ± 3.86 cm, cricket players was 33.42 ± 2.00 cm, and football players was 32.20 ± 2.50 cm [Table 2].

The variance in the mean values of trochanterion base height among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of trochanterion base height between different groups (basketball, cricket, and football players) was statistically significant.

Further, results of scheffe *Post-hoc* [Table 4] showed that basketball players showed the significant difference in trochanterion base height at $P < 0.05$ when compared with the football players.

Thigh length

It was observed that the mean arm thigh length of basketball players was 46.60 ± 5.63 cm, cricket players was 46.26 ± 2.21 cm, and football players was 44.56 ± 3.24 cm [Table 2].

The variance in the mean values of thigh-length among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of thigh-length between different groups (basketball, cricket, and football players) was not statistically significant.

Tibiale laterale base height

It was observed that the mean tibiale laterale base height of basketball players was 49.38 ± 5.16 cm, cricket players was 45.98 ± 2.69 cm, and football players was 45.10 ± 2.32 cm [Table 2].

The variance in the mean values of tibiale laterale base height among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of tibiale laterale base height between different groups (basketball, cricket, and football players) was statistically significant.

Further, results of scheffe post-hoc [Table 4] showed that basketball players showed the significant difference in tibiale laterale base height at $P < 0.05$ when compared with the cricket and football players.

Foot length

It was observed that the mean foot length of basketball players was 27.22 ± 2.06 cm, cricket players was 24.86 ± 1.92 cm, and football players was 26.00 ± 1.15 cm [Table 2].

The variance in the mean values of foot length among different sports disciplines was statistically analyzed with the help of ANOVA. The results of ANOVA showed [Table 3] that the variance in the mean values of foot length between different groups (basketball, cricket, and football players) was statistically significant.

Further, the results of scheffe post-hoc [Table 4] showed that basketball players showed the significant difference in foot length at $P < 0.05$ when compared with the cricket.

DISCUSSION

The present study evaluated the anthropometric parameters of male basketball, football and cricket players which can be of great

importance for future reference of researches on its correlation with sports performance and athletic training. In our study we observed variations in many anthropometric variables between the given sports. Ayegbusi, 2017 recognized that different anthropometric and performance characteristics are required to be successful in different sports, and found that femoral length, tibial length and foot length were significantly correlated with vertical jump performance in recreational basketball players. A study by (David, 2006) demonstrated adequate arm length is one of the multiple independent predictors of V_{peak} in the senior bowlers and is an important determinant of bowling speed required to progress to the senior ranks of fast bowling. (Singh K, 2015) stated that arm girth positively influence the performance in throwing. In our study we observed variations in many anthropometric variables between the different sports which accounts for specific training and selection method in each sport respectively (Mala *et al.*, 2020) have reported that football players with increased body size and dimensions such as tibial length, thigh length and foot length have shown improved speed, power, and strength performance, especially during pubertal years. In basketball players with greater height are required in order to perfect the handling of rebounds and score a field goal, these actions also require greater physical contact, therefore explaining the greater occurrence of lower limb injuries among basketball players as stated by (Bhardwaj and Kalla, 2021). Ceri, 1997 reported the anthropometric and physiological characteristics of players and observed that each individual had unique anthropometric and physiological attributes which depended on positional role and the playing standard. These have important implications for team selection and highlight the necessity for individualised training programmes and fitness attainment targets.

CONCLUSION

The physique characteristics mainly arm length, forearm length, hand length, tibial length, foot length and thigh length are significantly distinct in basketball, cricket and football players performance. The predictability of sports performance significantly depends upon these anthropometric characteristics. These characteristics can suspect the rate of specific injury in the athlete during training. Therefore, training specific for the individual athlete can be implemented for prevention of the same.

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Research Article

A study on work–life balance of women entrepreneurs in selected service sectors of Telangana

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ABSTRACT

Women in India have to balance both their profession and their family. The time has witnessed that, many women have successfully converted as entrepreneurs and contributing in their own way to the society. The work-life balance becomes difficult in such circumstances which made us to take up this study among the women entrepreneurs. To study the work-life balance of women entrepreneurs in Telangana State working in different sectors. To assess the importance of work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors. To find the solutions to work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors. H_1 : There is no significant difference in work-life balance of women entrepreneurs in Telangana State working in different sectors. H_2 : There is no significant difference in the importance of work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors. H_3 : There is no significant difference in solutions to work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors. A total of sixty women entrepreneurs working in Hyderabad and 4 other districts of the Telangana were included as sample. A Likert scale-based questionnaire was administered in order to elicit the work-life balance among the women entrepreneurs. This study had shown that priority to look after the family, work-life, applicable for women with multiple responsibilities. Among the importance of work-life and long hours, working on commuting hours had high mean value among the solutions to work-life was the priority of the women entrepreneurs. The alternate hypothesis regarding the difference in work-life balance, the importance of work-life balance among the team members, and solutions to work-life balance among the team members were accepted.

Keywords: Balance, Life, Women entrepreneurs, Work

INTRODUCTION

Decades 1990 and 2000 have witnessed remarkable changes regarding the status and work of women in India. Increased globalization, social and economic cross currents, technological advancements, and the media have led to the emergence of Women's entrepreneurship. The increased cost of living and improved education and employment opportunities have made women working outside the home also. The personal and professional life of women especially in indicant culture is very difficult and hard to manage.

The main problem of women entrepreneurs is they have to manage their job work/business work along with domestic responsibilities also. The married women have to play an important role in order

to satisfy all the parties. The joyful atmosphere in the family will be distorted if they cannot balance everything. Such a disparity between the individual and her surrounding environment results in stress when there is alleged failure to face the constraints or demand encountered which will further result in imbalance, violent behavior, and coping mechanism. Hence, coping mechanism is the ultimate in removing the stress which can often be termed as the work-life balance in another context.

This study was mainly undertaken in order to study the work-life balance (WLB) of women entrepreneurs working in Telangana.

Research objectives

1. To study the work-life balance of women entrepreneurs in Telangana State working in different sectors
2. To assess the importance of work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors

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3. To find the solutions to work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors.

Hypotheses

1. H_1 : There is no significant difference in work-life balance of women entrepreneurs in Telangana State working in different sectors
2. H_2 : There is no significant difference in the importance of work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors
3. H_3 : There is no significant difference in solutions to work-life balance among the team members of women entrepreneurs in Telangana State working in different sectors.

Review of Literature

A study by Kumari *et al.*, based on the contemporary issue of work-life balance of women employees, the present research is done. The study aims to examine work-life balance of women employees and analyze various factors affecting work-life balance. The women employees in Bangalore city constitute universe for the study. The researcher has drawn 360 women employees working in various sectors such as banking, insurance, IT, BPO, health care, and education constituting sixty employees from each sector for the purpose of the study. Data were collected with the help of a structured questionnaire and data was analysed using statistical tools such as ANOVA and mean score. The study revealed that the levels of work-life balance of women employees in select service sectors of the study are significantly different.

Talreja *et al.* noted that despite of the increasing number of women obligations little attention has been paid toward the actual expectations and true picture of entrepreneurship along with the extent to which entrepreneurship offers an improved work-life balance. Hence, the present article endeavors on the journey of 80 women entrepreneurs as to how they maintain a balance between the household and entrepreneurial work through the questionnaire and offers the reality of their experiences.

Bharthiya *et al.* found that there is a need of more in-depth studies for Indian working women work-life balance problem. This study is just a tip of the iceberg. The issue is a deeper one related to work-life balance of working women in India. The few studies that have touched on this issue are also done basically in the western context. Their applicability in the Indian context and especially for women needs to be further explored.

A study from Bangladesh had shown that there are five factors of WLB namely role overloads, health-related

issues, dependent care, time management, and family and social support which are accountable for around 65 percent variance. Out of these five factors, work overload and dependent care issues are negatively related with WLB, whereas, health-related issues, managing time, and family and social support have a positive relationship with WLB of women entrepreneurs. This finding implies that women entrepreneurs can focus on to reduce their workloads and managing dependent care issues, and improvement of their health, managing time properly, and ensuring family and social support to maintain a balance between work and family life to survive, compete and make their business a success one. Therefore, result brings out the implication for HRM practitioners, management consultants, and policymakers, association of women entrepreneurs, and academicians to use the dimensions of WLB to enable them to have a satisfactory level of WLB.

Table 1: Distribution of the study group according to age

Age group (years)	Frequency	Percent
21–30	1	1.7
31–40	9	15.0
41–50	25	41.7
51–60	21	35.0
More than 60	4	6.7
Total	60	100

Source: Primary data

Table 2: Distribution of the study group according to education

Education	Frequency	Percent
Diploma	4	6.7
Bachelor's degree	23	38.3
Master degree	26	43.3
PhD	7	11.7
Total	60	100

Source: Primary data

Table 3: Distribution of the study group according to work experience

Work experience (years)	Frequency	Percent
<2	3	5.0
2–5	22	36.7
5–10	27	45.0
More than 10	8	13.3
Total	60	100

Source: Primary data

MATERIALS AND METHODS

The study of the objectives and testing of the hypothesis primarily depends on the reliable measurement of the variables and methods and procedures applied for deriving the conclusions.

Sample Design

The women entrepreneurs working in Hyderabad and four other districts of Telangana constituted the study sample. The researcher selected the women entrepreneurs working in Hotel, Garments, health care, education sectors and other sectors formed the sample frame.

Sample Size

About sixty women entrepreneurs working in various sectors were selected as the study sample. The sample respondents include doctors, hotel owners, garment outlets and factory owners, owners of educational institutions, etc.

Sampling Method

The sample was selected by using simple random sampling to ensure the women entrepreneurs from different strata., i.e. different sectors adequately represented in the sample.

