International Journal Dental and Medical Sciences Research
Volume 3, Issue 3, May - June 2021 pp 446-456 www.ijdmsrjournal.com ISSN: 2582-6018

Prevalence and Factors influencing sports participation among adolescents residing in rural field practice area of medical college, Mathura

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Submitted: 05-06-2021 Revised: 18-06-2021 Accepted: 20-06-2021

ABSTRACT

Participation in sports has been associated with holistic physical, mental and social well-being of people in all age groups. If adolescents indulge in sports, they can lay the foundation of healthy adulthood. Therefore we sought to find out the factors that influence sports participation especially among the less guided, less opportune rural adolescents of our country. Objectives: 1. To find out the prevalence and characteristics describing sports activity among adolescents 2. To determine the factors affecting sports performance among adolescents. Methodology: A cross-sectional study design, with a sample size of 43 adolescents selected through simple random sampling. Study tool was a questionnaire, and the participants were subjected to a physical performance test and scores were assigned to them after measuring their ability to perform. Data was analysed using Epi Info 7 software. Results: The mean age of boys and girls participating in this study was found to be 14.4 and 14.5 years respectively. 90.7% of study participants, both boys and girls, were engaged in some sport even if not an organized sport. Cricket as a sport had maximum indulgence in comparison to all sports activities among boys (74.19%) whereas majority of girls (50%) responded to engagement in physical exercises. 14 (87.5%) boys scored excellent compared to only 2 (12.5%) girls in their physical ability test. Conclusion: The prevalence of sports participation among the adolescents was high. The BMI-z score, WHR, Nutrition Profile or SES were not significant determinants. Education, Type of family and training were also not significant. Expert coaching is required to enable more successful competitive sports indulgence among adolescents belonging to rural areas of our country.

Key-words: Sports Participation, Adolescent physical ability, Sports Performance, Rural Sports, Determinants of sports performance, Factors affecting sports participation

Abbreviations: BMI-Body Mass Index, WHR-Waist Hip Ratio, NIN- National Institute of Nutrition, SES-Socio-economic status

I. INTRODUCTION

Participation in sports has been associated with holistic physical, mental and social well-being of people in all age groups. Particularly in adolescent age, sports related physical activity lays the foundation for a healthy life in adulthood. Only being physically active by indulging in household chores is not helpful in the physical and mental well-being of children and adolescents. Therefore religiously finding time for a run or some other sports activity is pertinent for their growth and development[1]. Deciphering muscle strength and motor activity of children may become essential for measuring their ability to indulge in sports. But before that, we need to find out the other factors that influence sports participation especially among the less guided, less opportune rural adolescents of our country. Through observation, it is well known that the lifestyle disorders are comparatively less prevalent in rural children; most have less weight for age and ample time to engage in sports. Those who don't play might have proclivity for substance abuse, violence or listlessness[2]. There is a large demographic bonus in rural India that needs to be addressed as an important candidate for change and not a burden on society due to mental and physical illness. Moreover, many of the young boys due to necessity want to join Army and are keen on enhancing their physical strength so that they can be selected.

Hence, through this study we plan to describe participation in sports comprehensively in terms of capacity, nutrition, social, and environmental factors among the adolescents of rural Mathura, in India.

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II. OBJECTIVES

1. To find out the prevalence and characteristics describing sports activity among adolescents
2. To determine the factors (physical, nutritional, social, environmental) affecting sports performance among adolescents

