Physical Activity Level among Pre-University Students of Mangaluru City, India: a Cross-Sectional Study

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Abstract: Physical activity is one of the best health promotion activities that enhance the overall health status, mental status and performance. There is decline in the physical activity by ten folds since last four decades among adolescence worldwide. Educational institutions have a prime role in enhancing physical activity among school going children's through schedule classes. This study was conducted to determine the level of physical activity among the Pre-University students of Mangaluru city. The study also aimed to determine the nutritional status of the students using weight for height. Cross-sectional study was conducted in selected Pre-University colleges of Mangaluru city. The study period was from January 2019 to April 2019. In total 572 samples were collected. YPAQ for physical activity and Likert scale questionnaire for college based program were used to collect a data. Overall 50.5% of the students were found to be physically active in this study. In-house factors like type of college, type of streams (Science/Commerce/Arts), mode of transportation and personal factors like gender, gym workouts, household activities were significantly associated (p<0.05) with the level of physical activity respectively. Student's regular participation in physical activity at college level was significantly associated (p<0.05) and were 3.76 times more active than students who did not participate. Regular physical activity schedule at the college level and motivation to participate along with studies will significantly improve the overall performance of the students.

Key Words: Physical activity, College, Adolescent, Students, BMI

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1. Introduction

Physical activity is one of the best health promotion activities for all ages. It not only reduces the non-communicable diseases but also helps to boost the academic performance, maintenance of good mental health status, socialization, control of weight, improves teamwork and healthy behaviour [1]. Despite the clear health benefit from physical activity, globally 81% of adolescents (aged 11–17) were still insufficiently active in 2010 [2]. A recent factsheet of WHO shows that the number of obese

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Int. J. Phys. Ed. Fit. Sports, 29-35 | 29

children and adolescents worldwide has raised ten folds in the past four decades which is alarming to many health conditions along with social and economic burden. Similarly the prevalence of physical inactiveness ranges from 37% to 81% [2-5] in global scenario. Many of the studies have shown that physical activity declines markedly in late childhood and early adolescent [4, 6]. Similarly overweight and obesity are also increasing which have a direct relationship with physical inactiveness along with NCD's [7, 8].

WHO recommends that children and adolescents aged 5 to 17 years should do at least 60 minutes of moderate to vigorous-intensity physical activity (MVPA) daily [9]. Recommended physical activity can be obtained by multiple shorter bouts spread throughout the day like two bouts of activities of 30 minutes each or 20 minutes activities of three bouts [9].

Schools and colleges represent an accessible and cost-effective setting which helps to motivate and engaged in physical activity as students spends most of their time in schools and colleges. Also it is widely recognized that physical education at school and college forms the foundation for the overall development of a student's mind and body [5]. Many countries have established guidelines that call for children, adolescent and youth to obtain at least a recommended level of 60-150 minutes of physical activity per week [10]. But there is a limited existence of national guidelines on physical activity in low and middle-income countries for health benefits and also for the public health significance [9]. In India, there is an apparent lack of evidence demonstrating the implementation of Government strategies to drive child and youth-focused active living policies and programs [11]. With the advancement of grade, there is a decline in the pattern of physical activity due to the burden of academic performance. Many studies have shown that the proportion of active individuals decline significantly during adolescences, which continued the rise in obesity rates among 11 to 20 year olds and it, will increase more in young youth stages especially during their high school or Pre-University [7-10]. There is a need for physical activity program

or intervention as an academic discipline. This can be done through national policy on education with significant stress on sports and physical education to be part of the Pre-University and higher education process. To address these issues, this study will help to see the gap between physical activities, academic importance of physical education and the factor that is associated with it. The purpose of this study is to determine the level of physical activity among the Pre-University students of Mangaluru city. It also aims to compare the level of physical activity among students of different streams and determine body mass index (BMI) of the students.

2. Materials and Methods

2.1 Study design, settings and sampling technique

This cross-sectional study was conducted in the Pre-University colleges of Mangaluru city. Students studying in grade 11 and 12 from science, commerce and arts were included. Out of fifty one Pre-University colleges five colleges (1 Government, 2 Government-Aided and 2 Private) were selected randomly through lottery method. The students from each stream and grades were selected according to the population proportionate to the size. Study was conducted from January 2019 to April 2019.

2.2 Sample size

The sample size was calculated based upon taking the prevalence rate of physical activity of 37% with 95% confidence interval and 5% margin error (precision) along with 1.5 design effect, the sample size was calculated to be 537 [3]. Adding 10% as non-responsiveness the total sample size achieved was 591.

2.3 Study tools

The data collected for this study broadly consisted of two types of procedures: self-administered questionnaire (YPAQ for physical activity and Likert scale questionnaire for college based program), anthropometric measurements and

observation of the colleges for infrastructure and playing materials.

A pilot study was conducted among the twenty students in a similar setting for reliability of the tools. The cronbach's alpha was calculates and found to be 0.88. For anthropometric measurements digital weighing machine (Seca scale) and portable statue meter was used to measure the height and weight of the students.

