

Physical activity promoting mental well-being among adolescents: A community-based school nursing intervention

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Abstract

Introduction

Sedentary behavior among adolescents is a growing public health concern that calls for urgent intervention, as it contributes to both physical and mental health problems and directly affects adolescents' quality of life. External factors such as parental support, parents' health literacy, and frequent screen use negatively influence the adoption of regular physical activity. As this issue becomes increasingly prevalent among adolescents, community and public health nurses play a key role in school settings by promoting health literacy among young people and actively supporting behavior change through empowerment strategies.

Objective

To equip 8th-grade adolescents with the knowledge and skills to adopt healthy physical activity habits that promote mental well-being.

Methods

The project was developed using the Health Planning Methodology and grounded in Nola Pender's Health Promotion Model. The situational assessment was carried out using the Students' Attitudes Toward Physical Education questionnaire and a focus group. A non-probabilistic convenience sample of 10 students was obtained.

Results

Adolescents demonstrated limited knowledge about the importance of physical activity for their overall development and mental well-being, and reported engaging in sedentary behavior during their free time.

Conclusion

This school-based health promotion project increased adolescents' knowledge of the topic and empowered them to adopt healthier physical activity habits, contributing to long-term behavior change and healthier lifestyles.

Keywords

Physical Activity; Mental Well-being; Adolescents; Community and Public Health Nursing.

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Received: 21/10/2024

Accepted: 23/07/2025

Editor: Pedro Lucas

How to cite this article: Galamba R, Bacatum C, Sousa E. Physical activity promoting mental well-being among adolescents: A community-based school nursing intervention. Pensar Enf [Internet]. 2025 Jan-Dec; 29(1): e00368. Available from: <https://doi.org/10.71861/pensarenf.v29i1.368>



Introduction

Adolescence is a period of significant physical and emotional changes, during which young people undergo experiences that may shape their development and have a substantial impact on their mental well-being and overall health. Globally, the World Health Organization (WHO) estimates that 14% of adolescents aged 10 to 19 experience a mental disorder, with anxiety being the most common among those aged 15 to 19.¹ Suicide is also one of the leading causes of death during adolescence, highlighting how critical this stage is for mental health, as adolescents often engage in risky behaviors that may harm their emotional well-being.

In Portugal, the 2015 National School Health Program identified mental health as a priority area for intervention, aiming to strengthen students' socio-emotional skills by promoting protective factors for lifelong health.²

According to the WHO, physical activity provides important mental health benefits, helping to prevent cognitive decline, depression, and anxiety.³ However, physical inactivity remains highly prevalent among Portuguese adolescents: WHO data indicate that 78% of boys and 91% of girls do not meet the recommended levels of physical activity.⁴ Physical activity plays a key role in maintaining well-being and promoting healthy behaviors, making it essential to foster regular participation in physical activity during adolescence.

The COVID-19 pandemic further emphasized the importance of encouraging physical activity, as this behavior is now recognized as a key determinant of both physical and mental health.⁵ Pender et al. state that regular physical activity among adolescents helps reduce depressive symptoms and cognitive decline while enhancing overall well-being.⁶ Physical activity serves as a protective factor for mental health, whereas physical inactivity may contribute to the development of mental health problems.⁷ Multiple factors can negatively influence adolescents' attitudes toward physical activity. One primary concern is technology dependence, particularly the excessive use of social media, video games, and television, which directly affects adolescents' quality of life. Adolescents who spend more than two hours per day in front of screens tend to report poorer mental health outcomes.⁸ A study by Chortatos et al.⁹ found that those who spent less time on multimedia activities (such as TV/movie streaming or gaming) were significantly more likely to participate in physical activity during the week or on weekends. These findings highlight the harmful effects of excessive screen time on adolescents' daily lives and reinforce the need for interventions that promote healthy lifestyle habits.

