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FACTORS ASSOCIATED WITH PHYSICAL ACTIVITY LEVELS IN ADOLESCENTS

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ABSTRACT

Objective: to analyze the factors associated with physical activity levels in adolescents.
Method: cross-sectional, quantitative study, conducted with adolescents enrolled in two educational institutions in a capital of the midwest region of Brazil. Data collection occurred from April to October 2021, through a self-administered questionnaire composed of validated scales. The association between the variables was verified by logistic regression.
Results: 219 adolescents participated in the study, with a mean age of 15.7 years, more than half were girls (52.5%) from medium economic class (51.1%); 55.3% were very active/active; 39.3% had low self-esteem; 17.8% were at risk for developing an eating disorder; 12.3% at risk for severe anxiety symptoms; and 13.3% at risk for moderate depression symptoms. The factors associated with the level of physical activity were self-esteem and risk for depression.
Conclusion: Early screening of adolescents with low self-esteem and risk for symptoms of depression is proposed as an initial strategy to direct actions that encourage the practice of physical activity.

DESCRIPTORS: Adolescents. Exercise. Self-image. Depression. Health promotion.

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FATORES ASSOCIADOS AO NÍVEL DE ATIVIDADE FÍSICA EM ADOLESCENTES

RESUMO

Objetivo: analisar os fatores associados ao nível de atividade física em adolescentes.
Método: estudo transversal, de abordagem quantitativa, realizado com adolescentes matriculados em duas instituições de ensino de uma capital da região Centro-Oeste brasileira. A coleta de dados ocorreu no período de abril a outubro de 2021, por meio de questionário autoaplicado composto por escalas validadas. A associação entre as variáveis foi verificada por meio de regressão logística.
Resultados: participaram do estudo 219 adolescentes, com média de idade de 15,7 anos, mais da metade eram meninas (52,5%) e de classe econômica média (51,1%); 55,3% eram muito ativo/ativo;39,3%, com autoestima baixa;17,8% apresentaram risco para desenvolver transtorno alimentar;12,3% risco para sintomas de ansiedade grave; e 13,3%, risco para sintomas de depressão moderada. Os fatores associados ao nível de atividade física foram a autoestima e o risco para depressão.
Conclusão: O rastreamento precoce de adolescentes com baixa autoestima e risco para sintomas de depressão pode constituir estratégia inicial para direcionar ações de estímulo à prática de atividade física.

DESCRITORES: Adolescentes. Exercício físico. Autoimagem. Depressão. Promoção da saúde.

FACTORES ASOCIADOS A LOS NIVELES DE ACTIVIDAD FÍSICA EN ADOLESCENTES

RESUMEN

Objetivo: analizar los factores asociados a los niveles de actividad física en adolescentes.
Método: estudio transversal, cuantitativo, realizado con adolescentes matriculados en dos instituciones educativas de una capital de la región Centro-Oeste de Brasil. La recolección de datos ocurrió de abril a octubre de 2021, a través de un cuestionario autoadministrado compuesto por escalas validadas. La asociación entre las variables se verificó por regresión logística.
Resultados: Participaron del estudio 219 adolescentes, con una edad media de 15,7 años, más de la mitad eran niñas (52,5%) de clase económica media (51,1%); el 55,3% eran muy activos/activos; el 39,3% tenía baja autoestima; el 17,8% tenían riesgo de desarrollar un trastorno alimentario;12,3% en riesgo de síntomas de ansiedad severa; y 13,3% en riesgo de síntomas de depresión moderada. Los factores asociados al nivel de actividad física fueron la autoestima y el riesgo de depresión.
Conclusión: El cribado precoz de adolescentes con baja autoestima y riesgo de síntomas depresivos puede constituir una estrategia inicial para encaminar acciones que incentiven la práctica de actividad física.

DESCRIPTORES: Adolescentes. Ejercicio. Auto imagen. Depresión. Promoción de la salud.

