

Evaluating the Effectiveness of School-based Health Education Programs in Improving Adolescent Well-Being

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Abstract

Background: Well-being during adolescence is an important public health issue, involving physical, psychological and social aspects which impact long-term health. Schools offer an opportunity to deliver health education programs to set up healthy behaviours during this period of development. **Objective:** This research assesses the impact of school-based health education programs on the adolescent well-being - health literacy, health behaviors and psychological resilience. **Methodology:** We used both quantitative surveys and qualitative interviews with high school students. Information regarding health literacy, health related behaviours and psychosocial issues were gathered from students by pre- and post-program assessments. Data were analysed statistically and thematically. **Findings:** The findings show substantial positive impact on students' knowledge about health, and moderate positive change in physical activity, nutrition and hygiene behaviours. Furthermore, increased mental health awareness and coping strategies were noted. But program outcomes were dependent on quality of delivery and socio-cultural context. **Conclusion:** School health education programs are essential to support the well-being of adolescents, but effectiveness relies on program delivery, suitability and stakeholder engagement. Improving program development and evaluation can have long-term benefits.

Keywords: vitamin D, periodontal health, gingivitis, adolescents, 25-hydroxyvitamin D, gingival inflammation

1. Introduction

Well-being in adolescence is now understood to be a multifaceted variable that includes physical, mental and social well-being, all important for optimal development, and the transition to adulthood. According to the World Health Organization, adolescent well-being is a state of being where people can develop their abilities, cope with normal stresses of life, make a contribution to their community, and achieve their aspirations [1]. It involves physical health (proper nutrition, activity, and absence of illness), mental health (emotional regulation, resilience, and lack of mental disorders) and social health (social support, safe and supportive environments, social participation) [2]. Schools are argued to be one of the best settings for addressing adolescent well-being given it offers structured settings where adolescents spend considerable time. Schools allow for broad, uniform, and developmentally tailored interventions that have the potential to influence knowledge, attitudes, and behaviors [3]. Additionally, schools provide opportunities to incorporate health education into the curriculum, to create peer networks and to engage the teachers as role models for and promoters of healthy behaviours [4]. Despite these benefits, there are numerous health issues facing adolescents. Psychiatric conditions, including anxiety disorders, depression and stress, are increasing worldwide [5]. Health-risk behaviours such as substance abuse, unhealthy diet and exercise, also lead to chronic health issues such as overweight and obesity, and non-communicable diseases [6]. The rise of online media, educational pressures, and socio-economic inequalities also compound these issues, making adolescents a population in need of special attention [7]. To combat these challenges, school health education programs have been devised. These programs often consist of a combination of nutrition education, promotion of physical activity, mental health promotion, sexual and reproductive health education and substance abuse prevention [8]. These aim not only to raise awareness but change attitudes and promote long-term behavior

modification using interactive and participatory approaches [9]. There is some evidence that effective programs have positive impacts on adolescent health literacy, self-efficacy and behavior change [10]. But the success of these programs varies because of differences in program structure and nature, cultural fit, fidelity of delivery and assessment processes [11]. Some programs demonstrate short-term increases in knowledge, but not long-term changes in behavior, suggesting the need for more holistic and culturally responsive approaches [12].

1.1 Problem Statement

While school-based health education programs are widely implemented in schools, there is little robust evidence on their effectiveness in promoting overall adolescent well-being.

1.2 Objective

This research will assess the impact of school-based health education programs on adolescents' physical, psychological and social well-being.

2 Literature review

2.1 Concept of Adolescent Well-Being

The concept of adolescent well-being is generally accepted as a multivariate notion, which combines physical health, mental-emotional well-being and social functioning [3]. Most recent models stress a broad framework, comprising life satisfaction, adaptation, social relationships and resilience [1]. Recent advancements also recognize that online spaces and social environments impact on well-being outcomes [2].

2.2 Types of School-Based Health Programs

School-based health programs include a wide variety of interventions catering to different aspects of well-being. For instance, nutrition education programs promote healthy eating habits and prevent obesity, whereas mental health programming seeks to increase emotional literacy, coping strategies, and reduce mental health stigma [3]. Sexual and reproductive health programs teach skills for safe practices and decision-making [4]. Finally, physical activity promotion programs offer incentives to engage in physical activities to avoid sedentary behavior and related health issues [5]. Comprehensive programs integrating these elements are becoming more common for enhanced impact.