Family influence is also a key factor in shaping adolescents' physical activity behaviors. In a study by Kefeliçol and Altay,¹⁰ adolescents whose parents had higher educational attainment and strong family relationships were more likely to engage in healthy behaviors. The study also found that adolescents who did not live in nuclear families reported fewer healthy habits compared to those who did. These results are supported by Sollerhed et al.,¹¹ who noted that

adolescents with good subjective health, higher levels of physical activity, and greater satisfaction with school tended to come from families with stable financial conditions. In contrast, adolescents whose parents had lower levels of education were more likely to spend excessive time in front of screens.⁹

Sedentary behavior among adolescents has become an increasingly pressing public health concern, with significant physical and mental health consequences. It is well established that sedentary lifestyles are a risk factor for anxiety, depression, cardiovascular disease, and type 2 diabetes, and are also associated with depressive symptoms, suicide attempts, and premature death in adolescents and young adults.^{12,13} Pontes et al. also point out that physical inactivity is more prevalent among girls than among boys.¹³ In addition to its well-established contribution to the healthy growth and development of children and adolescents, regular physical activity fosters the development of social skills and provides numerous psychological, emotional, and cognitive benefits, with positive effects on academic performance.¹² Additionally, Portuguese children and adolescents spend an average of 545 minutes per day engaged in sedentary activities.¹² Regular physical activity contributes to the improvement of positive health and lifelong well-being. As such, the school years represent a unique opportunity to intervene and prevent sedentary habits, since many unhealthy behaviors are established in this period.¹²

Schools play a fundamental role in shaping adolescents, not only in the academic domain but also in promoting health and encouraging the adoption of healthy habits. Nurses are the health professionals best positioned to lead health promotion initiatives in school settings.⁶ Their close relationship with the community is essential to the health planning process, as it allows them to identify the population's actual needs and develop appropriate strategies that equip individuals to adopt healthier lifestyles. According to the principles set forth in the Ottawa Charter,¹⁴ it is the responsibility of health professionals to empower the population through health promotion, enabling individuals to achieve their full health potential by taking control of the factors that determine it.

This project is grounded in the European initiative *Promoting Mental Wellbeing through Online Exchange in Secondary Schools (wExchange)*, co-funded by the European Union. It was developed through a consortium of higher education institutions and secondary schools in Finland, Slovenia, Greece, and Portugal to promote adolescent mental well-being through peer education. The present project aimed to equip 8th-grade students with the knowledge and skills to adopt healthy physical activity habits that support mental well-being. Peer education was the core strategy employed during the community intervention phase.

Methods

A cross-sectional observational study was conducted, based on the Health Planning methodology proposed by

Imperatori and Giralde and theoretically grounded in Nola Pender's Health Promotion Model (HPM).

According to Imperatori and Giralde, health planning arises from the need to manage limited available resources in order to address prioritized health problems through collaborative efforts with other community sectors.¹⁵

Health planning is characterized as a continuous process that coordinates the necessary resources and enables the selection of the most appropriate solutions to achieve the desired health outcomes.¹⁶ The HPM proved essential throughout the process and was applied at every stage of health planning. This theoretical model emphasizes that health behavior change is an intrinsic ability of each individual, who possesses the potential for change through self-knowledge, self-regulation, problem-solving, and decision-making.⁶

The project was developed within the catchment area of a Local Health Unit, through the Public Health Unit and the Community Care Unit, in partnership with a secondary school within a public school cluster.

The study population consisted of 8th-grade students from a secondary school in the municipality of Barreiro. The target population consisted of all 8th-grade students enrolled at this school during the 2023–2024 academic year. The sample was obtained through purposive (convenience) sampling and comprised 10 students. This sample was obtained by administering the questionnaire to four 8th-grade classes. Those classes that did not participate were excluded because their parents or legal guardians did not provide consent.

Inclusion criteria were: being an 8th-grade student in the 2023–2024 academic year; having reading and writing skills; having completed the questionnaire; and having a signed informed consent form from a parent or legal guardian. Exclusion criteria were: lack of signed parental consent, lack of interest in participating in the study, or not being an 8th-grade student.