III. METHODOLOGY

- Type of study: A cross-sectional study
- Sample Size: In a previous study[3] conducted in India, there was 85% sports participation among boys and 59% by girls. By calculating the average prevalence, taking equal weight of boys and girls, 72% sports participation prevalence was used to calculate sample size. Our absolute uncertainty was assumed to be 72% ± 20%. Relative uncertainty was 20% of 72% which is 14.4% (approximately 14%). So by taking relative precision of 14% at 95% confidence interval, we can calculate our sample size to be 39.5 adolescents or 40. Formula: $(1.96X1.96 \text{ X } p \text{ X } 1\text{-}p)/ (d)^2$. But while conducting the study 3 more participants volunteered, who were siblings of enrolled adolescents. So our final sample size was 43 adolescents of 10-19 years of age.
- Method of sampling: Simple random sampling
- Time Period: The month of August 2019
- Method of collection of data: There are 9 villages in the rural field practice area of our medical college in Mathura, Uttar Pradesh. We chose 2 villages by convenience of the ease to access. These villages were Ladpur and Ranhera. Adolescent population of Ranhera is 892 and Ladhpur 712. Using the survey register of Rural Health Training Center, we added adolescents of both the villages as our sampling unit (1604 adolescents). First we wrote all the listed numbers of adolescents on 2 A4 size sheets attached with tape side to side. We wrote numbers from 1 to 1604.We selected the participants from the enlisted numbers by moving a pen in all directions with closed eyes. We selected 40 adolescents for enrolment. They were approached by our Medico-social worker, and brought to Rural Health Training Center in groups of 5 where we measured their endurance and administered a questionnaire to collect data. We were able to complete data collection in 9 days.
- Study tool: A pre-tested, semi-structured questionnaire was used for the study. Interview method was applied to collect the information. It took 2-3 hrs to complete the interview and physical activity all together for 5 adolescents each day.
- Method of analysis: Epi Info 7 was used for data entry and statistical analysis. Chi-square statistic was applied as the test of significance to elaborate possible associations between the score of physical performance and various variables elaborated in the study. Also to find out the significance of difference between boys and girls in characteristics describing sports performance, chi-square test was used. Note: Wherever a particular observation frequency of individual variables being studied was found to be zero, we added 1 to all cumulative frequencies in all categories of the variable being analysed to calculate the chi-square statistic. Significance level of p was assumed to be less than 0.05.
- Variables: **Terms used: Physical exercise** aims to improve health and physical capacity whereas **training** increases physical performance. **Sport** can be indulged with a team or alone based on age, sex, level of ambition, weight and other groupings. **Endurance** where a majority of energy production occurs by oxygen expenditure, it requires stamina. Resistance or muscle strengthening exercises means to perform movements that require muscles to hold the posture and increase the capacity to be in that position for a while[4]. Scores were calculated for **physical ability** to perform sports using endurance and resistance exercises. A distance of 141 meters was demarcated in the rural health center verandah. Participants were asked to take a run to measure how easily they performed this task in the least time as an indicator of endurance capacity. Resistance was measured by maximum time taken to complete Plank position, Right and Left side plank and prone double leg rise. Another parameter in scoring was the subjective assessment by participants of their physical performance per months or years of engagement in any sport or exercise as declining or stationary or improving. If the participant was not practicing, a score according to the adolescent's subjective interpretation was still assigned. Maximum score was 8 and minimum 3. The scoring is described as follows:

1. Time taken to run 141 m: Less than 30 seconds score=2
   More than 30 seconds score=1
2. Time taken in each exercise posture (averaged): Less than 40 seconds score =1

40-90 seconds score = 2

More than 90 seconds score = 3

3. Progress graph of physical capacity (subjective): Declining score=1

Stationary = 2

Improving = 3

For calculating **nutrition deficit**, standard measures were elaborated in the form of 1 portion size equivalent to fistful or more of grains, 1 piece of fruit and 1 small spoons full of sugar, 1 katori cooked vegetables. The adolescents were asked how much they had in their meal in the past 24 hrs of all the food groups as classified by National Institute of Nutrition 2010 guidelines[5] (Annexure 14). One portion size of vegetables or fruits was 100 grams (1 portion fruit or 1 katori cooked vegetable) and sugar or jaggery 5 grams (1 teaspoons). Cereals and pulses consumed were measured as 30 grams per portion size (1 katori dhal or 2 medium sized chapatis). 50 grams portion size of egg, meat or chicken was considered as 1portion size. We enquired the frequency of intake in terms of portion sizes. Recommended portion sizes and daily intake of calories were referred to using NIN guidelines[5] (Annexure 4). Recommended minus Actual calorie intake in the past 24 hours was expressed in percentage and was used to calculate the caloric deficit in the diet of each participant.

BMI z-scores by WHO were calculated using NIN charts[5] (Annexure 5) according to specific age and sex.

Socio-economic status was calculated using Modified B.G Prasad[6] scale for the year 2019. This scale measures per capita income levels of rural families of India, it is upgraded periodically using consumer price index for rural laborers.

Waist Hip Ratio was measured by training our public health workers to accurately use measuring tape and note waist and hip circumference. WC was divided by HC to get WHR. A cut-off of 0.87 in girls and 0.93 in boys and more indicates obesity and less than 0.85 indicates under nutrition[7].

IV. RESULTS

The mean age of boys and girls participating in this study was found to be 14.4 and 14.5 years respectively. As summarized in Table 1, 38.71 % adolescent boys who engaged in some sports were of the age 10-13 years, 29.03% of the age 13-16 years and 25.81% were above 16 years of age. 41.67% girls were of the age 10-13 years, 33.33% in the age group 13-16 years and 1 girl (8.33%) was above 16 years of age participated in sports activity.

