

Correlation between Mental Health and Physical Activity among Adolescents

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Abstract: Adolescence is a transitional period of development between childhood and adulthood¹. About 50 million Indian children suffer from mental disorders and this number will increase if they are not attended in right time.² There's a general concept that; physical activity improves both physical and mental wellbeing. Physical activities have positive effect on psychological state and there are studies that are supportive and contradictory to this concept. This is a descriptive correlational study conducted to find the correlation between mental health and physical activity among adolescent students belonging to the age of 14 - 16 years. **Methods:** Participants were 270 school going adolescents of Alappuzha district. Socio personal data were collected using structured questionnaire. Assessment of mental health and physical activity were done using Strengths and Difficulties Questionnaire (SDQ11 - 17), Physical Activity Questionnaire (PAQ - A) respectively. Association between mental health and physical activity to the socio personal variables of adolescents was also found. Data were analyzed using descriptive, inferential statistics. **Results:** Mean age of the participants was 15.04 years. Majority of them (92.2%) have good mental health and 70.4% have moderate physical activity. No significant correlation was found between mental health and physical activity ($r_s=0.08$). There was statistically significant association between mental health of adolescents and socio personal variables like nature of residential area ($\chi^2=13.2, p=0.039$), type of school ($\chi^2=15.60, p=0.004$), sector of school ($\chi^2=15.45, p=0.004$), mode of stay ($\chi^2=26.2, p=0.001$), and history of substance use ($\chi^2=9.1, p=0.01$). Statistically significant association was there between physical activity and socio personal variables like Age ($\chi^2=9.4, p=0.05$), gender ($\chi^2=15.2, p=0.001$), type of school ($\chi^2=41.15, p=0.001$) and sector of school ($\chi^2=20.8, p=0.001$). **Conclusion:** Adolescent students have shown good mental health and moderate physical activity; but there was no significant correlation between mental health and physical activity of adolescents. Measures to enhance physical activity among adolescents can be taken, regardless of types / sectors of school. Since mental health and physical activity have significant association with type and sector of schools, school based initiatives can be planned to improve both the elements.

Keywords: Mental health, physical activity, adolescents

1. Introduction

Adolescence reflects maximum physical, psychological, and behavioral change especially it is viewed as the time of complexities, worries, anxiety, conflicts etc. All round development in adolescence has a contribution in physical, emotional, and social health in adulthood which helps to work productively for the family and society.³

Mental health problems account for 16% among burden of diseases which affect people aged between 10 - 19 years and one in six people belong to this age. There are evidences that half of all mental health conditions start by the age of 14 years⁴. Worldwide, 10 - 20% of adolescents experience mental health problems; but it remain undiagnosed and untreated².

Depression is one of the leading problems among adolescents. Suicide is the third leading cause of mortality among 15 - 19 - year age groups.⁴ If mental health conditions are not identified during adolescence; it may extend to adulthood and may impair both physical and mental health, and it can limit the opportunities to lead fruitful life as adults.⁴

As India has the highest number of children and adolescents (more than 434 million), health problems among them is a concern for researchers²

Rapid urbanization, technological changes, poverty, changes in the family structure, modernization etc. have negative effects on mental health through their influence as stressors and adverse life events⁵.

2. Literature Survey

According to the National mental health survey in India, the prevalence of mental disorders in the age group 13 - 17 years was 7.3% and nearly equal in both genders. The most prevalent problems were depressive episode & recurrent depressive disorder (2.6%), agoraphobia (2.3%), intellectual disability (1.7%), autism spectrum disorder (1.6%), phobic anxiety disorder (1.3%) and psychotic disorder (1.3%)⁶.

According to UNARV, a district model for adolescent mental health program in Kerala, the most common problems are involvement in physical fights (38.3%), viewing and showing pornography to others (21.8%), skipping classes (19.1%), poor scholastic performance

(20.7%), smoking (14.2%), Alcohol abuse (19%). Common mental disorder identified was conduct disorder (36.4%)⁷.

A study shows that worldwide 81.0% of students aged between 11 and 17 years were not sufficiently physically active⁸. In India, overall prevalence of insufficient physical activity was 76.6% in 2001 and it was decreased to 73.9% in 2016.

Studies conducted to find the relationship of physical education, leisure time physical activity and psychological distress in adolescence shows that school based physical activity increases psychological wellbeing⁹.

Himachal Pradesh based study showed that low leisure time physical activity was significantly associated with highest depressive symptoms¹⁰. Very few studies show that overall physical activity was inversely associated the risk of anxiety and depression in boys¹¹.

Competitive learning necessitates more time to be spend for studies, which will further increase stress due to lack of recreation and physical activity. There are many competing demands and preferences also; like exams, tasks and role in family etc. which also ends up in increased stress and less physical activity.