Data Collection

Primary data was used for the present study. The survey method was used to collect the primary information in the study. The

Table 4: Work life balance

S. No.	Criteria	n	Minimum	Maximum	Mean	Std. Deviation
1	This definition has stemmed from the “corporate perspective” which prioritizes work	60	1.00	5.00	3.6333	0.99
2	It is about working to achieve some kind of harmony as an individual	60	1.00	5.00	3.8500	0.77
3	The work balance I do not like it because my family is absolutely my priority and always will be so	60	1.00	5.00	3.8833	0.80
4	People play a number of roles in their life which may vary at different stages. The work-life balance is to be able to harmonize their different roles rather than having to choose between conflicting demands	60	1.00	5.00	3.7833	0.88
5	Balance is in the eye of the beholder and it depends on how much importance you place on each domain	60	1.00	5.00	3.8833	0.78
6	We have to consider that there is a need to be space in my life for doing things with my family, doing things that I want to do for myself which is as important as my work	60	1.00	5.00	3.6833	0.87

Source: Primary data

Table 5: Importance of work life balance among the team members

S. No.	Criteria	n	Minimum	Maximum	Mean of LS	Std. Deviation of LS
1	It is mostly required for working women who have multiple responsibilities of family, children, and job	60	1.00	5.00	3.92	0.89
2	It is applicable most to the person having childcare requirement	60	1.00	5.00	3.85	0.92
3	Caring responsibilities for old age parents	60	1.00	5.00	3.75	0.95
4	People having personal goals such as higher studies, and hobbies .	60	1.00	5.00	3.80	0.86
5	It is required to all age groups irrespective of the gender	60	1.00	5.00	3.82	0.93

Source: Primary data

Table 6: Solutions to work life balance among the team members

S. No.	Criteria	n	Minimum	Maximum	Mean	Std. Deviation
1	Encouraging to take necessary breaks	60	1.00	5.00	3.8000	0.85964
2	Work from home and flexible working hours	60	1.00	5.00	3.9500	0.81146
3	Flexi time during maternity and space for childcare/ caring parents	60	1.00	5.00	3.6333	0.88234
4	No long hours, working on commuting hours	60	1.00	5.00	3.9833	0.81286

Source: Primary data

Table 7: Decision on hypothesis

S. No.	Criteria	T	Df	Sig. (2-tailed)	Null hypothesis
1	Work-Life Balance	17.266	59	0.000	Reject
2	Importance of work-life balance among the team members	16.045	59	0.000	Reject
3	Solutions to work-life balance among the team members	17.962	59	0.000	Reject

Source: Primary data

required data was collected from the sample respondents with the help of a questionnaire designed primarily for the purpose of the study through personal interviews.

Questionnaire

A questionnaire was designed based on the objectives of the study. The questionnaire included demographic variables and three sections of work-life balance. The questions pertaining to work life balance were based on Likert scaled items ranging from 1 to 5. A scale of 1 meant strongly disagree and 5 represented strongly agree.

STATISTICAL ANALYSIS AND RESULTS

The tools that are used were analyzed using means, percentages, and one sample *t*-test.

This study had shown that about 41.7% of the women entrepreneurs were aged between 41 and 50 years and 35.0% were aged between 51 and 60 years.

Almost 43.3% of the women entrepreneurs were educated up to master's degree and 38.3% were educated up to bachelor's degree. It can be inferred that 90% of women entrepreneurs are graduates and above level of education. It can be further noted that a very few technocrats constituting about only 7% are entrepreneurs.

About 45.0% of the women entrepreneurs had experience of 5–10 years and 36.7% had education up to bachelor's degree. 90% of women turned into entrepreneurs after reasonable experience in industry indicating that their experience will help in managing the firms better.

The entrepreneurs had expressed that it is their priority to look after their family members and had high mean value and the definition has stemmed from the corporate perspective had low mean value.

The mean value of importance of work-life applicable to mostly required for women with multiple responsibilities had the high

mean value and statement caring responsibilities of old age parents had low mean value (Likert scaling ranges between 1 and 5, 1 being min and 5 being Max).

Among the solutions to work-life balance, no long hours, working on commuting hours had high mean value and enough maternity/paternity leaves had low mean value.

T value explains the greater the magnitude of *t*, the greater the evidence against null hypothesis. This means there is a significant difference. The *t*-test value for the mean difference between the work-life balance, importance of work-life balance, and solutions to work-life balance had *P*-value (level of significance) of <0.05. Hence all the null hypotheses were rejected and alternate hypotheses were accepted. Hence, we can conclude that work-life balance, the importance of work-life balance, and solutions to work-life balance were significantly different.

CONCLUSION AND SUGGESTIONS

- This study was undertaken mainly to study the work-life balance among the women entrepreneurs working in Telangana State
- This study had shown that most of the women entrepreneurs were aged between 41 and 50 years, educated up to master degree, and had work experience of 5 and 10 years
- The priority to look after the family had high mean value in this study. Work-life applicable to mostly required for women with multiple responsibilities among the importance of work-life and no long hours, working on commuting hours had high mean value among the solutions to work life
- The alternate hypothesis regarding difference in work-life balance, importance of work-life balance among the team members, and solutions to work-life balance among the team members were accepted.

The study assessed issues affecting the work-life balance by women entrepreneurs in Telangana state. This study was mainly based on the primary data collected through a questionnaire survey. The survey included 16 items using five-point Likert's scale applying simple random sampling. The survey was conducted among sixty women entrepreneurs of Telangana state. The study was expected to produce a number of significant issues related to the WLB of women entrepreneurs. The important WLB issues that are confronted by women entrepreneurs are role overload, health-related issues, time management issues, dependent care, and lack of available social and family support. The study had shown that there is significant difference in the work-life balance issues, importance, and solutions to maintain the work-life balance.

This study has some limitations. The study has not considered the psychological aspects which may have influence on WLB

or women entrepreneurs. The sample size may not be sufficient to draw and meaningful conclusions from the study. The multicultural and multireligious people and mixed formation of the society may yield more representative output.

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Research Article

Sports injuries among men handball players of Hyderabad district in Telangana state - A Review

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ABSTRACT

Handball is a frequent physical contact sport between players played with high speed. The physical demands are characterized by intermittent speed running. Match play involves high-speed running sides wards, forwards and backward, agile movements, jumps, landings, turns, and repeated acceleration and deceleration activities. The sample for the study consists of fifty male handball players in the age group of 18–22 years. The data are collected through questionnaire at their practice sessions in Hyderabad at different training coaching centers. It is concluded that handball players have secured the lower extremities injuries are 55%, upper extremities injuries are 35%, head and neck injuries are 5%, and spine 5%. This type of study is useful to coaches to give proper coaching for the development of motor qualities for the prevention of injuries among handball players.

Keywords: Agile movement jumps, Lower extremities, Spine, Upper extremities

INTRODUCTION

Handball is a frequent physical contact between players played with high speed. The physical demands are characterized by intermittent speed running. Match play involves high-speed running sides ward, forwards and backward, agile movements, jumps, landings, turns, and repeated acceleration and deceleration activities. Most of the play in handball involves balancing on one or two legs while catching, bouncing, or throwing the ball with one hand. With tough tackles and frequent body checking, there is an obvious risk of injuries in handball.

Seil *et al.*^[1] (1998) studied about sports injuries in team handball. One hundred eighty-six players of 16 teams in two male team handball senior divisions were observed prospectively for one season to study the injury incidence in relation to exposure in games and practices. Ninety-one injuries were recorded. Injury incidence was evaluated at 2.5 injuries

per 1000 player-hours, with a significantly higher incidence in game injuries (14.3 injuries per 1000 game-hours) compared with practice injuries (0.6 injuries per 1000 practice-hours). Practice injury incidence was higher in the lower performance level group, and game injury incidence was higher in the high-level group. The upper extremity was involved in 37% of the injuries, and the lower extremity in 54%. The knee was the most commonly injured joint, followed by the finger, ankle, and shoulder. Knee injuries were the most severe injuries, and they were more frequent in high-level players. There was an increase in the severity of injury with respect to performance level. The injury mechanism revealed a high number of offensive injuries, one-third of them occurring during a counterattack. The injury pattern showed certain variations with respect to player position and performance level. Prophylactic equipment was used by a majority of players at the higher performance level.

Akhila (2021) studied about sports injuries among goalkeepers in football and hockey in Telangana state. The sample for the study consists of twenty male goalkeepers in football and twenty male hockey goalkeepers in the age group of 19–22 years. The data are collected through questionnaires at their practice session. It is concluded that goalkeepers in football, the

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Table 1: Percentage of injuries among handball players

Lower extremities injuries (Hamstring strain, knee ligament, sprained ankle, achilles tendon, shin bone, patella dislocation, heel pain, etc)	Upper extremities (Rotator cuff, elbow injury, fractures in hand)	Head and neck	Spine
55	35	5	5

lower extremities injuries are 45%, upper extremities injuries are 25%, head-and-neck injuries are 10%, and spine 20%. It is concluded that goalkeepers in hockey, the lower extremities injuries are 40%, upper extremities injuries are 30%, head-and-neck injuries are 15%, and spine 15%. This type of study is useful to coaches to give proper coaching for the development of motor qualities for the prevention of injuries among football and hockey goalkeepers.

The 11 most common injuries in handball are:

1. Sprained and strained ankle
2. Patella dislocation
3. Throwing shoulder pain
4. ACL injuries
5. Dislocation in shoulder
6. Heel pain
7. Jumper's knee
8. General back pain

METHODOLOGY

The sample for the study consists of fifty male handball players in the age group of 18–22 years. The data are collected through questionnaire at their practice session in different handball Training centers in Hyderabad District in Telangana State in India. The training state of each handball players is 3 years.

Research Instruments

Questionnaire forms were given to male handball players those who regularly practice of handball in Hyderabad at their practice session.

The form included items on age, gender, length of practice, and injury diagnosis.

- Lower extremities (Hamstring strain, Knee ligament, Sprained ankle, Achilles Tendon, Shin Bone, Patella dislocation, Heel Pain)
- Upper extremities (Dislocated shoulder, fractures in the hand)
- Head and neck (Cuts and bruises to the face or head).
- Spine (Back pain).

RESULTS AND DISCUSSION

It is concluded that handball players have secured the lower extremities injuries are 55%, upper extremities injuries are 35%, head-and-neck injuries are 5%, and spine 5%.