The prevalence of sports participation was 93.6%, among 29 out of 31 adolescent boys and (83.3%), among 10 out of 12 adolescent girls. The aggregate number of boys and girls participating in sports was 39 (90.7%).

Table 2 depicts that Cricket as a sport had maximum indulgence in comparison to all sports activities among boys (74.19%) whereas majority of girls (50%) responded to physical exercise engagement. Running practice was prevalent among 58.06% boys and 41.67% girls. There were similar responses for Kabaddi, Hockey and Kho-Kho among boys and girls. Badminton was more commonly played by girls (41.6%) and prevalence of Football, Badminton among boys was 22.58%. Engagement in physical activity was also reported by 70.7% boys. Although there were varied responses in the choice of sports practiced, there was no significant difference between sports played and gender.

As shown in Table 2, 48.3% boys practiced sports for more than 10 hours in a week whereas 66.67% of girls practiced for less than 5 hours in a week. There was a significant difference found between times spent in sports by boys compared to girls.

Respondents were asked exclusively for practice of run even if they were not engaged in any sports activity. It was found that maximum number of girls, 7(58.33%) did not run. A majority of boys (35.48%) were running regularly for the past 6 months to 2 years' span already. However, this difference among boys and girls was not deciphered as significant. Also 51.61% boys ran about 1-3 Km daily. 29.03% boys ran for less than 1000 m as compared to 66.67% girls. Strikingly, 22.58% of boys ran a distance of 14 Km weekly. Other characteristics like time spent exercising weekly, engagement in farming and other occupations were not found significantly different among boys and girls. 66.67% girls practiced physical exercises for less than 70 minutes per week compared to 51.61% boys. Although among boys maximum practiced for less than 70 minutes, 35.48% trained for 70-210 minutes (10-30 minutes daily), and quite a few practiced for more than 210 minutes; 12.9% boys and 16.67% girls. Majority among boys (70.97%) reported engagement in farming and other occupations. Only 41.67% girls engaged themselves in other occupations.

There was a significant difference between boys and girls in the prevalence of frequent injuries happening to them due to sports activity. Almost half the boys (54.84%) reported frequent injuries whereas majority of girls (83.33%) played safely without getting injured.

The participants were asked for their opinion about their own sports performing capacity (including running) in the span of past 6 months to 2 years. According to half of the girl respondents, their performance graph was stationary, out of which 3 girls said they did not know the reason for not improving, 1 girl said she was more concerned about school and studies. Those who described improvement (41.66%) responded "practice" as the reason for better performance. Similarly even boys reported that due to practice their performance was improving. 2 boys said "Don't Know" for a stationary graph. There were some responses as a declining graph (both boys and girls), for which their iterated reasons were, "no coaching", "no practice", "not regular", "not serious", "relocated to city from village". There was one response by a 16 years old boy that he was too young to practice, so his performance graph subjectively was stationary.

Irrespective of their engagement in sports, all participants were subjected to a physical ability test and were marked with scores based on their performance. As depicted in Table 3, 14 (87.5%) boys scored excellent compared to only 2 (12.5%) girls. Quite a number of boys, 6 (66.66%) scored poorly in contrast to 3, (33.33%) of girls. Majority of the girls scored moderate (4 to 6 points) in their physical performance test organized at the rural health training center of our medical college.

According to Table 3, we elicited several factors upon which the scores of physical performance were assumed to be plausibly dependent. We found highest percentage of adolescents to a lower socio-economic status according to Modified B.G Prasad[6] scale. The difference across scores was not significant. Enrolment in school was not a significant factor either but in Table 3, it is summarized that the highest scores were obtained by adolescents with more than 10 years of enrolment in schools whereas none obtained high scores with school enrolment of less than 5 years. It is shown in Table 3 that very few adolescents were enrolled for less than 5 years while others were scholastic for at least 5 years and beyond despite residing in a rural area.

Maximum adolescents belonged to a nuclear family and among them 62.5% achieved excellent scores and 61.12% performed moderately well. Among those who scored poorly, a majority (44.45%) belonged to a joint family although the type of family was not found to be associated with scores obtained significantly.

Highest scorers were involved in self-engagement and training. There were 62.5% respondents for peer training and 31.5% reported that they took coaching from an expert. Almost all performance scorers were self engaged or training themselves with a high response to group participation too. Only 5 of them took coaching and scored excellently in our performance test.