Health research requires compliance with ethical principles governing all activities involving participants. The adolescents were informed about the purpose of the project, the potential risks and benefits of their participation, and their right to decline or withdraw from the study at any time without consequences. Those who agreed to participate signed an informed assent form, and their parents or legal guardians signed the informed consent form.

Authorization was requested from the Primary Healthcare Group, the Public Health Unit, and the School Cluster. The study was also submitted to the Health Ethics Committee of the Regional Health Administration of Lisbon and Tagus Valley (protocol no. 060/CES/INV/2023), which issued a favorable opinion on December 15, 2023.

Because the project involved collaboration with other professionals—specifically, teachers from the School Cluster and a nurse from the Public Health Unit—a formal commitment statement was prepared and signed by all parties involved.

Data collection for the situational diagnosis took place in December 2023 using a structured questionnaire consisting

of two sections. Section A focused on the participants' sociodemographic characteristics, while Section B contained the "Student Attitudes Toward Physical Education Questionnaire" (QAAEF), developed by Pereira et al.¹⁷

Section A gathered sociodemographic information. For the two open-ended questions, the responses were coded by creating new variables based on the main categories identified in the answers. Section B comprised 10 items: 7 assessing students' enjoyment of physical education and 3 evaluating the importance they assigned to the subject. Seven statements were positively worded, and three were negatively worded. Each item was rated on a 5-point Likert scale: 1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, and 5 – strongly agree.

A focus group session was also conducted in January 2024 to supplement the data collected for the situational diagnosis. This qualitative data collection technique is based on participants' spontaneous sharing of opinions on a specific topic, allowing for open discussion and the extraction of relevant insights. It can be applied at any stage of the research process.¹⁹ Participants were selected based on characteristics relevant to the topic under discussion and their potential to provide valuable contributions to the study.

Data analysis was conducted using descriptive statistics, including measures of central tendency and dispersion. The analysis was performed using IBM SPSS (Statistical Package for the Social Sciences) Statistics 28, and the data were processed between December 2023 and January 2024.

Results

The sample (n = 58) consisted of students aged between 11 and 16 years: 1 student was 11 years old (1.7%), 2 were 12 (3.4%), 41 were 13 (70.7%), 11 were 14 (19%), 1 was 15 (1.7%), and 2 were 16 (3.4%). The mean age was 13.26 years, the mode was 13, and the standard deviation was 0.78. Regarding sex, the sample included 30 girls (51.7%) and 28 boys (48.3%).

In terms of family composition, 34 students (58.6%) belonged to nuclear families, 14 (24.1%) to single-parent families, 3 (5.2%) to extended families, 4 (6.9%) to blended families, and 3 (5.2%) to dual-caregiver households. Regarding parents' educational attainment, 3.4% had completed primary school (1st cycle), 3.4% had completed lower secondary (2nd cycle), 46.6% had completed upper secondary (3rd cycle), and 46.6% had attended higher education.

As for how students spent their free time, 24.1% reported playing games, 36.2% engaged in sports, while 63.8% stated they did not practice any sport. Additionally, 56.9% spent their free time on leisure activities, and 22.4% reported engaging in rest-related activities.

Regarding the "Students' Attitudes Toward Physical Education" questionnaire, differences were found between boys and girls in terms of enjoyment and the importance attributed to physical education. In question B1 – "I usually have fun in physical education class" – 31.03% of boys

strongly agreed, compared to only 10.34% of girls. For B2 – “I like physical education class” – 36.21% of boys and 20.69% of girls strongly agreed. In B3 – “Time goes by quickly in physical education class” – 36.21% of boys strongly agreed versus 20.69% of girls. For B4 – “I like the topics covered in physical education” – 27.59% of boys strongly agreed, while only 8.62% of girls gave the same response. In B5 – “Physical education is one of my favorite subjects” – 37.93% of boys strongly agreed compared to just 12.07% of girls. For B6 – “I usually get bored in physical education class” – 32.76% of boys strongly disagreed, 10.34% of girls strongly disagreed, and 20.69% neither agreed nor disagreed. In B7 – “I usually wish physical education class would end quickly” – 35.09% of boys strongly disagreed, compared to just 14.04% of girls; one response was missing for this item. In B8 – “Physical education is important for my overall development” – 25.86% of boys and 13.79% of girls strongly agreed. In B9 – “Physical education is as important as other subjects” – 31.03% of boys and 18.97% of girls strongly agreed. Finally, in B10 – “Compared to other subjects, physical education is one of the least important for my overall development” – 19.30% of boys strongly disagreed, 14.04% of girls strongly disagreed, while 19.30% of girls neither agreed nor disagreed. One response was also missing for this item.