Research Recommendations

Handball injuries are most common, and mostly acute injuries occur in the lower extremities, such as ankle, knee, and hip sprains. The most common overuse injuries are in the shoulder, knee, and lower leg. More injuries are recorded in match play than during training sessions.

Sufficient warm-up, proper technique, correct biomechanics, proper conditioning, optimizing balance, coordination, optimizing reaction times, optimal diet, adequate rest, and positive attitude will reduce the risk of injuries. Increase your flexibility by performing dynamic warm up prior to practice and competition followed by static stretching post activity. Consult a coach or physical trainer to incorporate the conditioning programs during the practice in handball.

ACKNOWLEDGMENTS

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Research Article

A phenomenological investigation of the college transition from former high school athletes no longer engaged in varsity competition

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ABSTRACT

Participation in sport not only provides athletes with health benefits but also can be an important aspect of living a meaningful life as a student. The study looked into the reasons what makes the athletes discontinued engaging in sports trainings and competition participation based on the data gathered by the researchers through the one-on-one interview, there are many challenges and factors that considered by the former student-athletes. The researchers have found out that time management, injury, and their role transition are those challenges that are a big factor for them when it comes to balancing their time and roles.

Keywords: Athletes, Athletics, Participation, Sports

INTRODUCTION

Organized sport plays an important role in collegiate athlete development. Despite this, there has been an increase athlete that discontinues participating in sports in these ages, especially in occidental countries due to the massification of sport practice among youths, leading to more numbers of discontinued athletes which are particularly worrying in collegiate ages in 18–22.

In relation to adolescent sports, athletes discontinued participation in sports' phenomenon can be explained as a moment when young athletes terminate their athletic careers prematurely and before they have reached their top performance. According to Guillet *et al.*, (2000), provides significant information regarding the periods that discontinue within sport occur, however it fails to distinguish exactly why this occurs. The proliferation of

studies conducted in several sports shows existing concern with the increasing number of athletes who discontinue in sport practice. Several investigators (Stratton and Baer, 2000, 2002; Weiss and Chaumeton, 2001) have concluded that the most frequent reasons advanced by children and adolescents who withdraw from sports are interest conflicts or the desire to do something else.

In other definition presented by Cervelló (2000) that seem relevant, in general, sport dropout can be considered as the situation in which the person stops their sports commitment explicitly. In addition, a relevant point on this subject is that most authors do not define discontinue specifically. Sarrazin and Guillet (2002), found that its conceptual definition does not appear to be consensual in literature and, in most studies, where authors do not specify if discontinue is about a specific sport or sports in general.

This study is significant as it aims not only the underlying reasons of withdrawal among athletes' participants within a sport but also to identify the reason as to why others choose to not pursue their involvement and interest in the sport.

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METHODS

The researcher used an individual interview to obtain information and create meaning to answer the problem of the study.

The following are the guide questions that will help the researcher in collecting the data.

1. What are the reasons that trigger you to discontinue your participation in sports?
2. How do you manage your daily lifestyle for not engaging sports?
3. How do you feel about your body conditions when you are not engaging yourself in sports?

RESULTS AND DISCUSSION

Thematic analysis will be utilized to identify, analyze and report patterns and themes within data. The emergent themes

were then organized into thematic networks (Attride-Stirling, 2001) consisting of themes on three levels, namely, time management, personal and social activities, and fatigability themes. These themes are discussed in the subsections below.

This study started with the purpose of the researchers to know the different factors faced by the former athletes in high school who are not committed in sport in college. The researcher gathered data through classroom announcements of freshmen we sought to ask this question “who is the former athlete in High School and does not pursuing his sport in college?” in order to know who will be the key informants of the study and then we gathered 18 participants and we gave them an open-ended questionnaire which is used to interview the key informants and extract answers from their experiences. After collecting the answers, the researcher had a careful analyzation and interpretation of the data. We come up with five qualified students to our inclusion criteria which is a freshmen student who must be range from 18 to 22 years old, an athlete during his/her high school days, and not engaging in sports in



Figure 1: Thematic Network representing the no longer engaged college athlete

college. In interpreting informants shared experiences they enumerated the reasons and challenges why they discontinued in sports. Meanwhile, the common answers are their role transition to college which is an adolescent milestone that is universally- acknowledge as stressful and demanding.

CONCLUSION

The findings of this study are important to high school athlete in the state university as well as their parents and coaches, each of whom would benefit from the young persons, enhance the ability to successfully bring back their interest and engagement to sports and also for the benefit of the sports organization in the university to have more competitive athlete can give pride to the university. However, to help the student bring back their physique.

Recommendation

In light of the present gap in the literature, pursuing a deeper understanding of high school athletes' disengagement from sport during the 1st year in college represents a fruitful research endeavor. Indeed, this study has the potential to extend the existing identity transition literature, which has yet to examine the large population of high school athletes who do not go on to participate in varsity athletics at the intercollegiate level.

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Research Article

A study on body composition among table tennis and badminton players

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ABSTRACT

The purpose of the study was to compare the body composition among table tennis and badminton players of Gulbarga University. Total 20 male players 10 each from Table Tennis and Badminton and age ranging between 18 and 24 years were randomly selected for this study. The necessary data were collected using body composition analyzer which is based on bioelectrical impedance. To compare the mean difference between table tennis and badminton players, *t*-test was computed using the SPSS software. The results indicate that there were no significant difference found between table tennis and badminton players on the variables of body composition fat basal metabolic rate, body fat mass, body mass index, total body water, only the fat free mass was found to be statistically at 0.05 level of significance.

Keywords: Fat basal metabolic rate, Body fat mass, Body mass index

INTRODUCTION

Body composition is the proportion of the lean body mass and depot fat, and it is one of the most important morphological features characterizing human organism. It is well known that a high percentage of fat in relation to the total body weight is detrimental and may lead to obesity. It is an integral component of total health and physical fitness. Analysis of body composition can depict the percentage of various components (muscles, skeletal mass) of the total body weight of an individual and provide precise information about overall body functioning. For an athlete body composition is an important factor that contributes for a peak performance. It has been known to be fundamental to excellence in athletic performance. It is well accepted that an athlete who has a low level of fat percentage desirable give optimum performance in the competition.

Studies of body composition in certain sports indicated that the athletes who were very lean but heavy due to well-

built musculature were superior in performance in certain competitive sports such as football, weight lifting and shot put. On the other hand, athletes who have a substantial amount of adipose tissue have increased energy demands due to the inner weight of fat, thus rendering the work more difficult to perform in endurance activities where the body has to none longer with greater weight. It may be for this reason that the long distance runners are found to be less endomorphic than other runners and their counter parts at lower level of competition.

The terms fat free mass (FFM) and lean body mass are often considered interchangeable when they should not be. The lean body mass contains a small percentage of essential fat stores (perhaps as much as 3%), chiefly within the central nervous system, marrow of bones, and internal organs. In contrast, use of the term "Fat-Free" mass refers to the body mass devoid of all extractable fat.

METHODS

For the purpose of this study, overall 20 male players, 10 each from table tennis and badminton players of Gulbarga University who are keenly participated in different tournament

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Table 1: Comparison on body composition among table tennis and badminton players

Variables	Groups	n	Mean	SD	ME	SE	"t"
BMI	TT	10	10.38	1.90	0.67	0.61	0.55
	BAD	10	9.20	1.40			
BMR	TT	10	757.72	89.03	26.57	26.28	0.50
	Bad	10	731.15	76.72			
FM	TT	10	2.24	1.39	0.28	0.53	0.27
	BAD	10	1.96	1.93			
FFM	TT	10	24.14	5.15	3.39	1.54	1.1
	BAD	10	20.75	4.57			
TBW	TT	10	17.4	3.63	1.84	1.10	0.83
	BAD	10	15.55	3.33			
F%	TT	10	4.01	1.85	0.30	1.06	0.14
	BAD	10	4.32	4.38			

BMI: Body mass index, BMR: Basal metabolic rate, FM: Fat mass, FFM: Fat free mass, TBW: Total body water

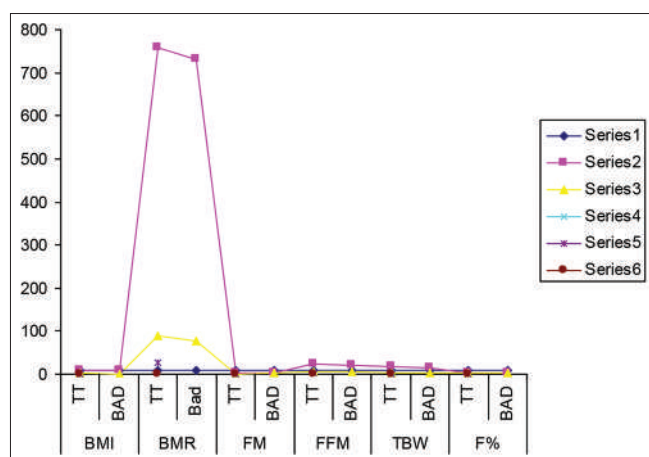


Figure 1: Mean scores of body composition parameters of table tennis and badminton players

such as inter university competitions were randomly selected as subject for this study. The age of the players was ranged between 18 and 24 years. The necessary data was collected using body composition analyzer which is based on bioelectrical impedance. Before the administration of the test the subject were briefed on the objective and requirements of the test that were to be tested. The instructions were properly given to the players before the commencement of the test. They were instructed to have a sound night's sleep and they should not have any physical exertion at the time of the test and the test were conducted after three hours of light breakfast. The height (in cm) and weight (in kg) were measured using stadiometer and weighing machine respectively and the age

of the subjects were recorded from their identity cards of their respected institutions. The subjects were asked to relax for half an hour and empty their bladder before testing the body composition parameters, that is, fat %, basal metabolic rate (BMR), fat mass (FM), FFM, body mass index (BMI), and total body water (TBW).