50% of excellent scores were obtained by performers of normal BMI score for their respective age and gender. Considerable proportion of excellent performers was thin. Only 1 of the excellent performer was obese. Maximum adolescents were having BMI of z-scores between -2 SD to -3 SD whereby 77.8% scored poorly, 66.67% obtained moderate scores and 43.75% performed excellent.

In this study, low scores cannot be attributed to thinness or under-nutrition as some (43.75%) of adolescents scored excellent despite being thin. Waist- Hip ratio in adolescent age for boys should be below 0.9 and for girls below 0.8. Obesity was found only in 4 participants according to BMI z-scores[5] but higher WHR was only 0.25% among the highest scoring group of boys and 44.45% of poor scores. Low WHR (no abdominal obesity) helped in scoring high in boys (62.5%). Low WHR as a factor for high performance was not found to be associated significantly. Maximum girls achieved moderate scores with WHR above 0.85. All high scorers were normomophic, 7 adolescents were asthenic while 2 were bradymorphic.

There was no significant relationship with score grades and caloric deficit assessed by 24-hr recall method. 7(43.75%) of excellent scores were obtained by adolescents, being 16.3% of total study participants, with a caloric deficit of more than 60% in their daily diet. There were also adolescents (8, 18.6%) who scored poor with caloric deficit of more than 60% and moderate (17, 39.5%) out of total study participants.

Majority of performers were vegetarians and 18.75% of excellent scoring performers had 200 grams and more of green leafy vegetables in their daily diet. However, those who did not take at least 200 grams of GLV also performed well. Those who consumed 5 grams or more of refined sugars and, or jaggery (56.25%) scored high. Only 0.25% of high performers' intake of sugars was less than 2.5 grams. Poorer performers consumed less sugars but the association was not statistically significant.

Normal respiratory rate of adolescents is between 12-16 bpm irrespective of their gender. It was found that resting respiratory rate was more than 16 bpm among the highest performers (68.75%) while only 12.5% of the less than 12 bpm RR in the group. Half of the performers scored moderate in 12-16 bpm range. These results were not significant.

10 out of all girls had pallor of skin and sclera, and none of the boys presented such findings. Only 2 of them performed excellent, 2 performed poor and 6 performed moderate.

According to Table 4, we interviewed all adolescents with few dichotomous questions, to find out their subjective opinion about the environment in which they practice sports. There was a statistically significant association between high scores and place of practice near a medical facility. Majority of the poor performers reported industrial pollution in the vicinity of their practice place compared to high performers. 2 high performers were practicing near industries. 1 high scoring girl reported that she becomes conscious of her body image when playing in the open. There were similar responses about the quality of ground among all grades of scores.

Maximum participants who scored excellent had their family members employed in the Police or Army. As shown in Table 5, poor performers reported parental pressure for pursuing sports whereas highest scores were obtained by almost 31.25% adolescents whose parents did not allow them to practice sports. Gender discrimination was not prevalent across all scores. Overall cohesiveness in families to perform sports was also good in all categories of scorers. Other factors like constant hitting, abusing, domestic violence was prevalent in the families similarly in all score groups. 13.9% of study participants reported such occurrence but its distribution across score groups was not statistically significant. Most adolescents inhabited a loving role in their family but 13.9% were indifferent and 3(6.97%) were abusive also. Here also, the difference among all categories of scorers was insignificant.

V. DISCUSSION

In the year 2016, in their work, Felfe[1] et al discussed that approximately 65% of children worldwide were involved in some kind of sports. Moreover there is no gender discrimination prevalent in terms of practicing sports. A study by Kwon[8] et al revealed no gender discrimination also. They found 45.1% continuous participation in sports in males and 47% in females. No participation was prevalent among 17.5% males and 16.9% females. Regular physical activity by girls in Pakistan[9] was found to be 22%, and sports participation among them was 66.9%. Similarly, our study also has shown that sports participation in this part of rural India is not left behind. 90.7% of study participants, both boys and girls, were engaged in some sport even if not in an organized form of activity. It was found that at least running was practiced among the adolescent boys. We did not find any gender bias like in other studies. Moeijes[10] J et al, in a Dutch study on children described Team sports practiced by 55.4% children, and factors such as social support and peers, parental relation and home life, Socio-economic status and social acceptance (no bullying) to be significantly associated with sports engagement. In another similar study by Jain[3] et al, peer or parent influence and constraints were reported in 10.3% males and 14.6% female college going students with respect to participation. This result was not attributable as also in our study, factors such as turmoil in family, parental pressures as well as SES were insignificantly associated among boys and girls for sports participation.