INTRODUCTION

The increase in the prevalence of chronic conditions in the adolescent population causes numerous care challenges, especially with regard to the development of health promotion actions, for example the encouragement of physical activity[1]. It should be noted that these actions need to be directed by the health system and by social policies aimed at promoting quality of life and physical and mental well-being[2].

A positive aspect for health promotion is related to the fact that behaviors are modifiable factors. Thus, the threat posed by behaviors is subject to intervention and even small changes can lead to improvements in overall health [3]. However, because behavior change is a complex and interactive process, in which even individuals who are aware of the benefits of better lifestyle habits may fall short of adjusting their behavior[4], the identification of factors that influence lifestyle habits is the key issue for health research.

Among modifiable behaviors, the practice of physical activity, for example, in addition to having a positive impact on biological conditions, also brings benefits to mental health and promotes social interaction. low-cost healthcare that, when practiced regularly, constitutes a protective factor for the development of chronic conditions and contributes to the reduction of symptoms of depression and anxiety [6–7].

However, estimates indicate that four out of five adolescents do not practice physical activity regularly, which results in expenses with direct medical care (approximately US$ 54 billion)[1]. In turn, a national study conducted with schoolchildren showed that the percentage of ninth-grade students classified as physically inactive increased from 61.9% to 63.8% between 2009 and 2019[8].

Among the factors that can influence this practice in adolescents is the limitation of access due to the incompatibility of schedule and the fact that the activities offered by public policies sometimes do not meet the preferences of this public, which can make them unattractive[9–10]. In addition, personal and family behaviors, socioeconomic level[11], low self-esteem, dissatisfaction with body image[12], anxiety and depression[13] and the presence of eating disorders[14] are also factors that are considered influential regarding physical activity and that, sometimes, are subject to intervention by health teams.

However, the scarcity of studies that explore the association between subjective, mental health issues and the practice of physical activity by adolescents, and that are subject to intervention, led to the following question: what are the factors associated with the practice of physical activity by adolescents? It is believed that expanding knowledge regarding these factors can help to plan intersectoral intervention actions focused on health promotion.

Thus, the aim of this study was to analyze the factors associated with the level of physical activity in adolescents.

METHOD

Cross-sectional study with a quantitative approach, which used the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) criteria.

Adolescents regularly enrolled in municipal schools in a capital of the Brazilian Midwest region and in the Federal Institute of Mato Grosso do Sul (IFMS) participated in this study, which at the time of data collection had 2070 and 720 adolescents enrolled, respectively. Due to social isolation, as a measure adopted during the COVID-19 pandemic, the sample was composed by convenience. Inclusion criteria were: being between 10 and 19 years old and being regularly enrolled in the mentioned institutions. In turn, those who did not meet the established deadline for completing the questionnaires (15 days) and those who filled the forms in incompletely were excluded.

Between April and October 2021, data were collected through online questionnaires or distributed by the researchers to students in a face-to-face format, depending on the teaching methodology adopted by the institutions during the COVID-19 pandemic. Initially, telephone contact was made to schedule a meeting with the directors of the schools, who proceeded to present the research proposal to the teachers. Next, the research was presented to the parents and guardians of the adolescents and the questionnaires were presented to the adolescents.

As a result of the COVID-19 pandemic, the invitation to participate in the survey was extended to all guardians and students in the ninth grade classes of municipal schools and from the first to the sixth semester of the IFMS Integrated Technical High School. For the institutions that adopted blended learning, parents or guardians received an envelope containing the questionnaires, the Free and Informed Consent Term (TCLE) and the Free and Informed Assent Term (TALE) for those under 18 years of age, along with the TCLE for the responsible. In case of consent, after accepting the student's participation, the envelope with the completed terms and instrument was delivered to the participants at the school at the time of collection of the new didactic material. And for those institutions that adopted emergency remote teaching, the Google Forms link was made available to those responsible for accessing the TCLE. After accepting participation and filling out the term, students were given access to the links with the TALE and the questionnaires.