2.4 Ethical consideration

Ethical clearance was taken from the Institutional Ethics Committee, K.S. Hegde Medical Academy, Nitte (Deemed to be University). Permission was obtained from the Deputy Director of Pre-University office of Mangaluru. All information collected from the participants was kept strictly confidential and was not disclosed to an outsider. Informed consent was obtained from participants and their parents.

2.5 Level of physical activities

Level of physical activities was based on the scores for the different items obtained through the questionnaire using YPAQ.

Levels of physical activity were categorized into two:

- Those who met the current WHO recommended levels of 60 minutes per day of MVPA as physically active
- Those who did not meet the recommended levels of 60 minutes per day of MVPA as physical inactive [WHO 2010]

2.6 Data analysis

All the data was manually entered into the SPSS 16.0 version. Quantitative Variables were summarized using frequency, percentiles, mean, SD and Inter-Quartile range (IQR). Chi-square/ likelihood ratio was used to show an association of different variables with the level of physical activity. And binary logistic regression analysis was used to show the strength of association. P less than 0.05 were used as statistically significant.

3. Results

Total 572 students were participated in the study. Most 290 (51%) of the students were studying in the private college followed by 241 (42%) in Government- Aided and 41 (7%) in Government Pre-University college respectively. Similarly 262 (45.8%) were from science stream, 256 (44.8%) were from commerce stream and 54 (9.4%) from Arts stream.

Table1. Demographic characteristics of the study population

Characteristics (n=572)	Frequency	Percentage
Age Group		
< 17 years	299	52
≥ 17 years	273	48
Gender		
Male	236	41
Female	336	59
Type of family		
Nuclear	445	77.8
Joint	120	21
Extended	7	1.2
Do you have Siblings?		
Yes	489	85.5
No	83	14.5
Residence		
Rural	188	32.9
Urban	384	67.1
Type of House		
Independent House	508	88.8
Apartment	64	11.2

In the college, cricket was most played sports

(32.5%) followed by shuttle badminton (27.6%). Other than sports students were also engaged in jogging, running and walking (36.9%), dancing (17.3%) and cycling (24.7%) in the college. The students quoted the major reasons for not participating in physical activity at college level were studies (69%) followed by tuitions (43.5%).

More half of the respondents 289 (50.5%) were physically active in this study. The mean ± SD time spends on physical activity was 72.9 ± 5.86 minutes/day with maximum minutes of 317/day. Boys were more physically active than girls (p< 0.001). The students who used vehicles to come to college were 0.453 times less active than those come by walk (p<0.05).

Table 2. Association of physical activity with streams of different Pre-University College

Variables (n=572)	Level of physical activity		p-value
	Active (%)	Inactive (%)	
Government college			
Science	6 (20.7)	1 (8.3)	0.592
Commerce	9 (31)	4 (33.3)	
Arts	14 (48.3)	7 (58.4)	
Government aided college			
Science	40 (47.6)	61 (38.9)	0.16
Commerce	38 (45.1)	73 (46.5)	
Arts	6 (7.3)	23 (14.6)	
Private college			
Science	86 (48)	68 (59.7)	0.046*
Commerce	89 (50.6)	43 (37.7)	
Arts	1 (1.4)	3 (2.6)	

P < 0.05

The students who did not participate in the college physical activity were also inactive at household level. Respondents who were involved in house hold activity and others games apart from college were more active (p=<0.001) than those who were not involved. Table 2 shows the association between physical activities with streams among different Pre-University colleges.

The Body Mass Index (BMI) was classified according to the WHO Asia Pacific categories. Around half of the respondents 294 (51.4%) had normal BMI followed by underweight 177 (30.9%). Similarly, 49 (8.6%) were overweight and 52 (9.1%) obese.

Table 3. Association between physical activity and Body Mass Index among Pre-University colleges

Variables (n=572)	Level of physical activity		p-value
	Active (%)	Inactive (%)	
Government college			
Under Weight	11(37.9)	4 (33.3)	0.524
Normal weight	14 (48.4)	8 (66.7)	
Overweight	03 (10.3)	0 (0)	
Obese	01 (03.4)	0 (0)	
Government Aided college			
Under Weight	21(25.0)	46 (29.3)	0.902
Normal weight	43 (51.2)	74 (47.4)	
Overweight	08 (9.5)	14 (8.6)	
Obese	12 (14.3)	23 (14.7)	
Private College			
Under Weight	59 (33.5)	36 (31.6)	0.882
Normal weight	95 (54)	60 (52.6)	
Over weight	13 (7.4)	11 (9.6)	
Obese	9 (5.1)	7 (6.2)	

Majority (49%) of the respondents belonging to overweight category were from private colleges followed by Government aided (44.9%) and Government colleges (6.1%) respectively. Within Government colleges 36.6% were belonging to underweight category. However body mass index of the respondents were not associated with the level of physical activity. Table 3 shows the association between physical activity and Body Mass Index among Pre-University colleges.