Another aspect that we studied was the role imbibed by adolescents in their family. We found very few boys as abusers or both girls and boys as indifferent. A few girls were indifferent. A study by Spruit[2] et al, found that athletes were not more delinquent than non –athletes. Sports participation was not associated with delinquency according to them. Malm[4] et al wrote that sport is a double edged sword regarding its effect on health. With the indulgence in sports and physical activity, the participant becomes well equipped with knowledge of nutrition, exercise and health.

Sports participation at least once a week for girls and twice a week for boys was associated with high level physical activity in later life and likewise obesity related lifestyle disorders could be prevented[11]. Jain[3] et al found 38% males playing for one day a week and only 10% not playing any sport, and quite a proportion, 15 % played for 6-7 days a week. Notably 24% females played for one day a week, 38% did not play at all and 11% played for 6-7 days a week.

In this study we described that both the adolescent girls and boys indulged in physical exercise for at least 10-30 minutes daily. Most boys practiced sports for more than 5 hrs whereas most girls for less than 5 hrs in a week. This was found to be a significant difference between boys and girls. One of the high performing girls, who did not practice, said she does not feel like it despite negligible compulsions from family. Therefore, sometimes, as postulated by Malm[4] et al, people

who undergo planned training in sports, perform less physical activity compared to those exercising without a schedule. Again in this study, there was another girl who did not practice with moderate performance score retorted she had long study hours. Among boys there were few who did not practice, they were either above 16 years of age or less than 13 years. The reason the former gave was the need to be employed in some vocation to earn money for their family. They also reported frequent injuries both chronic and recurrent. One boy was occupied in a factory and most others were farmers, and one was studying hard and taking care of his ill grandmother. In the latter age group, boys were not yet serious about athletic or sport indulgence.

Jain[3] et al showed Cricket as the most common sport practiced by college males while only by 11 % females. Majority of the females (48%), played Badminton, compared to only 24% boys. Football was male predominant compared to only 2% females who indulged in the sport. Whereas in the present study none of the girls played football and 41.67% girls played badminton, other games played by girls were kho kho and cricket. Boys were found to indulge themselves in hockey, kabaddi also.

Sometimes[1], parents who worry about their child's development, send them for sports activity and try to inculcate this practice more strictly. But in our study we questioned the adolescent for parental pressure for both in terms of forcing indulgence as well as forcing non indulgence in sports. There were equal responses among high performers for both conditions. There was noted a 44.45% (Table 5) response for parental pressure to be engaged in sports among poor performers, and we surmised that there was a presence of likely stress in such adolescents to perform well which might have lead to a poor performance.

We also found that prevalence of sports injuries is a common occurrence among both boys and girls. It could be due to participation in heavy sports practiced by boys and lack of safe practice. According to Ishfaq[12] R et al, there is a lack of coaching and technical expertise in management of sports injuries. Only 16.27 % of adolescents took coaching in this study, out of whom majority were high performers (Table 2) in their physical test thus consequent injuries. In our study, 54.84% boys reported frequent injuries compared to 16.67% girls. Sreekaarini[13] et al found the prevalence of previous injury of 19.1% and 32.3% both previous and recent injury among adolescent athletes in their study. This was much lower than our findings of frequent injuries but the difference between boys and girls was found significant (Table 2).

Elsborg[14] et al described lifestyle disorders among people belonging to lower socio-economic status of developed countries. In contrast, in this study there were higher scores among adolescents belonging to lower socio-economic strata of the population. The sports performance according to economic class stratification was not found to be significant in our results.

According to Vella[15] SA, there was no association with BMI-z scores at age 14 with indulgence in sports at age 12 in their follow-up study. Also in the opposite relation, BMI-z score at age 12 did not result in effective sports participation at age 14. Similarly Waist circumference was also not a factor in sports participation. This was concordant with the results of our study in which we found no association with BMI-z scores, Waist Hip Ratio across all scores of physical performance.

It is a well known fact that sports participation enhances mental and cognitive development if started at an early age, and our study reveals high performance among adolescents who go to school (Table 3). Although this association was also not found to be significant. Neither the type of family like nuclear or joint can be attributed to sports indulgence.

VI. LIMITATIONS

This is a small scale study, and therefore we cannot postulate our results to actually represent the population. More in depth context based situational analysis is required to actually find out the problems faced by the rural adolescent in practicing sports. A large scale study can actually help to prove the consistency of our results and elicit more factors and their association. A stratified sampling for age and sex, rural, urban can be further taken up to be more accurate in depiction of factors influencing sports participation and performance among all adolescents.