Regarding data collection, the questions included the characterization (gender, age, study period and self-perception of health and body image) and five validated, self-applicable instruments:

1) Rosenberg's Self-Esteem Scale consists of 10 questions with themes related to feelings related to respect and self-acceptance. The answers are presented in four items in *Likert* format, with half of the questions presented positively, and the other half negatively. The data related to this instrument are classified by the sum of the answers, in which individuals are identified with low self-esteem (0 to 25 points), medium (26 to 29 points) and high (30 to 40 points)[15].

2) Eating Attitudes Test (EAT-26), composed of 26 questions in the form of a Likert scale, which assesses the risk for the development of eating disorders, whose classification is performed from the sum of the answers of each item. The higher the score, the greater the risk[16].

3) Hospital Anxiety and Depression Scale (HAD), whose objective is to identify symptoms of anxiety and depression. It consists of 14 questions (seven related to anxiety symptoms (HAD-A) and seven to symptoms of depression (HAD-D)). The answers are distributed in a Likert scale from 0 to 3 points, with the possibility of reaching 21 points. When added, the classification corresponds to: 0 to 8 points - no anxiety/depression;9, with symptoms of anxiety/depression; 8 to 10 points, with mild symptoms; 11 to 14, moderate and 15 to 21 severe [17].

4) Socioeconomic Questionnaire: an instrument composed of 15 questions whose classification, through the sum of the score obtained in the answers, occurs in six socioeconomic strata: A, B1, B2, C1, C2 and D-E. For this study, those classified in socioeconomic stratum A correspond to high economic class; B1 and B2 the middle economic class; and C1, C2 and D-E at low economic class [18].

5) Physical Activity Questionnaire (IPAQ): composed of eight qualitative questions referring to the participant's physical activity time in the last week and classifies the intensity as: very active, active, irregularly active[19]. The results were aggregated in very/active and irregularly active/sedentary for the analysis in the present study.

Data were entered in double entry and organized in an Excel spreadsheet and later analyzed using descriptive and inferential statistics in the Stata software, version 14.2 (StataCorp LP, CollegeStation, United States).

As the outcome analyzed was the practice of physical activity in a dichotomous manner (very active or inactive/irregularly active), logistic regression was chosen to infer the factors associated with the practice of physical activity by adolescents. The raw models were created between the practice of physical activity and the covariates individually. For the adjusted analysis, covariates that had $p<0.20$ were included and the findings were interpreted using both p values and effect sizes measured by the odds ratio. Due to the influence of social determinants on health, socioeconomic status was used to adjust the final multivariate model.

The study was approved by the Human Research Ethics Committee of the Federal University of Mato Grosso do Sul, in accordance with national and international standards of research ethics. All ethical and legal aspects recommended by Resolution nº466/12 and nº510/2016 of the National Health Council were respected.

RESULTS

At the time of the study, among the 25 municipal schools, students from 21 of the schools answered the questionnaires and among the 18 classes of the IFMS integrated technical course, students from nine classes answered, which resulted in 347 participants. However, 128 questionnaires were excluded due to incomplete responses, which resulted in 219 participants (102 from municipal schools and 117 from IFMS).

Half of the adolescents were girls (52.5%), with a mean age of 15.7 years (minimum of 13 and maximum of 19 years), middle class (51.1%), enrolled in the morning period (53.9%). Regarding the level of physical activity, 55.3% of them were classified as very active/active 39.3% had low self-esteem and 33.3% had high self-esteem. In addition, 17.8% were at risk for developing an eating disorder, 12.3% and 18.7% had severe and moderate anxiety symptoms, respectively, and 13.3% had symptoms of moderate depression, as shown in Table 1.

Females were 23% less likely to be associated with physical activity than boys. In turn, adolescents with high self-esteem had a 78% chance of being associated with the practice of physical activity compared to those with low self-esteem. Therefore, those who had average self-esteem had a 28% chance of association with the practice of physical activity, compared to those with low self-esteem.