2.3 Theoretical Frameworks

There are various theoretical frameworks for the design and delivery of school health education. The Health Belief Model and Social Cognitive Theory account for health behavior through perceived threats and rewards or through observational learning, self-efficacy, and rewards respectively [6]. The Ecological Model, on the other hand, introduces a broader view by including many types of influences (individually, inter-personally, institutionally and socially), thus, advocating for a holistic approach of interventions [7].

2.4 Evidence from Previous Studies

Recent research shows that school health education programs can enhance students' health knowledge and promote positive behavior change, especially in health-related fields like nutrition, hygiene, and mental health [8]. But findings on long-term behavior sustained change are varied, with research also showing limited effectiveness beyond program duration. Differences in program outcomes can be attributed to factors including cultural fit, resources and program fidelity.

2.5 Research Gap

However, more long-term and culturally sensitive studies that assess the effectiveness of multifaceted school-based health education programs on adolescents are needed.

3 Methodology

3.1 Study Design

This research uses a mixed-methods approach to assess the impact of school-based health education programs on adolescent well-being. The quantitative part examines the change in health knowledge, health behaviours and health outcomes measured through formal testing, and the qualitative part examines school students' attitudes, perceptions and experiences of school-based health education programs. This approach enables data triangulation, leading to richer insights. A pre-test and post-test comparison of outcomes before and after program delivery allows the evaluation of short-term effects.

3.2 Data Sources

The study uses data from various sources to achieve rigor and scope. Primary sources include survey questionnaires for students, covering aspects of health knowledge, health-related behaviors and emotional needs. Broad interviews and focus groups are held with students and teachers to understand qualitative aspects of program delivery and impact. Secondary data are school health and attendance data and program documents, which offer contextual and historical insights. Furthermore, program reports and curriculum documents are examined to understand curricula delivery and consistency.

Table.1.Data Sources and Collection Methods

Data Source	Method of Collection	Purpose
Student Surveys	Structured Questionnaires	Measure knowledge, behavior, well-being
Interviews	Semi-structured Interviews	Explore perceptions and experiences
Focus Groups	Group Discussions	Understand shared views and program impact
School Records	Document Review	Assess attendance and health indicators
Program Reports	Content Analysis	Evaluate program design and implementation

3.3 Sample

Our population of choice is 13- to 18-year-olds, a period when health behaviors are established. The sample includes students from various schools, public and private, and urban and semi-urban areas, to promote sample variability and broader applicability shown in table 2. It adopt stratified random probability sampling to identify schools and individuals, taking into account gender, socio-economic and educational status. Sample size is statistically justified to ensure an adequate power of analysis.

Table.2. Sample Characteristics

Variable	Description
Age Group	13–18 years
Gender	Male and Female
School Type	Public and Private Schools
Location	Urban and Semi-Urban Areas
Sampling Technique	Stratified Random Sampling
Sample Size	Determined based on statistical power

3.4 Evaluation Criteria

School health education programs are assessed against several criteria that align with the broad notion of adolescent well-being. Knowledge changes are evaluated via shifts in students' knowledge of nutrition, mental health, hygiene and other health-related topics. Lifestyle change is assessed through changes in behavior such as physical activity, dietary choices and smoking or drug use. Physical health is assessed by assessing body mass index (BMI), attendance and health problems. Psychological well-being is measured by established psychometric instruments that capture measures of stress, self-esteem and coping skills. These provide a holistic approach to assess program effectiveness in both the short and medium term.

3.5 Data Analysis Techniques

Data Analysis Techniques Quantitative data are evaluated through statistical analysis methods (descriptive and inferential) like descriptive statistics, paired t-tests and regression analysis to determine significant differences and associations between variables. These techniques are used to assess the impacts of the programs in various aspects of well-being. Qualitative data from interviews and focus groups are coded, categorised and themes are identified via thematic analysis methods that help identify themes regarding the program experience and outcomes. Combining quantitative and qualitative data enables a richer understanding of study findings, including not only the effectiveness but also the factors that impact the success of the program.

3.6 Dataset and Parameters

Data for this study was drawn from a structured questionnaire and school health records of adolescents between the ages of 13-18 years in a number of schools. It covers demographic, health perception, behavior and emotional measures. As shown in table 3 data collection used established tools for reliable and valid assessment. Baseline and follow-up measurements allowed for comparisons to determine the program's impact. Critical parameters informing health among adolescents and evaluation models were referenced [13][14].