VII. CONCLUSION

Sports participation is highly prevalent in this part of rural India. There are many social, physical, environmental, nutritional factors associated with indulgence in sports. Unexpectedly, even the girls were found to be participating. But there were significantly lesser hours weekly that girls spared for sports activities than boys. However the time spent on exercises by both boys and girls was not different. A well developed sports infrastructure may provide the less opportune

adolescents to actively participate and get guidance to perform competitive sports. The environmental stimulation must be present to encourage them. A nearby medical facility may enable the performers to take sports seriously without the fear of frequent injuries. If started now, interventions in this direction like health education and neighborhood facilities to perform may change the sports culture and overall development of rural families contributing to improvement of their socio-economic status in the long run. Especially girls shall delay their marriage and can become responsible in limiting and spacing child births in future.

Ethical Considerations

The study protocol was presented before the Institutional Research Ethical Committee of K.D Medical College, Mathura, Uttar Pradesh, India. They granted us the consent to work on this study. Since we were already practicing at the rural health training center of our college, the villagers were well informed about the study by our health workers and many adolescents were keen on participating.

ACKNOWLEDGEMENT

We are highly grateful to the faculty of Community Medicine of our medical college situated in rural Mathura for their support in carrying out this research. We also thank the paramedical staff of our department without whom we could not have conducted this study.

Conflict of Interest

None

REFERENCES

[1]. Felfe C, Lechner M, Steinmayr A. Sports and Child Development. PLoS ONE. 2016;11(5): e0151729.doi:10.1371/journal.pone.0151729

[2]. Spruit A, Vugt EV, Van der Put C, Van der Stout T, Stams GJ. Sports Participation and Juvenile Delinquency: A Meta-Analytic Review. J Youth Adolescence. 2016; 45:655-71

[3]. Jain V, Raizada S. Assessment of Sports Participation Behaviour and the Constraints Encountered by College Adolescents in India. Ann Trop Med & Public Health; Nov 2020; 23(17): SP231754. DOI: http://doi.org/10.36295/ASRO.2020.231754

[4]. Malm C, Jakobsson J, Isaksson A. Physical Activity and Sports-Real Health Benefits: A review with Insight into the Public Health of Sweden. Sports 2019;7(127):doi:10.33901/sports7050127

[5]. Krishnaswamy K, Bhaskaram P, Bhat R V, Ghafoounissa, Raghuram T C, Raghuramulu N, Sivakumar B, Vijayaraghavan K. Dietary Guidelines For Indians-A manual. Ed 2. NIN 2011

[6]. Pandey V K, Aggarwal P, Kakkar R.Modified BG Prasad Socio-economic classification, Update-2019.Indian J Comm Health;31,1:123-125

[7]. Waist Circumference and Waist-Hip Ratio. Report of WHO Expert Consultation Geneva 8-11 December 2008

[8]. Kwon, S.; Letuchy, E.M.; Levy, S.M.; Janz, K.F. Youth Sports Participation Is More Important among Females than Males for Predicting Physical Activity in Early Adulthood: Iowa Bone Development Study. Int. J. Environ. Res. Public Health. 2021; (18):1328. Available from: https:// doi.org/10.3390/ijerph18031328

[9]. Memon A R, Ali B, Memon A U R, Ahmed I, Feroz J. Motivation and factors affecting sports participation: a cross-sectional study on female medical students in Pakistan. J Pak Med Assoc. Sep 2018; 68(9): 1327-33

[10]. Moeijes J, Busschbach J T van, Wieringa T H , Kone J, Bosscher R J, Twisk J W R. Sports participation and health-related quality of life in children: results of a cross-sectional study. Health and Quality of Life Outcomes. 2019; 17:64. Available from: https://doi.org/10.1186/s12955-019-1124-y

[11]. Tammelin T, Jarvelin M R. Adolescent participation in sports and adult physical activity. American J of Preventive Medicine. 2003;24(1):22-8

[12]. Ishfaq R, Pramil T. A single point assessment of Prevalence and Patterns of Sports Injuries among young Indian Adults. J Pharm Pract Community Med. 2019; 5 (1):18-21

[13]. Sreekaarini I, Eapen C, Zulfeequer C P. Prevalence of Sports Injuries in Adolescent Athletes. J Athl Enhancement. 2014; 3:5. DOI: 10.4172/2324-9080.1000168