Statistical analysis

For testing the statistical significant difference between the mean value of table tennis and badminton players, *t*-test was employed with the help statistical package for the social sciences software. The level of significance chosen was $P \leq 0.05$.

RESULTS

The results are presented in the following Table 1 and Figure 1.

DISCUSSION

From the result in Table 1 it has been observed that there was no significant difference in the parameters of body composition (fat %, BMR, body FM, BMI, and TBW) between table tennis and badminton players. Body composition is one of the important components of morphological characteristics of every player. These components may vary from player to player. It can be observed that both the players of table tennis and badminton are normal in case of BMI. It can also be observed that the calculated values of BMR, FM, FFM, and TBW are higher in table tennis players than badminton players. The table tennis players have less fat %. The result revealed that the table tennis players are superior to their counterpart, that is, badminton players as per the present study.

CONCLUSION

In the light of the findings of the present study followings conclusions were drawn no significant difference was obtained among table tennis players and badminton players on body composition (fat %, BMR, body FM, BMI, and TBW). Statistically significant difference was found between table tennis players and badminton players on FFM.

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Research Article

A psycho social study on the performance of sports persons

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ABSTRACT

The objectives of the present research was to study the effect of psychosocial factor on sports persons training for athletics and martial arts events with reference of self concept, aggression, locus of control, and other selected social variables. The sample consists two types of sports persons training for athletics 60 members and martial arts 60 members. The sample consisted of sports persons practicing athletics and martial arts events in different sports organizations (including NIS) and martial arts training centers in different parts of the Bangalore city with minimum one year of training. There are no significant differences between athletics and martial arts sports persons on psychological variables (a) self concept and (b) aggression. Aggression between athletics and martial arts sports persons.

Keywords: Self-concept, Aggression, Martial arts, Athletics

INTRODUCTION

Psychology of sport is a branch of psychology that examines various aspects of sports activities and physical culture. It also studies the psychological aspects of the athletes personality. It develops diagnostic techniques for selecting persons of specific sporting events and effective training methods. Sports psychology is also designed to develop the psychological foundations of sporting skills by teaching optimal locomotor habits and proper control of one's body and by fostering the athlete's will power and all around development.

Social psychology has been defined as the study of how groups influence individuals. Additionally, however, the individual athlete influences the group. It is important to understand facts of this mutually influential relationship to comprehend how athletes and athletic teams truly function.

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METHODS

Objectives

The objectives of the present research was to study the effect of psychosocial factor on sports persons training for athletics and martial arts events with reference of self concept, aggression, locus of control, and other selected social variables.

Hypothesis

1. The two groups of sports persons will differ on the psychological variables, that is, self-concept and aggression
2. Male and female sports persons will differ in all the psychosocial variable
3. The most important social factor judged as affecting performance will differ for the two sports and sex groups
4. The most important personal factor judged as affecting performance will differ for the two sports and sex groups.

Research Design

Sample

The sample consists two types of sports persons training for (1) Athletics, and (2) Martial arts.

The sample consisted of sports persons practicing athletics and martial arts events in different sports organizations (including NIS) and martial arts training centers in different parts of the Bangalore city with minimum 1 year of training. The number of sports persons contacted in each type of sports is given in Table 1. There was no other criterion for selection the sample [Table 2].

It has been found that the group has in general; good self concept 40% of the athletes and 45% of the martial arts had scores on self concept higher than the group median. This scale is supported to measure all aspects of self-concept, perceived, ideal, real and social. As such it can said that two groups do not significantly differ in the way they perceive themselves as consider other a perceiving them [Table 3].

The “*t*” values indicate that there is exist significant difference between two sports (athletics and martial arts). The results shows that the aggression level of athletics and martial arts groups has low but compare to athletics, martial arts sports persons has high score. This shows the level of aggression is

Table 1: Distribution of the sample in two groups

Events	Male	Female	Total
Athletics	30	30	60
Martial Arts	30	30	60

Table 2: Difference between the two groups of self-concept

	Mean	SD	“ <i>t</i> ”
Athletics	117.5	23.194	0.042
Martial arts	117.33	20.242	

Table 3: Difference between the two groups of aggression

	Mean	SD	“ <i>t</i> ”
Athletics	8.3	3.14	2.14
Martial Arts	9.65	3.69	

differ. This may be due to the fact that due to different sports and different type of competitive situations. In athletics the sports person has no need to expose his aggression in extremely, but in martial arts the situation is different the sports man has to face the opponent directly. The direct attack leads to show more aggressive way of behavior.

CONCLUSION

There are no significant differences between athletics and martial arts sports persons on psychological variables (a) self concept and (b) aggression. Aggression between athletics and martial arts sports persons. Hence, hypothesis one is partially disproved.

There is a significant difference between male and female sports persons on psychological variables (a) self concept and (b) aggression, but there is a significant difference in aggression so hypothesis two is partially disproved.

The most important social factor judged as affects performance was different for two sports groups and for male and female.

The most important personal factor judged as affects performance was different for two sports groups and for male and females.

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Research Article

Effect of circuit training for the development of abdominal muscular endurance among men boxers of Gulbarga University

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ABSTRACT

The purpose of the present study is to find out the effect of circuit training for the development of abdominal muscular endurance among men boxers players of Gulbarga University. The subject was chosen at random from a group of boys between the ages of 21 and 23 years old. $n = 20$ experimental Group I and $n = 20$ control Group II are included in the study's sample. Sit-ups test was utilized in the study as a pre-test and post-test to determine core strength in both groups. Experiment Group I received circuit training on alternate days for 8 weeks, while control Group II received general warm-up training. The experimental group's performance on the sit-ups improved from pre-test to post-test. It is concluded significant effect in experimental Group I whereas the control group exhibits a reduction in their performance.

Keywords: Circuit training, Abdominal muscular endurance, etc.

INTRODUCTION

Boxing is a combat sports in which two people, usually wearing protective gloves and other protective equipment such as hand wraps and mouth guards, throw punches at each other for a predetermined amount of time in a ring. Amateur is both an Olympic and commonwealth games sport and is a standard fixture in most international games – it also has its own World Championships. Boxing is overseen by a referee over a series of 1–3 min intervals called rounds. A winner can be resolved before the completion of the rounds when a referee deems an opponent incapable of continuing, disqualification of an opponent or resignation of an opponent. When the fight reaches the end of its final round with both opponents still standing, the judges' scorecards determine the victor. In the event that both fighters gain equal scores from the judges, professional bouts are considered a draw. In Olympic boxing, because a winner must be declared, judges award the contest to one fighter on technical criteria.

Circuit training is a form of body conditioning that involves endurance training, resistance training, high-intensity aerobics, and exercises performed in a circuit, similar to high-intensity interval training. It targets strength building and muscular endurance. An exercise "circuit" is one completion of all set exercises in the program. When one circuit is completed, one begins the first exercise again for the next circuit. Conventionally, the time between exercises in circuit training is short and often with rapid movement to the next exercise.

Cristina-Elena Moraru "Alexandru Ioan Cuza" University, Iasi, Romania *et al.* (2019) efficient effects in the development of motor qualities, mainly strength, and resistance. The purpose of this paper was to demonstrate the efficiency of training in the circuit in the development of this motor quality. The sample within the research comprised 30 women aged 25–35 and who practiced three practices per week for 6 months. The independent variable included circuits for beginners (30" workout-30" pause), circuits for middle level (45" workout-30" pause), and circuits for advanced (50" workout-30" pause). The tests applied concerned the strength and resistance of abdominal muscles, of the back, of the legs, and of the arms. Findings. In the test for the

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strength and resistance of abdominal muscles, the values of the average and of standard deviation were 13.8 ± 1.52 initially and 15.2 ± 1.08 finally; concerning the strength and resistance of the back muscles, the values increased from 21.46 ± 1.684 initially to 23.53 ± 1.641 finally; in the strength and muscles of the legs, the values ranged between 14.86 ± 1.767 initially and 16.80 ± 1.473 ; in the strength and muscles of the arms, the values recorded an increase from 14.40 ± 0.985 initially to 16.26 ± 0.961 finally. The present research demonstrated that the use of circuit workout can improve the motor qualities of strength and it can also improve the motor qualities of strength and resistance, which confirms the purpose of the paper.

Objective of the study

The objective of the study is to find out the effect of circuit training on the development of abdominal muscular endurance among boxers players of Gulbarga University.

It was hypothesized that there would be a significant difference in circuit training development core strength among boxers players of Gulbarga University.

The purpose of the present study is to find out the effect of circuit training for the development of core strength among men boxers players of Gulbarga University. The subject was chosen at random from a group of boys between the ages of 21 and 23 years old. $n = 20$ experimental Group I and $n = 20$ control Group II are included in the study's sample.

Tools

Sit-ups

a. Purpose of the test: To measure core strength.

RESULTS AND DISCUSSION

The experimental group and the controlled group were given pre- and post-tests to see if there was an improvement in core strength after 8 weeks of circuit training, while the controlled group received general training.

The analysis of the data reveals that the subjects with the circuit training have shown improvement in the performance of sit-ups test from pre- to post-test mean \pm S. D experimental group pre-test result shown (32.9 ± 1.29) and controlled group (31.9 ± 1.45). After 8 weeks of specific of circuit training, there is an improvement in the subject's experimental group (37.4 ± 0.82) circuit training and controlled group (31.5 ± 1.40).

Table 1:

Variables	Group	Pre-test Mean \pm SD	Post-test Mean \pm SD	t	P-value
Sit-ups	Experimental	32.9 \pm 1.29	37.4 \pm 0.82	-18.291	0.000*
	Control	31.9 \pm 1.45	31.5 \pm 1.40	1.252	0.226

*Significant at 0.05 level

CONCLUSIONS

It was concluded that after the 8 weeks of circuit training, there is an improvement in experiment group, as it was analyzed in the results mention that the circuit training has shown excellent effect in the improvement core strength. The aim of formulating the effect of circuit training to the betterment and enhances their performance as well as a guideline for boxers coaches at various levels in preparing and designing quality and effective training program.