The analysis of the focus group also revealed sedentary behaviors and, most notably, a lack of knowledge regarding the importance of regular physical activity for maintaining mental well-being.

Based on the data analysis, the following health problems emerged and formed the health diagnosis: lack of knowledge about the importance of physical education for overall development; lack of knowledge about the relationship between physical activity and mental well-being; presence of sedentary behaviors during free time; and low interest in physical activity among girls. After identifying these problems, two nursing diagnoses were established: potential to improve knowledge about the importance of physical activity for mental well-being and presence of sedentary behavior. These nursing diagnoses were formulated according to the 2015 version of the ICNP® taxonomy.¹⁸

The priority-setting stage aimed to rank the identified health problems in order to guide the intervention toward those considered most urgent, based on the available resources and timeframe.¹⁹ In this project, the pairwise comparison method was selected, as it is suitable when fewer than ten problems are identified. This step was

carried out with the support of a panel of experts—the academic advisor and the pedagogical advisor—both certified specialists in community nursing. According to this method, each problem is successively compared with the others, and the most important one is selected in each comparison.^{15,19} Considering the time constraints of the project, the decision was made to address the top two prioritized problems, as they were interrelated and feasible to tackle: lack of knowledge about the relationship between physical activity and mental well-being, and the presence of sedentary behaviors during free time. Based on this prioritization, the intervention focused on increasing adolescents’ knowledge about the role of physical activity in promoting mental well-being and raising awareness about the consequences of sedentary behavior.

The strategy selection phase aimed to address the identified health needs through targeted interventions aligned with the project’s objectives.¹⁹ The chosen strategy was health education, designed to empower adolescents by enhancing their health literacy, particularly regarding the importance of physical activity as part of a healthy lifestyle that promotes mental well-being. This strategy was implemented through health education sessions conducted in the school setting with the adolescents who participated in the project and comprised the study sample. A peer education approach was also adopted, reinforcing the positive impact that adolescents can have on collective action and behavior change, as described by Pender et al.⁶ Sharing information among peers enables knowledge to reach a broader group of adolescents through a less hierarchical, more inclusive, and interactive learning environment. This approach also promotes the development of responsibility, which is fundamental in adolescence for the development of social skills. This is because adolescents play an active role in the transmission of knowledge, becoming accountable not only for their peers’ learning but also for their own.

Additionally, a health dissemination strategy was incorporated through the development of an e-book targeted at peer educators, which was sent via email (a communication method already used between students and teachers) to enable continuity of the project among their peers. A poster promoting physical activity among adolescents was also created and shared via email with the students who participated in the project.

Discussion

The WHO recommends that adolescents engage in at least 60 minutes of moderate to vigorous physical activity per day.³ According to the study by Gaspar et al.,²⁰ which compares findings from the 2018 and 2022 surveys, there was an increase in the number of adolescents reporting sports participation three to six times a week, from 52.5% to 56.3%, respectively. However, 18.4% of respondents

reported never having participated in any sport. The same study also noted a decrease in perceived happiness compared to 2018, with 27.7% of adolescents reporting feeling unhappy, 21% feeling nervous, 15.8% experiencing irritation or bad moods, and 11.6% feeling sad almost every day.²⁰

These findings reveal that physical activity remains inconsistent in the daily lives of adolescents, highlighting how young people perceive their emotional well-being,

with a considerable proportion reporting negative feelings. The analysis of the present study revealed that some students place little value on physical education for their overall development, which contributes to a diminished perception of the importance of physical activity in their developmental process, alongside the presence of sedentary behaviors.