[14]. Elsborg P, Nielsen G, Klinker C D, Melby P S, Christensen J H, Bentsen P. Sports-based recreation as a means to address social inequity in health: Why, When, Where, Who, What and How. BMC Public Health. 2019;19:1084

[15]. Vella SA, Cliff DP. Organised sports participation and adiposity among a cohort of adolescents over a two year period. PLoS

ONE. 2018;13 (12):e0206500. Available form: https://doi.org/10.1371/journal.pone.0206500

Table 1. Distribution of engagement in sports among adolescents according to age

Age	Sports engagement	Percentage
10-13 years Boys n=31	12	38.71
13-16 years Boys n=31	09	29.03
Above 16 years Boys n=31	08	25.81
Total boys n=31	29	93.55
10-13 years Girls n=12	05	41.67
13-16 years Girls n=12	04	33.33
Above 16 years boys n=10	01	8.33
Total girls n=12	10	83.33

Table 2. Prevalence and Profile of sports participation among adolescent boys and girls

Characteristics of sports performance	Boys (%) n=31	Girls (%) n=12	Chi-square Test	p-value
Engagement in sports				
Yes	29 (93.55)	10 (83.33)	1.07	0.30
no	02 (6.45)	02 (16.67)		
Sports played				
Cricket	23 (74.19)	02 (16.67)	5.861	0.21
Kabaddi, Hockey, Kho-Kho	08 (25.80)	03 (25.00)		
Football, Badminton	07 (22.58)	05 (41.67)		
Running	18 (58.06)	05 (41.67)		
Exercise	22 (70.97)	06 (50.00)		
Time engaged in sports per week				
Less than 5 hours	10 (32.26)	08 (66.67)	6.576	**0.04**
5-10 hours	04 (12.90)	01 (8.33)		
More than 10 hours	15 (48.39)	01 (8.33)		
Practice of run in years				
No run	07 (22.58)	07 (58.33)	5.199	0.16
Less than 6 months	06 (19.35)	01 (8.33)		
6 months-2years	11 (35.48)	02 (16.67)		
More than 2 years	07 (22.58)	02 (16.67)		
Distance run everyday				
Less than 1000m	09 (29.03)	08 (66.67)	4.8472	0.89
1000-3000m	16 (51.61)	04 (33.33)		
3000 m and more	06 (19.35)	00 (00)		
Distance run weekly				
Less than/equal to 5 Km	10 (32.26)	09 (75.00)	0.9579	0.62
5-14 Km	14 (45.16)	03 (25.00)		
More than 14 Km	07 (22.58)	00 (00)		
Time spent exercising weekly				
Less than 70 min	16 (51.61)	08 (66.67)	1.4523	0.48
70 min-210 min	11 (35.48)	02 (16.67)		
Above 210 min	04 (12.90)	02 (16.67)		
Engagement in farming or other occupations				
Yes	22 (70.97)	05 (41.67)	3.179	0.48
No	9 (29.03)	07 (58.33)		
Frequent injuries				

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Yes	17 (54.84)	02 (16.67)	5.1114	**0.02**
No	14 (45.16)	10 (83.33)		
Progress graph of performance				
Declining	05 (16.13)	01 (8.33)	3.125	0.21
Stationary	07 (22.58)	06 (50.00)		
Improving	19 (61.29)	05 (41.66)		