With regard to the comparison of socioeconomic status, middle-class adolescents had a 21% chance of being associated with lower levels of physical activity compared to those from the lower class. In turn, those from the upper class represented a 33% chance of association with lower levels of physical activity compared to those from the lower class.

Adolescents who were at risk for developing an eating disorder had a 20% chance of association with higher levels of physical activity when compared to those who were not at risk.

With regard to risk factors for mental disorders (anxiety and depression), adolescents classified as at severe risk for anxiety symptoms had a 20% chance of association with higher levels of physical activity. In turn, regarding depressive symptoms, individuals classified as having severe symptoms had a 69% chance of association with low levels of physical activity compared to individuals who were not at risk. Therefore, those who showed symptoms of moderate depression had a 56% chance of being less physically active when compared to those who did not present the risk. Finally, those classified as having a mild risk had a 43% chance of being associated with lower levels of physical activity when compared to those who were not at risk for developing depression.

Table 1 – Descriptive characteristics of adolescents from the municipality of Campo Grande, MS, Brazil, 2021. (n=219).

Variables	n	%	CI 95%	
Sex				
Male	104	47.5	40.9	54.2
Female	115	52.5	45.8	59.1
Turno				
Morning	118	53.9	47.2	60.4
Evening	101	46.1	39.6	52.8
IPAQ*				
Very active/active	121	44.7	38.2	51.4
Active/sedentary irregularism	98	55.3	48.6	61.8
Self-esteem				
Low	86	39.3	33.0	45.9
Average	60	27.4	21.9	33.7
High	73	33.3	27.4	39.9
Socioeconomic				
High	49	22.4	17.3	28.4
Medium	112	51.1	44.5	57.8
Low	58	26.5	21.0	32.8
Eating disorder				
No risk	180	82.2	76.5	86.7
At risk	39	17.8	13.3	23.4
Anxiety				
Low	96	44.0	37.4	50.5
Mild	55	25.1	19.8	31.3
Moderate	41	18.7	14.1	24.5
High	27	12.3	8.5	17.4
Depression				
Low	138	63.0	56.3	69.2
Mild	46	21.0	16.1	27.0
Moderate	29	13.3	9.3	18.4
High	6	2.7	1.2	6.0

* Physical Activity Questionnaire

Table 2 shows that low self-esteem and risk for depression symptoms were the factors associated with lower physical activity.

Figure 1 shows the linear prediction between depression and physical activity (trend of decline in physical activity when the risk of severe depression increases) and self-esteem and physical activity (tendency to increase the practice of physical activity when self-esteem increases).

Table 2 – Bivariate and adjusted analysis between the level of physical activity practice with the covariates self-esteem, socioeconomic level, eating disorder, anxiety and depression, of adolescents from the municipality of Campo Grande, MS, Brazil, 2021. (n=219)

Physical activity level	*OR	†P	‡CI 95%		*OR	†P	‡CI 95%	
	Unadjusted model				Adjusted model			
Sex								
Male	Ref							
Female	0.77	0.336	0.45	1.31				
Period								
Morning	Ref							
Evening	1.01	0.957	0.59	1.73				
Self-esteem								
Low	Ref							
Average	1.28	0.464	0.66	2.48	0.99	0.971	0.48	2.03
High	1.78	0.074	0.94	3.37	1.22	0.605	0.58	2.58
Socioeconomic position								
Low	Ref							
Average	0.79	0.489	0.40	1.56	0.87	0.704	0.43	1.77
High	0.63	0.246	0.29	1.37	0.70	0.392	0.32	1.56
Risk for eating disorder								
No	Ref							
Yes	1.20	0.606	0.60	2.43				
Risk Anxiety								
Absence	Ref							
Mild	1.33	0.398	0.68	2.60				
Moderate	1.49	0.287	0.71	3.15				
High	1.20	0.679	0.51	2.82				
Depression Risk								
None	Ref							
Low	0.57	0.103	0.29	1.12	0.60	0.187	0.29	1.27
Moderate	0.44	0,048	0.19	0.99	0.50	0.132	0.20	1.22
High	0.31	0,187	0.05	1.76	0.36	0.266	0.06	2.18

*OR: OddsRatio; †P: probability; ‡CI: confidence interval; §Stata version 14.2: StataCorp LP, *CollegeStation*, United States.