Most adolescents reported spending their free time engaged in leisure, rest, or computer games—activities that do not involve movement or physical effort—instead of participating in physical activity or sports. In this sample, a considerable percentage (63.8%) reported not engaging in any sports during their free time.

These results are consistent with WHO data showing high levels of physical inactivity among Portuguese adolescents,⁴ as well as with the study by Gaspar et al., which found that 18.4% of respondents had never practiced any sport.²⁰ The results also suggest that the importance adolescents assign to physical activity varies by sex. Boys demonstrated greater interest in physical education and placed more value on engaging in physical activity for their overall development and education compared to girls.

These findings are consistent with those from the scoping review conducted by Pontes, which clearly indicated that physical inactivity is more prevalent among girls than boys.¹³ Overall, the dimension related to enjoyment of physical education and its content showed higher levels of agreement, while the dimension concerning the importance of physical education revealed that some students expressed indecision, selecting “neither agree nor disagree.” These findings underscore the need for intervention with this community group to promote physical activity habits and enhance health literacy. Promoting positive attitudes toward physical activity can foster the adoption and maintenance of healthy behaviors during adolescence.¹⁷

Such results highlight the importance of school-based interventions led by health professionals to improve adolescents’ health literacy and prevent declines in mental well-being that may develop into mental health disorders in the future. Although it was not possible to assess behavioral changes or health gains, and in order to carry out the final stage of health planning, process/activity and outcome/impact indicators were defined, as recommended by Imperatori and Giraldes,¹⁵ aligning with the proposed objectives and targets.

After the health education sessions, the students completed a knowledge assessment questionnaire and a satisfaction questionnaire regarding the sessions. All process or activity indicators were achieved, as shown in Table 1. The two planned sessions were conducted, and all the expected students—that is, the peer educators—were present at both. The goal of distributing the informational poster and the e-book was also met, as both were shared with all the students for whom they were intended. Regarding the outcome or impact indicators, all were achieved: in the peer education session, 80% of the adolescents were able to identify at least one appropriate dynamic activity that could be implemented. In the “Actively” session, 100% of the adolescents identified three

benefits of physical activity for health and three consequences of sedentary behavior, and 80% were able to identify two sedentary behaviors. The results for the defined indicators underscore that the first step toward behavior change—knowledge acquisition—was accomplished. However, such a change will only be possible if adolescents are properly empowered by acquiring health literacy to make healthier decisions in the future.

These results show that it was possible to increase adolescents’ knowledge about the importance of physical activity for health, as well as about the peer education strategy, which forms the basis for continuing this project. Health promotion, when combined with the peer education strategy, has a positive impact on adolescents’ motivation and, consequently, on the actual modification of certain behaviors.²¹

Table 1 – Evaluation of the defined indicators

Process or activity indicators	Target	Result
Number of health education sessions conducted / number of planned health education sessions $\times 100\%$	Conduct 100% of the planned sessions	100%
Number of adolescents expected to attend the “peer education” session / number of adolescents present at the session $\times 100\%$	10 students (peer educators)	100%
Number of adolescents expected to attend the “Actively” session / number of adolescents present at the session $\times 100\%$	10 students (peer educators)	100%
Number of adolescents to whom the informational poster was made available / total number of students $\times 100\%$	At least 80% of the students	100%
Number of adolescents to whom the e-book was made available / total number of students $\times 100\%$	100% (peer educators)	100%
Outcome or impact indicators	Target	Result
Number of adolescents who identified one appropriate dynamic activity in the peer education session / total number of adolescents $\times 100\%$	70%	80%
Number of adolescents who identified three benefits of physical activity / total number of adolescents $\times 100\%$	70%	100%
Number of adolescents who identified three consequences of sedentary behavior for health / total number of adolescents $\times 100\%$	70%	100%
Number of adolescents who identified two sedentary behaviors / total number of adolescents $\times 100\%$	70%	80%