RECOMMENDATIONS

The following suggestions are made for the benefit of players, coach's academicians, and sports scientists. The researcher suggests the part of the coach to use the above-said development of the circuit training program for boxers players. The study helps the physical educationist and coaches for selecting the athletes.

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Research Article

Effect of hill training and fartlek training for the development of aerobic fitness among hockey players of Hyderabad district

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ABSTRACT

Introduction: Aerobic fitness is vital for middle- and long-distance runners. Aerobic fitness is of special importance at the beginning of the preparatory period. The objective of this study is to determine the effects of hill training and fartlek training for the development of aerobic fitness among the middle- and long-distance runners. **Methods:** The sample for the study consists of 10 middle- and long-distance runners between the age group of 18 and 20 years those who have participated in many middle- and long-distance events since the past 3 years. The selected subjects were randomly divided into three equal groups of 15 each. Group I is experimental hill training group, Group II is experimental fartlek training group, and Group III is control group. The experimental groups were given training alternate days for 12 weeks in addition to their normal practice on other days. The control group was given routine training. The data were collected in pre-test and post-test for all groups using the 12 min Run Cooper test. The collected data were analyzed statistically using ANCOVA. **Results:** The results of the study show that due to hill training and fartlek training, there is a significant development of aerobic fitness among experimental groups. **Conclusions:** It is concluded that hill running and fartlek running are beneficial to middle- and long-distance runners to stronger the lower body muscles, resistance to fatigue, etc. It helps for the development of aerobic fitness.

Keywords: Aerobic fitness, Fartlek training, Hill training

INTRODUCTION

Aerobic fitness is a measure of your body's ability to take oxygen from the atmosphere and use it to produce energy for your muscle cells. Many factors influence aerobic fitness, including your lung efficiency, cardiac function, gender, age, and genetic makeup. Understanding the various components of aerobic fitness will help you train smarter to achieve optimal performance.

Heart and lungs play a central role in aerobic fitness, with your heart being the prime limiting factor. While your lungs must function efficiently to transfer oxygen from the atmosphere to your bloodstream, they take a backseat to your heart, which must contract forcefully to inject oxygenated blood into your

system to reach your cells. Aerobic exercise training increases your total blood volume, heart muscle size, and contractility, resulting in a greater volume of blood being injected per heartbeat. Increased stroke volume means your heart does not have to beat as frequently at rest, resulting in a lower resting heart rate.

Hill running has a strengthening effect as well as boosting your athlete's power and is ideal for those athletes who depend on high running speeds – football, rugby, basketball, cricket players, and even runners. To reduce the possibility of injury, hill training should be conducted once the athlete has a good solid base of strength and endurance.

Hill training offers the following benefits:

- Helps develop power and muscle elasticity
- Improves stride frequency and length
- Develops coordination, encouraging the proper use of arm action during the driving phase and feet in the support phase

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- Develops control and stabilization as well as improved speed (downhill running)
- Promotes strength endurance
- Develops maximum speed and strength (short hills)
- Improves lactate tolerance (mixed hills)

The benefits of short, medium, and long hills are quite different, and can be used at different times of the year.

Short Hills

A short hill is one which takes no more than 30 s to run up and has an inclination between 5° and 15° gradient. The athlete's energy source on short hills is entirely anaerobic. The athlete should focus on a running technique which has vigorous arm drive and high knee lift, with the hips kept high so that they are "running tall," not leaning forwards.

The session is anaerobic so the recovery time can be long, a walk back down the hill, or a slow jog of 60–90 s. The total volume will depend on the fitness of the athlete and the reason for doing it. A sprinter looking for strength might do 10 repetitions of 15 s duration up a steep slope with a long recovery whereas a distance runner who is trying to improve sprinting speed might do 30 repetitions of 15 s duration.

Short hills of 5–10 s duration will help improve the adenosine triphosphate and phosphate-creatine (ATP + PC) energy system and hills of 15–30 s duration will help develop the ATP + PC + muscle glycogen energy system.

Medium Hills

A medium hill is one that takes between 30 and 90 s to run up. This is the length of hill is a good distance for the middle-distance runner, because it combines the benefits of the short hills with the stresses on local muscular endurance and tolerance of lactic acid. Use a hill as steep of one in six to one in 10 so that you can run at something near race pace. The energy source is both aerobic and anaerobic and the athlete will experience the buildup in blood lactate as they go further up the hill. Although the session will usually be quite fast and competitive, it is important that style is emphasized.

Long Hills

A long hill is one which takes from 90 s to 3 min plus. Here, most of the energy comes from aerobic sources, but if parts of the hill are steep and they are running them hard, there will still be an accumulation of blood lactate. There will be local muscular fatigue in the leg muscles, and possibly in the abdominal muscles too, but the main limiting factor will be the athlete's cardiovascular.

These hills can be used in two ways:

- As a hard aerobic training session during the pre-competition season

- As a hard time-trial session in the early part of the competition period.

As these hill sessions are aerobic, the athlete will not use as much power per stride as the shorter hills, and so perhaps would not be used by middle-distance runners, except for one or two time-trial runs. They are particularly good for the cross country or road runner who is running distances of 10,000 m and upwards. A session of, say 83 min, with a run back of 4 or 5 min will make a good hard workout.

Mixed Hill Running

The attraction of mixed hill training is that it can be fitted in with the terrain the athlete is running on and can, therefore, be interesting and full of variety. If they do a fartlek session round a hilly course, they will be able to fit in a number of different runs. Two advantages can come from this type of hill training:

Fartlek, which means "speed play" in Swedish, is a training method that blends continuous training with interval training. Fartlek runs are a very simple form of a long distance run. Fartlek training "is simply defined as periods of fast running intermixed with periods of slower running." For some people, this could be a mix of jogging and sprinting, but for beginners it could be walking with jogging sections added in when possible. A simple example of what a runner would do during a fartlek run is "sprint all out from one light pole to the next, jog to the corner, give a medium effort for a couple of blocks, jog between four light poles and sprint to a stop sign, and so on, for a set total time or distance. The variable intensity and continuous nature of the exercise places stress on both the aerobic and anaerobic systems. It differs from traditional interval training in that it is unstructured; intensity and/or speed varies, as the athlete wishes. Fartlek training is generally associated with running, but can include almost any kind of exercise. It is useful for speed endurance, race tactics, mental strength, spurt in races, etc.

Review of Related Literature

Pardeep Kumar, 2015, the purpose of the present study was to effect of fartlek training for developing endurance ability among athletes. Thirty athletes between the age group of 18–24 years (15 experimental group and 15 control group) were selected for the study. The 6 weeks endurance training program for experimental group were specific to experimental group which contains more sand training on alternate days and controlled group was given general training of athletics. The pre-test and post-test were proficient through Cooper test for both groups to estimation the effects of sand running. This study explains that the sand training has increased the endurance between the experimental groups along with physiological capacity of the athletes. It is optional that sand training is fine for the endurance development of athletes.

Table 1: Analysis of covariance for pre-test and post-test data on aerobic fitness of control group, hill training group, and fartlek training group

	Control group	Hill training group	Fartlek training group	SOV	Sum of squares	Degree of freedom	Mean square	F ratio
Pre-test Mean	2098.7	2108.00	2101.30	B:W:	693.33	2	346.7	0.02
SD	152.26	71.13	89.91		508586.67	42	12,109.21	
Post-test Mean	2095.3	2258.0	2198.7	B:W:	203,293.33	2	101,646.67	10.06*
	152.26	71.13	89.91		508,586.67	42	12,109.21	
Adjusted Post Mean	2099.00	2253.00	2200.00	B:W:	184,893.99	2	92,446.99	71.02*
					53,368.20	41	1301.66	

*Significant at 0.05 level. Required table value at 0.05 level of significance for 2 and 42 degree of freedom=3.22

METHODS

The sample for the study consists of 45 middle- and long-distance runners between the age group of 18 and 20 years those who have participated in many middle- and long-distance events since the past 3 years. The selected subjects were randomly divided into three equal groups of 15 each. Group I is experimental hill training group, Group II is experimental fartlek training group, and Group III is control group. The experimental groups were given training alternate days for 12 weeks in addition to their normal practice on other days. The control group was given routine training. The data were collected in pre-test and post-test for all groups using the 12 min run Cooper test. The collected data were analyzed statistically using ANCOVA.

RESULTS

Table 1 shows that pre-test mean of control group is 2098.7, hill training group 2108.00, and fartlek training group 2101.30. Since the obtained “F” ratio is 0.02 which is lesser than the table value of 3.22, there is no significant difference among pre-test means at 0.05 level of confidence with 2 and 42 degree of freedom. It is evident that there is no significant difference between control group and experimental groups, that is, hill training group and fartlek training group on aerobic fitness initially before the commencement of training program. The post-test means of control group is 2095.3, hill training group 2258.0, and fartlek training group 2198.7. Since the obtained “F” ratio is 10.06 is higher than the table value of 3.22 which reveals that there is a significant difference among all the groups on the post-test means at 0.05 level of confidence with 42 degree of freedom. The adjusted post-test mean of control group is 2099.00, hill training group 2253.00, and fartlek training group 2200.00. Since the obtained “F” ratio is 71.02 is much higher than the table value of 3.22 which reveals that there is a significant difference among all the groups on the adjusted post-test means at 0.05 level of confidence with 41 degree of freedom.

CONCLUSIONS

It is concluded that hill running and fartlek running are beneficial to middle- and long-distance runners to stronger the lower body muscles, resistance to fatigue, etc. It helps for the development of aerobic fitness.

It is evident that there is no significant difference between control group and experimental groups, that is, hill training group and fartlek training group on aerobic fitness initially before the commencement of training Program. The post-test mean of control group is 2095.3, hill training group 2258.0, and fartlek training group 2198.7. The hill training group is having the better results in fartlek training group. It is also concluded that hill training is more suitable than fartlek training for the development of aerobic fitness among middle- and long-distance runners.

Recommendations

The hill running and fartlek running are recommended to all coaches to include in there training regimen to develop the aerobic fitness which is essential for middle- and long-distance runners.