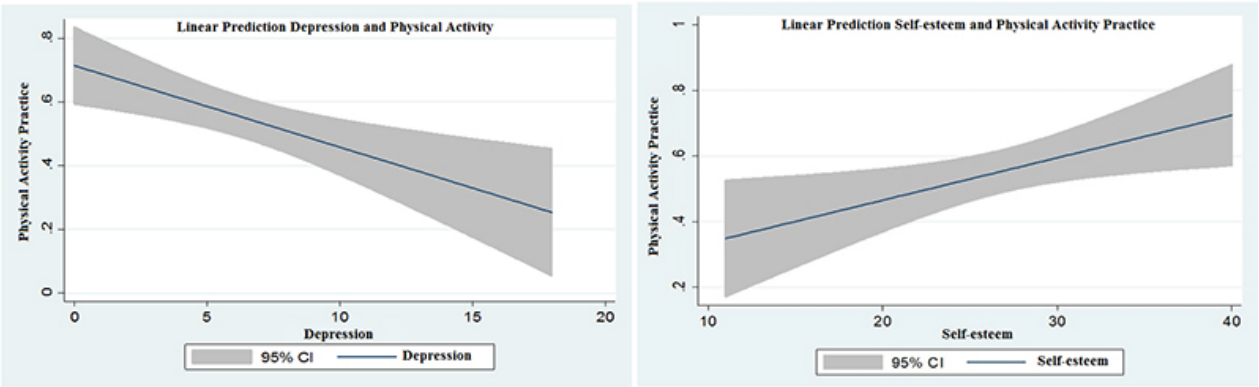

Figure 1 – Linear prediction between symptoms of depression, self-esteem and physical activity in adolescents in the municipality of Campo Grande, MS, Brazil, 2021. (n=219)

DISCUSSION

Adolescents with low self-esteem and risk for symptoms of depression were associated with lower levels of physical activity. It should be noted that both factors are subject to intervention through health promotion actions.

A study carried out on a global scale on the prevalence of physical inactivity in adolescents of both sexes, based on a sample of 1.6 million individuals from 14 countries, pointed out that most do not meet the WHO recommendations regarding the level of physical activity daily, which exposes the risk of mental and physical health[20]. However, among the participants of the present study, more than half were physically active, which corroborates the results of a survey also carried out with adolescents in the Brazilian Midwest, which pointed out that 77.7% were physically active[21].

Given this context, it should be noted that the increase in sedentary lifestyle can facilitate the emergence of chronic conditions in adolescents. However, a study pointed out that, although this population portion has little knowledge about chronic diseases, after reading educational booklets, 35.1% of adolescents broadened their perceptions, which highlights the need for health education actions aimed at this public in relation to health promotion and disease prevention[22].

When comparing levels of physical activity in relation to sex, girls were less likely to be associated with physical activity. Faced with this, it is necessary to identify the reasons that may discourage the female public from practicing physical activity and to develop intersectoral incentive actions for adolescents.

Low self-Esteem was the highest frequency found in adolescents (39%), which are less likely to be associated with the practice of physical activity. A study carried out with adolescents from public and private schools in the Midwest region of Brazil, pointed out that physically active participants had high self-esteem compared to those who were not active[23]. Thus, it is emphasized that the practice of physical activity positively influences the quality of life and subjective well-being, in addition to presenting itself as an opportunity to favor social relationships and improve self-esteem. In this sense, screening actions for low self-esteem in adolescents can work as an initial strategy to direct the focus on encouraging the practice of physical activity.

Furthermore, these health promotion and disease prevention actions should be based on behavior change and need to be extended to parents/guardians, as the home environment influences the habits and behaviors of adolescents[11]. In this scenario, Family Health teams occupy a privileged position, because their actions involve the particularities of the territory and the home space.