Since studies have shown positive and negative relationship between mental health and physical activity and Kerala based studies on mental health, physical activity and their correlation are very few, the authors were interested to conduct a study on these aspects.

The primary objectives of the study were to assess the mental health and physical activity among adolescents and to find the correlation between them. Secondary objectives were to find the associations of socio personal variables with mental health and physical activity of adolescents.

Statement of the problem

A study to assess the correlation between mental health and physical activity among adolescents of selected high schools in Alappuzha district.

3. Methods

Study Sample and Design

Current study was a cross - sectional, questionnaire - based study to find the correlation between mental health and physical activity among adolescent students studying in 10th standard and belonging to the age of 14 - 16 years. Participants were from selected high schools of Alappuzha district, Kerala, India; during February 2021 to March 2021. The study was initiated after obtaining permission from scientific review board and Institutional human ethics committee of Govt. College of nursing, Alappuzha.

Sample size Calculation

Primary objectives of the study were to assess the mental health and physical activity among adolescents and to find the correlation between them. Sample size was 270 and it

was calculated based on the findings of pilot study conducted February 2021.

Selection criteria

A total of 270 adolescents who met sampling criteria were selected by stratified multistage cluster sampling. Adolescents in the age of 14 - 16 years, and studying in 10th standard; willing to participate, were included. As per the class teacher's report, adolescents who came across a grief in the last 3 months (death of loved ones, major illness of family members or self), recent history of mental health problems and still under treatment (drug/ psychosocial therapy) and those with disability in mobility, vision, hearing and speech were excluded from the study.

Data collection

After getting permission from scientific review committee, institutional ethics committee of Govt. College of nursing Alappuzha and approval from Kerala University of Health Science, setting permission was obtained from district educational officer, and headmasters of selected schools. After getting informed consent from parents and assent from the participants, questionnaires were administered in classroom settings, following Covid protocol and data were collected by self - report technique. Period of data collection was one week from 22nd february to 1st march 2021.

Assessment Tools

Tool 1: Structured questionnaire to assess socio personal data

It consist of 18 items which includes age, gender, religion, residential area, nature of residential area, type of school, sector of schools, type of family, educational status of father, educational status of mother, occupation of father, occupation of mother, monthly family income, economic status of family, mode of stay, history of psycho active substance use, history of psycho active substance use in family members and presence of family dispute.

Tool 2: Strengths and Difficulties Questionnaire - SDQ 11 - 17

Strengths and Difficulties Questionnaire is a United Kingdom based standardized tool developed by Robert N Goodman that has been used in many studies to assess mental health. It consists of 25 items. Five items each to assess different domains like emotional problems, conduct problem, hyper activity, peer problem and pro social scale. Response is obtained as 'not true, somewhat true and certainly true; Scored as 0, 1, 2 respectively. Some responses were with reverse scoring for selected items. Total difficulties score was obtained by summing the scores of all items except pro social scale, and ranges from 0 - 40. A score of 0 - 15 indicate normal mental health. 16 - 19 indicate border line problems and 20 - 40 indicates poor mental health or mental health problems.

Tool 3: Physical Activity Questionnaire PAQ - A

Physical Activity Questionnaire is a self - administered tool, developed by KC Kent et al to assess the level of physical activity for high school students in grades 9 - 12 and approximately 14 - 19 years of age. The PAQ - A was

administered in class room setting and provides a summary of physical activity score derived from eight items, each scored on a 5 point scale (1 - 5). Physical activity composite score is the mean of 8 items out of 9 items, which result in the final PAQ - A activity summary score. A score of 1 indicates low physical activity, whereas 5 indicate high physical activity. Physical activity is classified as low (score - 1 - 1.6), moderate (score - 1.7 - 3.3), and high (3.4 - 5) by taking 33 percentile cut - off after getting permission from the author.

Statistical Analysis

Socio personal variables were represented by descriptive statistics - frequencies and percentages; Scores of mental health and physical activity were analyzed by using its score specification and mean and standard deviation of the scores. Spearman's correlation coefficient was used to find the correlation between mental health and physical activity of adolescents. Association of socio personal variables with mental health and physical activity were analyzed using chi - square test. Cut off for the level of significance was set as p value of <0.05.

4. Results

Socio personal variables of adolescents

A total of 270 adolescents participated in the study. The mean age of participants was 15.04 years. Among the participants, 162 (60%) were males and 159 (62.6%) were from Hindu religion. Nature of residential area was rural for 70.74% and coastal for 10%. (Please refer Table 1 for the detailed socio personal characteristics)

Mental health and physical activity among adolescents

Out of 270 participants 249 (92.2%) participants had good mental health, 5.2% were with borderline mental health problems and 2.6% were with poor mental health. Majority, 190 (70.4%) of participants had moderate physical activity level. Only 9 (3.3%) were with high physical activity level.