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Research Article

Sportify – A new web-based application program enhancing learning and knowledge in sport

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ABSTRACT

Learning happens everywhere but where and how you learn make all the difference. With increasingly global technology in schools and decreasing mobility, it is imperative that educational leaders, teachers, students, and other stakeholders must select the right device, platform, and tool for teaching and learning. The right learning context suitable for the student's grade level will activate their new pedagogical priorities and create their own learning. Delivering effective digital-based or website-based learning in the Philippine environment is becoming essential. Thus, this case study will attempt to enrich learning through web-based instruction. The researchers developed an educational website, created electronic questionnaires and answer sheets to obtain student's feedbacks and key results from pre-test to post test.

Keywords: Educational Technology, Learning Intervention

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2, otherwise known as the coronavirus disease pandemic, had changed business, economic, social, political, security, and even educational landscapes in many aspects (Ozili and Arun, 2020). Quarantine restrictions were set to limit the movement of people to essential services pursuant to issuances of the Inter-Agency Task Force for the Management of Infectious Diseases. In effect, many business establishments, government institutions, and schools were closed to subsequently contain the spread of the disease among clients, workers, and the students, as well as to balance health-care utilization (Ozili and Arun, 2020). As a result of these big societal changes, industries adopted remote working. Similarly, schools have embraced remote teaching and learning. Hence, to resiliently

continue basic economic and educational processes amid the restrictions brought by global pandemic, many institutions transacted online (Mekonnen and Muluye, 2020).

In the field of education, curriculum developers had extracted the most essential learning competencies in basic education as teachers and students switched online. Learning delivery modalities which include but not limited to blended modular and online education, radio- and television-based instruction, teleconferencing, and videoconference through Google Meet, Zoom, and MS Teams to name a few were used to communicate and interact with the learners, to deliver the subject matter, and to assess the written works and performance of learners synchronously and asynchronously (Mekonnen and Muluye, 2020). The higher education and graduate schools had likewise transitioned to full online distance e-learning to meet the learning targets in their respective syllabi. Thus, many online applications and software were used to further enhance specialized learning among college, graduate, and professional students in home quarantine (Mekonnen and

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Muluye, 2020). Learners and the wider community can benefit from technological tools that support a learner-centered and knowledge-oriented curriculum (National Association for the Education of Young Children, 2008).

Since all content areas were required to be delivered online, education specialists and teachers in the field explored different methods of online teaching. Language and reading subjects such as Filipino and English, subjects involving problem-solving such as Mathematics and Sciences, subjects involving livelihood such as Technology, Vocational, and Home Economics, and subjects concerning culture and society such as Araling Panlipunan, Music, and Arts, as well as Health and Physical Education which highly relied on performance tasks were taught in online classrooms (Tria, 2020). All of which require further learning interventions to increase learning in the new normal situation. Among these areas, MAPEH is evidently comprehensive particularly physical education. Thus, the researchers of this case study are deeply concerned to develop sports resource learning materials for distant education (Tria, 2020).

Considering that some PE lessons, sports, require skills demonstration in an actual face-to-face setting and that this mode of delivery, however, is physically impossible to attain to date due to quarantine protocols, the development of a web-based resource material is seen by the researchers as potential virtual platform to further enhance learning and engagement. The researchers named the web that it developed as Sportify – Your Daily Dose of Sports. In this case study, volleyball is the main subject-matter. A copy of the web content is attached as Appendix A.

METHODS

Materials

The researchers used PowerPoint slides to conceive and create the educational materials. Then, we used Profreehost and WordPress, which are both essential tools for building a website. Profreehost is a web hosting company that focuses on providing free servers. WordPress is a website-hosting and -creation content management system. It comes with Elementor, a website customization plugin.

Participants

Following the website development-based instructional material (IM), we randomly selected 115 grade 10 online distance learning students from General Licerio Geronimo Memorial National High School, a Junior High School in Rodriguez, Rizal, as our participants (AAA). The respondents were given an assessment using Google Forms.

The responders were given a 30-item pre-test evaluation through Google Forms. Following the pre-test, the students were given 2 weeks to navigate and study the researchers' web-based material.

The participants were given a 30-item post-test assessment through Google Forms after the time limit had expired. The necessary information was subsequently obtained, processed, and presented.

Procedures

In view of the foregoing, the researchers are motivated to develop a website intended for distant learners of physical education, of volleyball, respectively. Consequently, the researchers are challenged to determine whether learning is improved through the web-based IM as learning intervention and whether this technology is a quality intervention in the case of Class AAA.

A. Learning assessment

A teacher-made test is constructed in Google Forms for this purpose and attached as Appendix B.

1. What is the mean score of Class AAA learners in the quiz before the utilization of web-based IMs?
2. What is the mean score of Class AAA learners in the quiz after the utilization of web-based IMs?

B. Technology evaluation

An evaluation tool in Google Forms is developed for this purpose and attached as Appendix C.

Data Collection

To measure and to interpret student learning using the web-based IM and the feedback to the technology used by the researchers in the case study, the following decision criteria were used:

A. For the assessment of learning, the quantitative decision criteria are the following:

- a. Pre-test mean score
- b. Post-test mean score

B. For technology evaluation, quantitative decision criteria are the following:

- a. Objectives
- b. Relevance
- c. Appropriateness
- d. Adequateness
- e. Access and convenience
- f. Creativity
- g. Engagement

Assumptions

The researchers believe that student learning improves using Sportify – Daily Dose for Sports. Further, the researchers believe that the web-based material for distant learners is easy to use and motivating.

RESULTS

The data show that student learning has improved after Class AAA students utilized the web-based IM developed by the researchers. Refer to Table 1 for the mean scores of students in the pre-test and post-test. Hence, learning is possible and can improve through information, communication, and technology intervention. In the case of volleyball, it is evident from the data that this subject matter can be learned in online modality by the distant learners.

In soliciting student feedback about the web-based IM for volleyball, the researchers used a 5-point scale. Students were tasked to assign regarding the quality of the intervention used in this case study with corresponding adjectival rating as stated in Table 2.

In this case study, the researchers found that across all indicators of quality intervention, the web-based IM is very satisfactory. The student feedback shows that the objectives of the course are presented, congruent with and achieved in the developed online technology. Further, supplementary instructional aids embedded on the website such as PowerPoint presentation and other audio-visual references are relevant. The data also show that activities in the web-based IM for volleyball are appropriate to and adequate for the students. Furthermore, the website as the platform for distant learning and the attached materials to it is easy to access and to navigate based on student's feedback. Text, images, and illustrations on the website are realistic, appealing, and creative. Finally, the data show that the intervention is engaging. Refer to Table 3 for the quantitative and adjectival ratings.

Preferred Alternative with Rationale

While the data show a very satisfactory result in both student learning and the developed technology in this case, the researchers are fully aware that using this form of technology-driven lesson-specific intervention, to some extent, entails the availability of time, competence, and other resources. Developing the website, the supplementary learning aids, the instruments for evaluation of the content and the technology, observation, data collection, and analysis require time.

In web development for instruction, technical knowledge on programming languages is also a requisite. Moreover, creation of website is generally not free and requires subscription. With this in mind, an efficient technology-based learning intervention is preferred. The researchers are of the belief the use of web-based platform for instructional intervention must be limited to skill-based content areas and specially, which require the practice, acquisition, and enrichment of highly psychomotor, technical, and applied skills. Thus, considering the above-mentioned factors as the rationale, physical education, technology livelihood education – vocational, and home economics are

Table 1: Mean scores of Class AAA

Test	Respondents	Perfect score	Class mean
Pre-test	115	30	20.878
Post-test	115	30	25.373

Table 2: Table of interpretation for evaluating the quality of web-based material

Rating	Adjectival rating
5	Excellent
4	Very satisfactory
3	Satisfactory
2	Fair
1	Needs improvement

Table 3: Summary of ratings of web-based instructional material

Indicator	Ratings	Adjectival rating
Objectives	4.671	Very satisfactory
Relevance	4.632	Very satisfactory
Appropriateness	4.684	Very satisfactory
Adequateness	4.579	Very satisfactory
Access and convenience	4.526	Very satisfactory
Creativity	4.513	Very Satisfactory
Engagement	4.329	Very satisfactory
Average	4.562	Very satisfactory

the preferred content areas to be enhanced through web-based technologies for cost efficient yet very satisfactory intervention.

Recommendations

The researchers of this case study recommend major educational and institutions to consider web development for highly applied subjects in curriculum and instruction to have better learning outcomes like as in this case study. Further, it is recommended that subjects under Program for International Student Assessment be enriched through web-based materials, especially now that enrollees are distant learners (Rashid, 2020). It must be noted that the Philippines incurred below average PISA scores (OECD, 2020). Moreover, for research purposes, the researchers recommend the use of t t-test and other statistical instruments to determine causal relationships between web-based IMs and learning outcomes.