With regard to the risk of developing an eating disorder, the frequency in the present study (17.8%) was similar to that presented by young people from the Northeast region of the country (16%)[24]. Adolescents at risk for developing an eating disorder had 20% chance of association with the practice of physical activity, which may be due to body image distortion and weight dissatisfaction. Therefore, it becomes valid to provide spaces for discussion among adolescents about knowledge and acceptance of their own bodies, especially in schools, philanthropic institutions and public squares, potential environments for health promotion actions. It should be noted that actions aimed at this public in the form of groups can be more effective.

Body dissatisfaction is sometimes influenced by beauty stereotypes disseminated by the media, which can cause mental disorders such as anxiety and depression[25]. The frequency of risk for moderate (18.7%) and severe (12.3%) anxiety presented by the adolescents in the present study corroborates the results found in a study with adolescents from a city in Northern Brazil[26].

With regard to the relationship between anxiety symptoms and the practice of physical activity, it was observed in this study that adolescents at risk (severe and moderate) for anxiety symptoms are more likely to be associated with the practice of physical activity. It is believed that this association

may occur due to the feeling of well-being that the practice of exercise promotes, especially in the relief of anxiety symptoms. A review study highlighted that aerobic physical exercise was effective as a non-pharmacological treatment and significantly reduced anxiety both in healthy individuals and in those with physical or mental illnes[27].

In view of this, the importance of actions that encourage the practice of physical activity by adolescents is inferred, since this is considered a protective factor for mental health and favors well-being[13]. Based on the results of this study, it is possible to reflect on the need for public policies beyond the health area — for example, sports and leisure — that enable access, motivation and encouragement for this population.

It was observed, in the present study, that the higher the risk of symptoms of depression, the lower the chance of association with the practice of physical activity, which corroborates the results of the study conducted with young people regularly enrolled in the country's public school system, which found that there is a tendency for adolescents with low levels of physical activity to present depressive symptoms and higher levels of stress [28]. In this regard, the need for actions that favor the early identification of adolescents with symptoms of depression in order to act strategically with this public is highlighted. It should be noted that physical activity is considered a health promoter. Therefore, identifying the modifiable factors associated with it is a great challenge due to its amplitude, which includes physical, social, cultural, emotional and environmental factors.

For the development of actions with the adolescent public, schools/educational institutions are the most favorable places due to their presence in these spaces. However, although there are intersectoral Public Policies such as the Health at School Program, there are gaps related to articulation for joint work between health and education professionals[29], which negatively influences the implementation of the policy. In view of this, it becomes valid to provide professionals from the different sectors involved in adolescent care with a discussion regarding the factors that directly influence the practice of physical activity in order to support the planning of intersectoral actions for health promotion and the adoption of healthy behaviors .

The composition of the sample of adolescents participants for convenience and the involvement only of public institutions are considered limitations to this study. Although, initially, the principal investigator performed sample calculation from eligible schools, the COVID-19 pandemic interfered with the process of in-person data collection. Similarly, the higher frequency of physically sedentary/inactive adolescents may have been influenced by the period of social isolation, which further limited access to physical activity. However, the importance of the results found to support intersectoral discussions in relation to public policies directed to health promotion and encouragement of sports and leisure to this public is highlighted.

CONCLUSION

Self-esteem and risk for symptoms of depression were factors associated with the practice of physical activity. Thuse the early identification of adolescents with low self-esteem and risk for symptoms of severe depression can be a strategic care action and an incentive to promote health in the adolescent population.

These actions should be thought of by the different professionals who assist this public and developed in the collective spaces occupied from the consideration of the particularities and the context in which they are inserted.

The creation of Public Policies that favor access to physical activity by adolescents can be a strategy of great value for health promotion and prevention of physical and mental diseases.

Therefore, it is suggested that new studies, especially interventions, arebcarried out, which test actions to encourage the practice of physical and leisure activity accessible to adolescents and their relationship with the levels of self-esteem and symptoms of depression.

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