Association between mental health and selected socio personal variables

There is statistically significant association between mental health of adolescents and socio personal variables like nature of residential area ($\chi^2=13.2$, $p=0.039$), type of school ($\chi^2=15.60$, $p=0.004$), sector of school ($\chi^2=15.45$, $p=0.004$), mode of stay ($\chi^2=26.2$, $p=0.001$), and history of substance use ($\chi^2=9.1$, $p=0.01$).

Association between physical activity and selected socio personal variables

There is statistically significant association between physical activity and socio personal variables like Age ($\chi^2=9.4$, $p=0.05$), gender ($\chi^2=15.2$, $p=0.001$), type of school ($\chi^2=41.15$, $p=0.001$) and sector of school ($\chi^2=20.8$, $p=0.001$)

Correlation between mental health and physical activity among adolescents

There was no significant correlation between mental health and physical activity among adolescents ($r_s=0.08$). (Please see Figure 1, scattered plot showing correlation between mental health and physical activity)

Table 1: Frequency and percentage distribution of socio personal variables, (n=270)

Socio personal variables	f	%
Age in years		
14	53	19.6
15	153	56.7
16	64	23.7
Gender		
Male	162	60
Female	108	40
Religion		
Hindu	169	62.6
Christian	55	20.4
Islam	46	17
Residential area		
Panchayath	233	86.3
Municipality	37	13.7
Type of school		
Boys school	90	33.3
Girls school	45	16.7
Mixed school	135	50
Sector of school		
Government	90	33.3
Aided	135	50
Unaided	45	16.7
Type of family		
Nuclear	208	77
Joint	46	17
Extended	16	6
Occupation of father		
Legislators, senior officials and managers	8	3
Professionals	15	5.6
Technicians and associate professionals	16	5.9

Clerks	4	1.5
Skilled workers and Shop and Market Sales workers	38	14.1
Skilled agricultural and fishery workers	31	11.4
Craft and related trade workers	20	7.4
Plant and Machine Operators and Assemblers	17	6.3
Elementary occupation	107	39.6
Unemployed	14	5.2
Educational status of mother		
Profession of honors	12	4.4
Graduate	26	9.6
Intermediate or diploma	31	11.5
High school certificate	157	58.1
Middle school certificate	8	3
Primary school	36	13.4
Occupation of mother		
legislators, senior officials and managers	7	2.6
Professionals	17	6.3
Technicians and associate professionals	4	1.5
Clerks	0	0
Skilled workers and Shop and Market Sales workers	16	5.9
Skilled agricultural and fishery workers	29	10.7
Craft and related trade workers	19	7
Plant and Machine Operators and Assemblers	1	0.4
Elementary occupation	78	28.9
Unemployed	99	36.7
Monthly income in Rupees		
≤10, 001	185	68.5
10, 002 - 29, 972	42	15.6
29, 973 - 49961	32	11.9
49, 962 - 74, 755	7	2.6
74, 755 - 99, 930	4	1.5
Economic status		
APL (Above poverty line)	71	26.3
BPL (Below poverty line)	198	73.4
History of psycho active substance use		
Present	11	4.1
Absent	259	95.9
History of psycho active substance use in family member		
Present	49	18.1
Absent	221	81.9
Family dispute		
Present	29	10.7
Absent	241	89.3

Table 2: Mean and standard deviation of; total difficulties score based on strengths and difficulties questionnaire and summary score based on physical activity questionnaire. (n=270)

Variable	Mean	Standard Deviation	Maximum score	Minimum score
Total difficulties score	8.45	4.85	31	2
Physical activity summary score	2.03	0.586	1	4.2

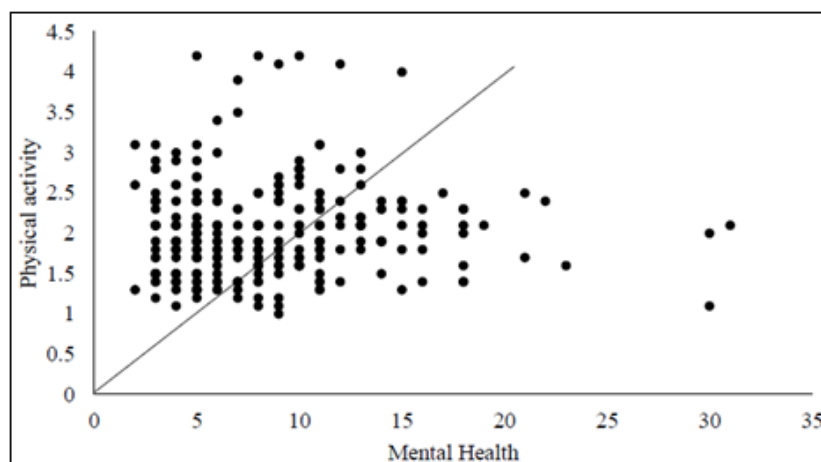


Figure 1: Scattered plot showing correlation between mental health and physical activity.