CONCLUSION

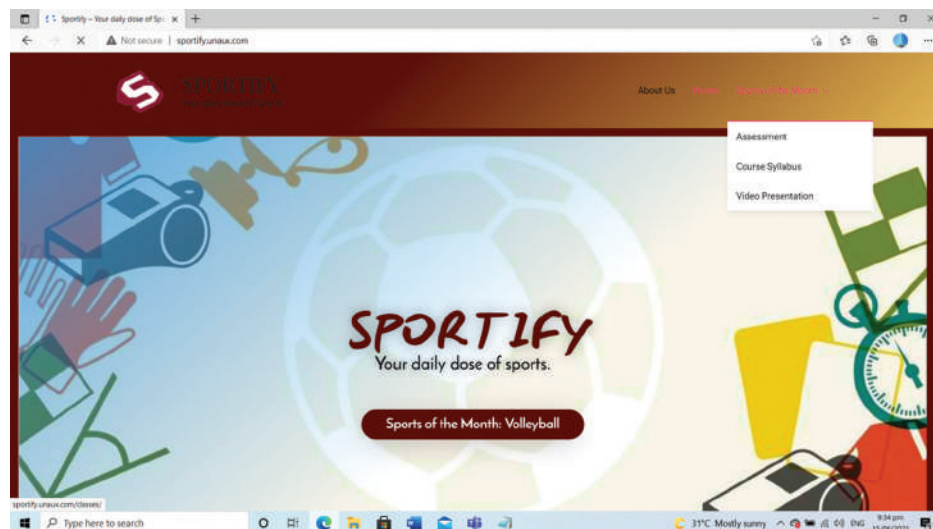
The post-test mean scores of students under Class AAA is higher than the mean scores before the latter had utilized Sportify – Your Daily Dose of Sports in learning volleyball. Overall, the technology developed is very satisfactory. In terms

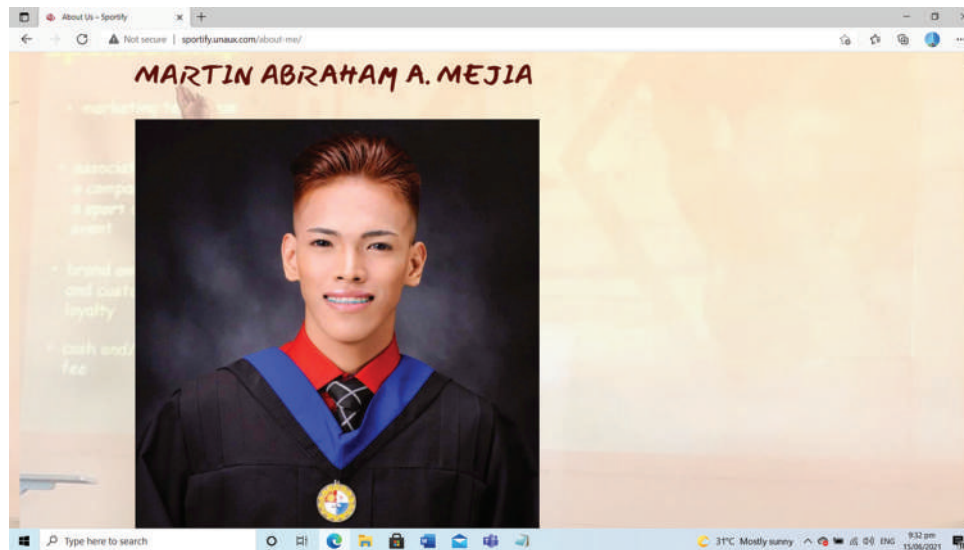
of objectives, relevance, appropriateness, adequateness, access and convenience, creativity, and engagement, the web-based IM is very satisfactory.

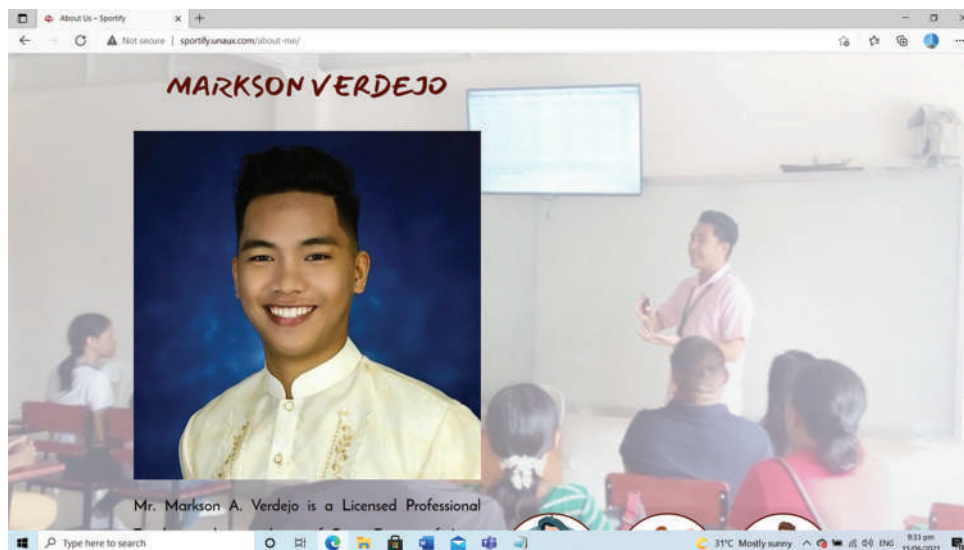
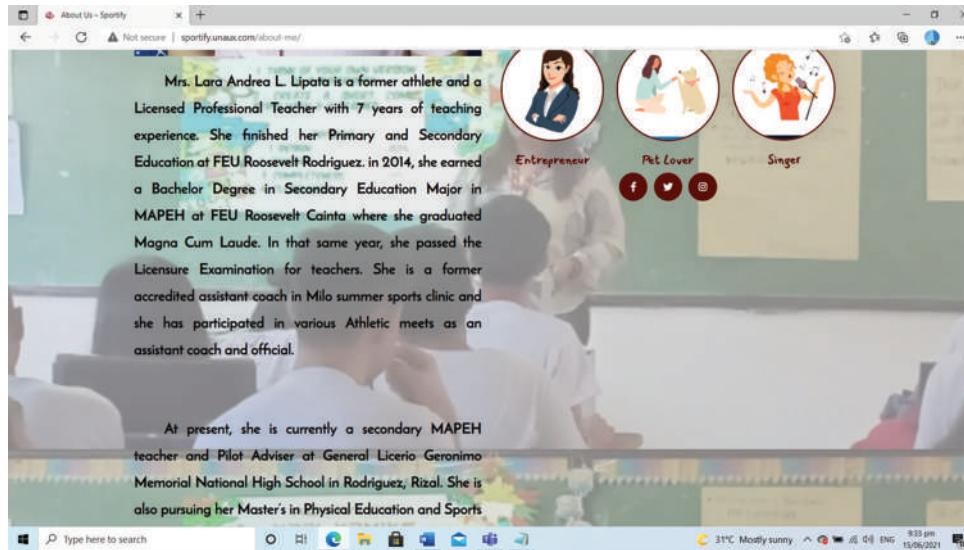
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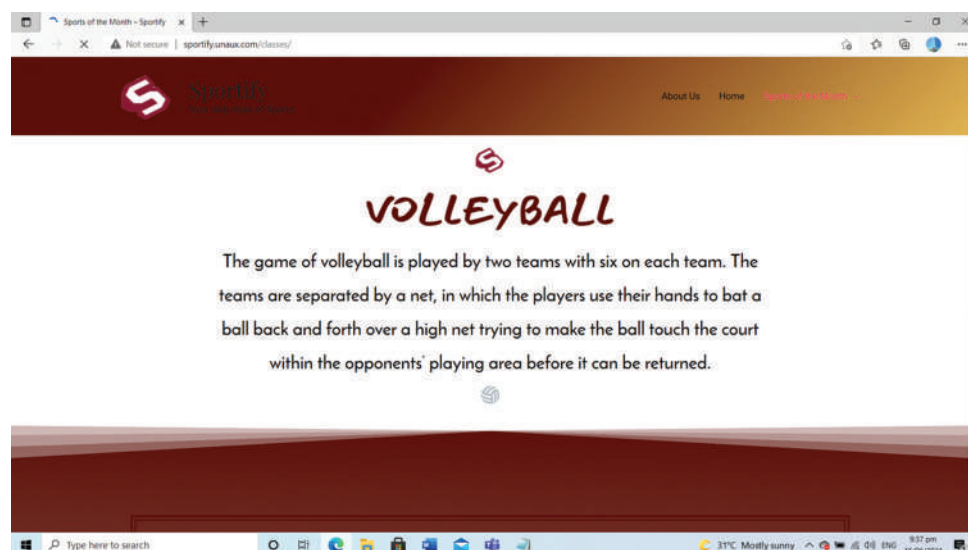
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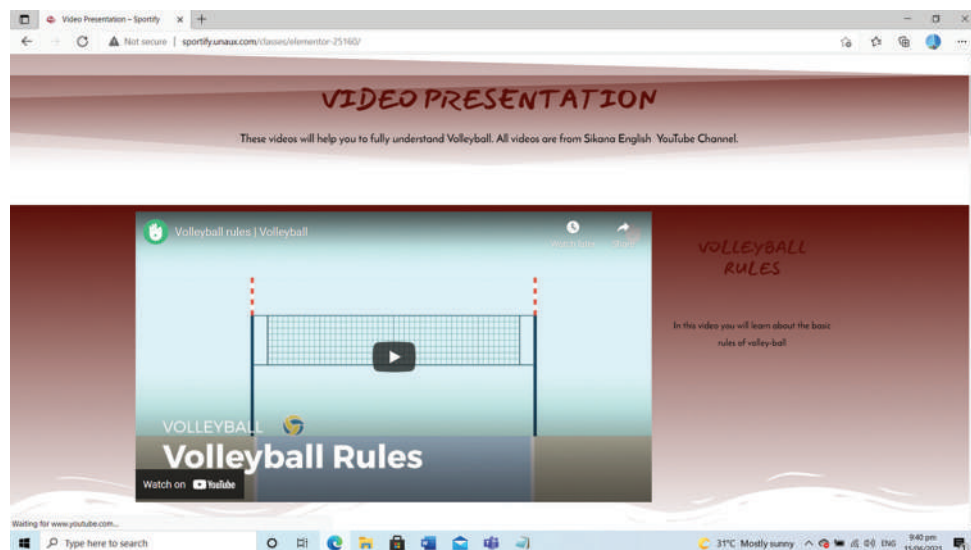
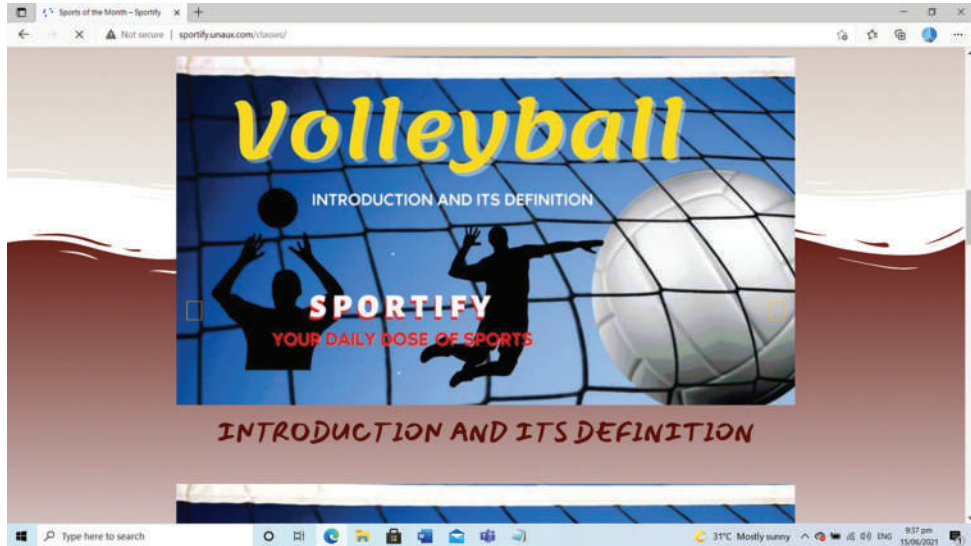
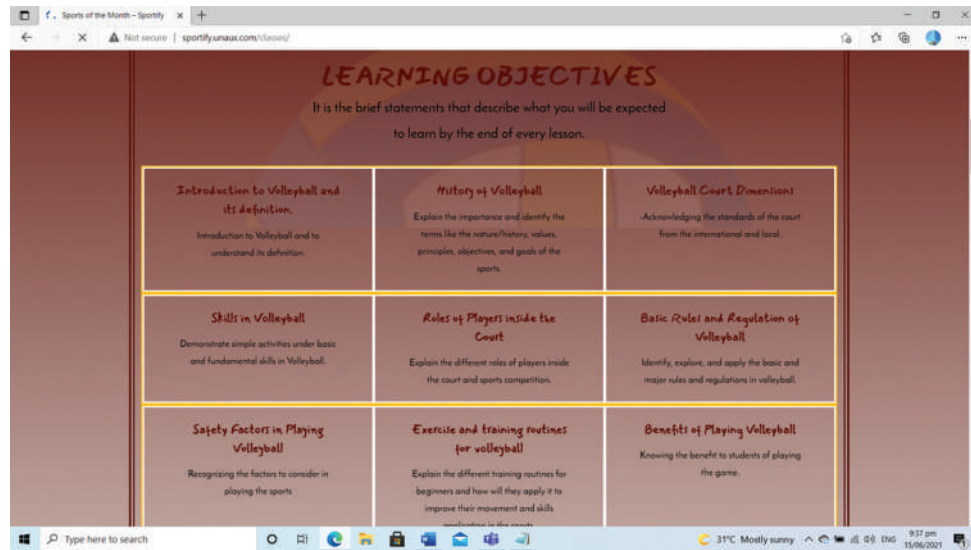
APPENDIX A – WEB CONTENT