Table 3. Factors affecting Physical performance scores among adolescents

Factors	Score less than/equal to 4 (Total=9)	Score 4-6 (Total=18)	Score more than 6 (Total=16)	Chi-square Test	p-value
Socio-economic status					
Middle and Upper Middle	02 (22.22)	03 (16.66)	05 (31.25)	3.125	0.21
Lower Middle	03 (33.33)	07 (38.89)	04 (0.25)		
Lower	04 (44.44)	08 (44.44)	07 (43.75)		
Education					
Enrolment less than 5 years	01 (11.11)	03 (16.66)	00 (00)	5.5772	0.23
Enrolment 5-10 years	05 (55.56)	12 (66.67)	05 (31.25)		
More than 10 years in education	03 (33.33)	06 (33.33)	11 (68.75)		
Type of family					
Nuclear	05 (55.56)	11(61.12)	10 (62.5)	1.7327	0.78
Joint	04 (44.45)	04 (22.23)	05 (31.25)		
Three Generation	00 (00)	03 (16.66)	01 (6.25)		
Type of training					
Self engagement and training	09(100)	18 (100)	14 (87.5)	4.1745	0.38
Peer group training	06 (66.67)	08 (44.44)	10 (62.5)		
Coaching	02 (22.22)	00 (00)	05 (31.25)		
BMI z-score					
Median To -2 SD	02 (22.22)	03 (16.66)	08(50)	4.6451	0.33
-2 SD to -3 SD (Thinness)	07 (77.78)	12 (66.67)	07 (43.75)		
Above + 1 SD (Obesity)	00 (00)	03 (16.66)	01 (6.25)		
Waist Hip Ratio					
Boys $\geq$ 0.9	04 (44.45)	06 (33.33)	04 (0.25)	3.0674	0.22
Boys < 0.9	02 (22.22)	05 (27.78)	10 (62.5)		
Girls above $\geq$ 0.85	03 (33.33)	06 (33.33)	01 (6.25)	1.2738	0.53
Girls below < 0.85	00 (00)	01 (5.56)	01 (6.25)		
Body form					
Normomorphic	06 (66.67)	12 (66.67)	16 (100)	5.5088	0.24
Bradymorphic	01 (11.11)	01 (5.56)	00 (00)		
Asthenic	02 (22.22)	05 (27.78)	00 (00)		
Nutrition Profile by 24-hr recall method					
Caloric deficit less than 40 %	00 (00)	00 (00)	03 (18.75)	9.0563	0.06
Caloric deficit 40%-60%	01 (11.11)	01 (5.56)	06 (37.5)		
Caloric deficit more than 60%	08 (88.89)	17 (94.44)	07 (43.75)		
Vegetarian Diet	07 (77.78)	14 (77.78)	11 (68.75)	0.4301	0.81
GLV more than 200 grams	01 (11.11)	01 (5.56)	03 (18.75)	1.438	0.49
Jaggery/sugar less than 2.5 gms	03 (33.33)	07(38.89)	04(0.25)		

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Jaggery/sugar 2.5-5 gms	04(44.45)	07(38.89)	03(18.75)	5.3878	0.25
Jaggery/sugar more than 5 gms	02(22.22)	04(22.23)	09(56.25)		
Resting respiratory rate					
12-16 bpm	03 (33.33)	09(50)	03(18.75)	7.4209	0.12
Less than 12 bpm	03 (33.33)	01(5.56)	02(12.5)		
More than 16 bpm	03 (33.33)	08(44.44)	11(68.75)		
Pallor (girls) n=12	02 (22.22)	06(33.33)	02(12.5)	0.5262	0.77
Gender					
Boys	06(66.66)	11(61.12)	14(87.5)	3.0985	0.21
Girls	03 (33.33)	07(38.89)	02(12.5)		

Table 4. Distribution depicting Environmental Factors affecting sports participation among adolescents

Environmental Factors	**Score less than/equal to 4 (Total=9)**	**Score 4-6 (Total=18)**	**Score more than 6 (Total=16)**	**Chi-square Test**	**p-value**
Practicing near industries (n=43)	00(00)	00(00)	02(12.5)	1.3842	0.50
Subjectively assessed air pollution in practice place (n=43)	07(77.78)	10(55.56)	06(37.5)	3.8090	0.15
Nearby medical facility (n=43)	05(55.56)	10(55.56)	15(93.75)	6.9485	**0.03**
Quality of ground or roads					
Even/no problem	06(66.67)	13(72.22)	09(56.25)	06009	0.74
Bad/difficult or uneven place to play	03(33.33)	05(27.78)	07(43.75)		

Table 5. Social determinants of sports participation among adolescents

Psychosocial factors (n=43)	**Score less than/equal to 4 (Total=9)**	**Score 4-6 (Total=18)**	**Score more than 6 (Total=16)**	**Chi-square Test**	**p-value**
Family members employed in Police/army	02(22.22)	01(5.56)	06(37.5)	5.2345	0.07
Parental pressure for pursuing sports	04(44.45)	05(27.78)	05(31.25)	0.7789	0.68
Parents do not allow to pursue sports	01(11.11)	05(27.78)	05(31.25)	1.3056	0.52
Prevalence of gender discrimination	00(00)	02(11.11)	00(00)	1.0643	0.59
Cohesiveness within family to perform sports	09(100)	15(83.33)	11(68.75)	2.4212	0.30
Beating, abusing, domestic violence prevalent in family	02(22.22)	02(11.11)	02(12.5)	0.6618	0.72
Any family member	02(22.22)	07(38.39)	04(25)	1.1209	0.57

chronically ill					
Your role in family					
Loving	08(88.89)	15(83.33)	11(61.11)	1.0164	0.91
Indifferent	01(11.11)	02(12.5)	03(18.75)		
Abusive	00(00)	01(6.25)	02(12.5)		