5. Discussion

This was a descriptive correlational study conducted to assess the correlation between mental health and physical activity among adolescents. We explored mental health, physical activity as well as their association with selected socio personal variables.

Present study revealed that (a) Out of 270 participants 249 (92.2%) participants had good mental health, 5.2% were with borderline mental health problems and 2.6% were with poor mental health. (b) Majority (70.4%) of participants had moderate physical activity level. only 3.3% were with high physical activity level. The study conducted to test the association between screen time, physical activity and self-reported psychological problems among urban adolescents showed that sufficient physical activity was protective for depressive symptoms (OR=0.78, 95%CI 0.67–0.91). Insufficient physical activity was associated with different psychological problems¹². But it is controversy to present study findings which shows no correlation between mental health and physical activity.

A Population based study conducted in Iran to find the association between physical activity and mental health among adolescents showed that adolescents with increased physical activity had decrease in mental health subscales (HEPA - activity decreases odds of somatic distress and social dysfunction compared with inactivity ($p=0.031$ and 0.001 , respectively); minimally activity decreases odds of anxiety compared with inactivity ($p=0.038$) except for depression ($p>0.05$)¹³, but the present study showed no correlation between mental health and physical activity.

Study conducted to find the association between physical activity and mental well-being of Chinese adolescents showed that the physical activity level was significantly correlated with the adolescent's mental well-being ($r = 0.66$, $p < 0.001$)¹⁴. But the present study finding is not supportive of it, as there is no significant correlation between mental health and physical activity ($r_s=0.08$).

A study conducted with the aim to investigate environmental and socio personal determinants of physical activity and inactivity patterns among subpopulations of US adolescents shows that maternal education was inversely associated with high inactivity (AOR of.61 (CI: .48 - .76)¹⁵. The present study shows no significant association between education of mother or father and physical activity among adolescents.

Cross sectional Study conducted to find the association between demographic and familial characteristics and psychological properties of adolescents show that there was a significant positive association between age and mental health ($p= 0.003$)¹⁶. The present study finding is not supportive of it, as there is no significant association between age and mental health.

6. Conclusion

Present study revealed that 92.2% of adolescents participated in study have shown good mental health and 70.4% have moderate physical activity level. Study finding

also showed that there is no correlation between mental health and physical activity among adolescents. The study showed that there is statistically significant association between mental health of adolescents and socio personal variables like nature of residential area, type of school, sector of school, mode of stay, and history of substance use. There is statistically significant association between physical activity and socio personal variables like age, gender, type of school and sector of school. Present study suggests modification and improvement in physical activity of adolescents which may improve physical and mental health among adolescents, which contribute to general wellbeing.

7. Future Scope

Nursing practice

- The study findings indicate a need for improvement of physical activity in school going adolescents as very less number of participants were with high physical activity. School health nurse can take initiation to improve physical activity or sports activity and physical education classes in school settings. Though mental health among adolescents has shown as 92.2%, screening for mental health problems should be done in schools by school health nurse or counselors. This will enable early detection and management of mental health problems.
- Study results indicate periodical assessment of mental health and physical activity; health education and counseling to motivate adolescents to participate in physical activities. Study findings necessitate awareness programs to teachers and parents to monitor and guide adolescents.

Nursing research

- Present study findings necessitate more research on physical activity and related factors of it, because physical activity must be encouraged for general wellbeing and physical fitness among adolescents.
- Though study indicated no significant correlation between mental health and physical activity, there are studies that reveal the benefits of physical activity/exercise on mental health. So the study can be replicated in other settings and in young adults with more sample size.
- Intervention studies can be conducted to find out the effect of physical activity or exercise on mental health among different age groups.
- Intervention studies can be conducted to find out the effect of physical activity or exercise on mental health problems like anxiety and depression.

Nursing administration

- Study findings can be used in educational settings, for planning remedial services to the students with poor mental health or borderline mental health problems. Nurse administrators can take initiatives to plan mental health services in schools, to address these problems.
- Study findings are useful for school health nurse to conduct assessment on mental health and physical activity and its related factors, for parent education as a part of information, education and communication programme.

- Study findings will help the health policy makers to plan school based protocols pertaining to improvement of physical activity and mental wellbeing among adolescents.

Limitations of the study

The study was conducted during COVID-19 season, when the school re - opened for 10th standard students, prior to their exam and there was only online classes for these students and their physical training, drill periods was restricted. Study was limited to selected schools of Alappuzha district in Kerala state

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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