During observation of five Pre-University colleges, it was found that four of the colleges have physical education teacher, have their own playground and fixed schedule for physical education class. All the Per-University colleges have special coaching classes. Similarly among the five colleges only two colleges have fixed schedule for physical education classes in science stream.Overall 67.3% of female respondents were under obese category (BMI> 25 kg/m^2) while 32.7% male were under obese category.

Table 4 shows female students are 0.4 times less physically active than male students (p<0.01), likewise students using vehicles to reach college are 0.45 times less active than that of students who are walking to the college (p<0.05). Students who do not engage in household activities are 0.4 times less active than those students who engage in household activities.

4. Discussion

The study was conducted to determine the level of physical activity among the students of Pre-University colleges. A total of 572 students participated in the study, 290 (51%) were studying in private college, 241 (42%) in Government-Aided college and 41 (7%) from Government. Similarly most of the respondents 385 (67.3%) were from grade 11and 187 (32.7%) from grade 12. Nearly half of the respondents were from science stream 262 (45.8%), and 256 (44.8%) from commerce and only 54 (9.4%) from Arts stream.

Table 4. Binary logistic regression analysis to see the strength of association of physical activity with predictor variables

Variables	B	S.E	AOR	95 % C.I. for AOR	p-value
Gender					
Male	-183	0.25	1	0.272-0.723	0.001**
Female			0.444		
Walk to the College					
Yes	-0.792	0.329	1	0.238-0.862	0.016*
No			0.453		
Do house hold work					
Yes	-0.81	0.396	1	0.294-0.673	< 0.001**
No			0.445		
Other game activities at home					
Yes			1	0.22-0.513	<0.001**
No	-1.09	0.272	0.336		
Participation In Physical Activity at college					
None			1		
Occasionally	0.013	0.434	1.013	0.43 -2.37	0.977
Frequently	0.515	0.431	1.674	0.72 - 3.89	0.232
Regularly	1.326	0.514	3.766	1.37 - 10.3	0.01*

*p<00.5, **p<0.001

This study showed 50.5% of the students were physically active as per recommended WHO criteria of ≥ 60 minutes/day of physical activity. The level of physical activity was higher in present study than the other studies done in India [3, 4, 8] but was similar to the studies done outside India [6,12,13]. There were few studies done among adolescents in India and most were done among the secondary and high school students. Similarly there is an association between thelevels of physical activity with different streams in a private college too (p<0.05). No any studies were found that has made a comparison between the streams and physical activity. It is assumed that students studying Science are more involved in a study than that of Commerce and Arts. And also, in the context of India parents and teachers motivate students to get good grades and spend more time on studies.

In present study among females 55.4% were inactive and when compared to males they were 0.44 times less active (p<0.01). Similar results were seen in the study done in Chennai [8]were 70% of females were physically inactive . The reasons can be less supportive environment, menstruation period, perception of the students and restrict from the family. There was no any association between the age of the respondents and physical activity in present study, in contrast study done in Gujarat shows decrease in physical activity along with increase in age [4] and also study by Diamant L Allison et al. in California showed the same results [6]. For this study, studies 203 (69%) and tuition 128 (43.5%) were the major barriers that hinders from participation in physical activities. Qualitative study done by Satija.et.al stated academic workload and education system as a barrier which is similar to this study [14]. There is no any association was found between physical activity and BMI in this study. Whereas Study done in USA came across as daily physical activity had an association with the BMI (p=0.0002) [15]. Similarly study conducted in Bangalore among high school students revealed overweight and obese were less active [3]. For BMI not only physical activity but also nutrition has a significant role which was not included in this study. The prevalence of overweight and obese were 49 (8.6%) and 52 (9.1%) which is quite higher in this study, this may be due to difference in classification of BMI.

Respondents who participated regularly in physical activity at college were 3.766 times more physically active compared to those who do not participate in physical activity (p=0.01) in this study. Similarly study in California suggests that participating in PE can contribute to increased levels of overall physical activity [6]. Only 18.4% of the student participated in physical activity regularly in this study which is lower to the study done in California where 42% participated regularly in physical activity. This can be due to lack of physical infrastructure, physical education curriculum, lack of motivation and support from parents and teachers.

5. Conclusion

The physical activity level was 50.5% with mean ± SD time spend of 72.9 ± 5.86 minutes for this study. It also showed an association of level of physical activity with types of Pre-University, streams, gender, mode of transportation to colleges, gym workouts, participation on different activities, household activities. Similarly, participation in physical activity programs and a supportive environment in the colleges were also associated with the increase in physical activity level. Educational institutions are a great place for promoting physical activity. All educational institute and streams need to include physical activity and create a sound full environment for regular participation. This study is cross-sectional generalization may be limited. Similarly a cross-sectional view of the physical activity level nature and participation in physical activity and sports may vary. As this study relied on the self-administered questionnaire by participants and there is no way to verify that the students responses were correct, accurate and truthful.

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