Conclusion

This project made valuable contributions in three key areas. First, it supported the target community by increasing adolescents’ health literacy. Second, it contributed to nursing research by clearly demonstrating the nurse’s role in advancing knowledge through the development of a community health diagnosis and the implementation of a health promotion project, both of which deepened understanding of population health and quality of life. Ultimately, it strengthened clinical practice in community nursing by improving professionals’ capacity to plan, manage, and carry out interventions based on the needs identified within the population. The focus of community and public health nursing is to improve the population’s health conditions and continuously enhance the quality of care, which in turn supports the advancement of nursing as a constantly evolving science.

In her Health Promotion Model (HPM), Nola Pender emphasizes that the school environment is a setting where a salutogenic approach to health promotion calls for comprehensive and ongoing interventions aimed at fostering early awareness of the importance of adopting healthy behaviors.⁶ The development of health-promoting or harmful behaviors during adolescence is directly influenced by the surrounding social environment and by the connection between family and school. Ensuring positive support systems can mitigate the risks inherent to this life stage.⁶ Based on this theoretical framework, the need to promote physical activity among adolescents becomes evident, especially considering the results from the questionnaire and focus group, which revealed a lack of knowledge about the impact of physical activity on mental well-being and on healthy growth and development.

Since sedentary behavior is highly prevalent among adolescents, as evidenced in the literature, this project has added social value by promoting health empowerment and raising awareness about the importance of behavior change in preventing sedentary lifestyles. The questionnaire results, when cross-analyzed with findings from the literature review, showed that adolescents tend to have a less favorable attitude toward integrating physical activity into their daily routines. This finding highlights the need to raise their awareness of the importance of becoming active agents in making informed and conscious decisions. Encouraging awareness of healthy lifestyle choices fosters opportunities for both personal and social growth. As peer influencers within their communities, adolescents are well-positioned to build positive relationships, share knowledge, and foster cohesion among peers.

The Alma-Ata Declaration²² emphasized the importance of primary healthcare, recognizing health promotion and community engagement as essential to achieving health for all. The strategies selected for this project align with this principle by reinforcing the need for early community involvement, empowering individuals to make informed, conscious, and health-promoting decisions. Health promotion serves as the starting point for reducing the future burden of health problems among adolescents, enabling them to reach their full health potential. The role of the community health nurse is crucial in primary care, as they actively promote health within the population and establish key partnerships to support the achievement of shared goals.

As outlined in the core competencies of specialist nurses in community and public health nursing, these professionals are expected to take on leadership roles in community-based processes that aim to empower the population and mobilize community partners involved in identifying and addressing health problems.²³

The objectives of this project were achieved, as all proposed indicators were met. The adolescents also demonstrated a clear interest in the topic, as reflected in their satisfaction and engagement throughout the process. These findings underscore the need for additional school-based projects that aim to empower adolescents to develop autonomy in their decision-making and take greater

responsibility for their own health. Targeting the social determinants that influence population health is crucial to maintaining community well-being and preventing risk behaviors that may negatively affect individuals' health.

This project is expected to continue, with potential expansion to other classes so that the knowledge can reach more adolescents and the desired health outcomes can be achieved. The goal is for adolescents to make informed decisions about leading an active lifestyle by incorporating physical activity or exercise into their daily lives in ways that match their abilities and routines. The implemented strategies aim to raise their awareness of the benefits of an active lifestyle compared to the risks associated with sedentary habits, which are commonly observed during adolescence.

Authorship and Contributions

RG: Conception and design of the study; Data collection; Data analysis and interpretation; Statistical analysis; Writing the manuscript.

CB: Data analysis and interpretation; Critical revision of the manuscript.

ES: Conception and design of the study; Data analysis and interpretation; Statistical analysis; Critical revision of the manuscript.

Conflicts of interest and Funding

No conflicts of interest have been declared by the authors.

Sources of support / Financing

The study was not funded.

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