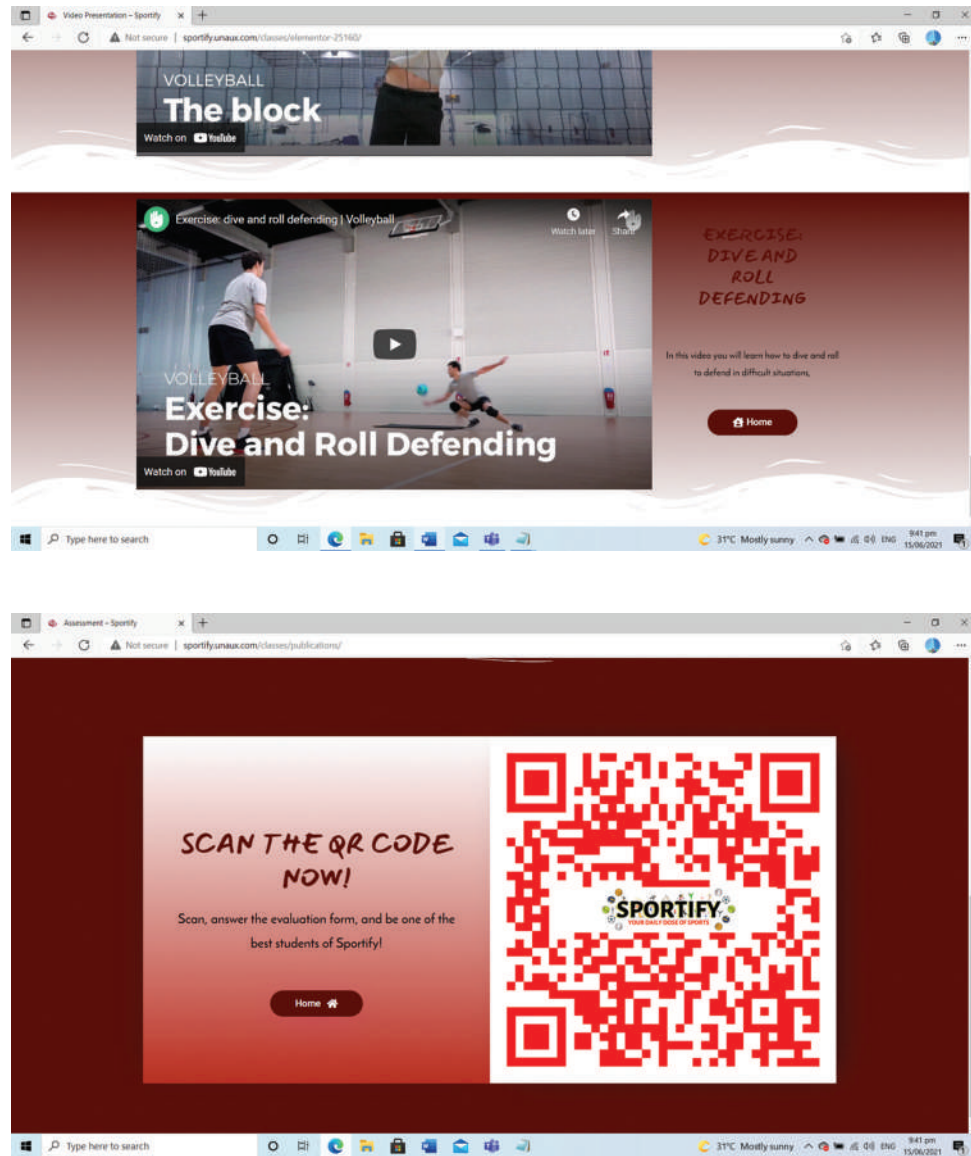












Acknowledgment

Images and videos embedded in the instructor-made website are courtesy of Google and You Tube.

APPENDIX B – TEACHER-MADE TEST

FULL NAME

SCHOOL NAME:

GENDER:

Are You Ready?

1. The game of volleyball is played to what score per set?
 2. How many players are on a one side of the court at a time in a regular volleyball game?
 3. What are the three most common types of hits used in the game of volleyball?
 4. How many times can the team hit the volleyball when it is on their side?
 5. If you are the server, what position on the court are you?
 6. Who directs the match from the start until the end?
 7. What is another name for an attack or hit used in volleyball?
 8. When do you rotate as a team?
 9. If the score ends up tied, how many points do you need to win by?
 10. Who invented Volleyball?
 11. A serve that is not returnable AND results in a point is considered:
 12. What is the official court size in meters?
 13. A volleyball that touches any part of the out of bounds lines is in?
 14. A player can hit the volleyball two consecutive times in a row?
 15. It is proper etiquette to roll the volleyball under the net when returning the ball to the other team after a rally?
 16. How do a team score a point?
 17. Which is not a skill in volleyball?
 18. Volleyball was first called as _____.
 19. What manner do a team rotate in?
 20. What is the heights of the Net?
 21. When and Where the game of Volleyball was invented?
 22. The set and spike concept first originated in the Philippines in 1916 and it was called _____.
 23. What is called the player who wear a contrasting jersey color from his or her teammates?
 24. What is the name of the Governing body of Volleyball around the World?
 25. Who introduced volleyball in the Philippines?
 26. The “Libero’s” primary role in volleyball is to..
 27. Some benefits of playing volleyball are:
 28. In volleyball, this is the contact that sets up the spike:
 29. A back-row player comes in front of the 3-meter line and attacks the ball above the height of the net. The correct call would be...
 30. The three hits used in volleyball are which of the following:
-

APPENDIX C – EVALUATION TOOL

Indicators	Excellent	Very satisfactory	Satisfactory	Fair	Needs improvement
Course objectives were presented, congruent, and achieved	5	4	3	2	1
Activities were appropriate for student like me	5	4	3	2	1
I was engaged in the activities	5	4	3	2	1
The Learning materials (PowerPoint and videos) were relevant	5	4	3	2	1
The learning materials (PowerPoint and videos) were adequate	5	4	3	2	1
The online platform and materials were easy to access and navigate	5	4	3	2	1
The text, images, and illustrations were realistic and appealing	5	4	3	2	1



Nizam College Principal Prof. L. B. Laxmikanth Rathod (second from left) hands the professional membership certificate to Mohammed Shamsuddin and institution membership citation to Sports Village Hyderabad. Also seen in the picture are Dr Avinash Jaiswal, Vice-Principal, Nizam Collage (right) and Prof. Rajesh Kumar (left), Principal, College of Physical Education, who also heads the Association.

Fitness body welcomes Sports Village

In a one-of-its-kind recognition, the International Federation of Physical Education Fitness and Sports Science Association (IFPEFSSA) gave membership for the first time to an Indian sports promoter and his entity in Hyderabad on Thursday. At a function held in Nizam College, its Principal Prof. L. B. Laxmikanth Rathod, granted professional membership to Mohammed Shamsuddin and institution membership citation to Sports Village Hyderabad, of which Shamsuddin is the founder-CEO. Shamsuddin said that this was a doubly memorable day as his efforts and those of Sports Village were recognised by a prestigious world body like IFPEFSSA.