Table.3. Dataset Variables and Parameters

Variable Category	Parameters Included	Measurement Type
Demographics	Age, Gender, School Type, Location	Categorical
Health Knowledge	Nutrition, Hygiene, Mental Health Awareness	Score (0–100)
Behavioral Practices	Diet, Physical Activity, Substance Use	Frequency/Percentage
Health Outcomes	BMI, Attendance, Illness Reports	Numerical
Emotional Well-Being	Stress, Self-esteem, Coping Skills	Standardized Scales

4 Results & Discussion

Here, we discuss the results of the study examining the impact of school health education programs on mental health of adolescents. The findings are structured according to several areas of health knowledge, behavior, mental and emotional well-being, and program uptake and engagement. Information gathered through pre- and post intervention measures, surveys and qualitative data is used to assess the impact of the program. The results offer quantitative and qualitative insights about the impact of the programs on teenagers' health

4.1 Impact on Health Knowledge

The results show marked increases in students' health knowledge following the programs. The pre-test scores reflected students' lack of knowledge of nutrition, hygiene, and mental health topics, while the post-test scores showed a significant improvement shown in table 4. They showed knowledge of balanced feeds, positive effects of physical activity and early symptoms of emotional disturbances.

Table.4. Health Knowledge Scores (Pre vs Post)

Indicator	Pre-Test Mean	Post-Test Mean	% Increase
Nutrition Knowledge	52	78	50%
Hygiene Awareness	60	85	41%
Mental Health Literacy	48	74	54%

4.2 Behavioral Changes

There was a moderate, positive impact on students' health-related behaviors. An increase in physical activity and healthier diet patterns was observed shown in table 5. There was also an increase in the number of students who reported decreased substance experimentation (such as smoking and alcohol), but differences were noted by sub-population.

Table.5. Behavioral Changes Among Students

Behavior	Before Program (%)	After Program (%)	Change
Regular Physical Activity	35	58	+23%
Healthy Eating Habits	40	65	+25%
Substance Use	18	10	-8%

4.3 Mental and Emotional Well-Being

Research indicates increases in students' emotional resilience and mental health awareness. Students expressed lower stress and greater self-efficacy to cope with academic and social challenges shown in table 6. Anecdotal evidence included better friendships and an increased willingness to talk about mental health.

Table.6. Emotional Well-Being Indicators

Indicator	Pre-Score	Post-Score	Improvement
Stress Levels	70	55	Reduced
Self-Esteem	60	78	Increased
Coping Skills	58	76	Improved

4.4 Program Reach and Participation

This program was well received by school staff and students, with high attendance rates in the schools that were selected shown in table 7. Retention and regular attendance was high, and response rates were high in interactive activities, including discussions and workshops.

Table.7. Program Participation Overview

Indicator	Value
Total Students Enrolled	300
Participation Rate	88%
Average Attendance	82%
Teacher Involvement	High

In conclusion, the findings show that school-based health education programs play a positive role in the well-being of adolescents, with varying impacts on different aspects of well-being.

4.5 Discussion

The results of this study demonstrate that school-based health education programs contribute favorably to various aspects of adolescent well-being. The substantial increase in health knowledge is consistent with previous studies that indicate educational programs increase knowledge. The moderate change in behaviour shows that, with ongoing program implementation, knowledge can lead to behavioural changes. The positive changes in mental and emotional health underline the need for promoting mental health as an integral part of school health programs. Nevertheless, there are variations in outcomes, suggesting that program effectiveness is affected by other factors, including program quality/ fidelity, student motivations, and socio-cultural factors, calling for flexible and ongoing programs and interventions.

5 Conclusion and future scope

This research confirms the important contribution of school health education programs to improving the well-being of adolescents, both physically, behaviorally and psycho-socially. The research shows that these programs significantly increase health literacy and promote healthy behaviour such as improved dietary and exercise habits and a reduction in risky behaviours. Further, the improvements in emotional well-being and literacy of mental health highlight the need to consider mental health as part of school health programs. But the inconsistencies in effect size among five outcomes suggest that program outcomes are tightly related to program delivery, contextual fit, and engagement.

The future scope involve longer-term research to understanding the sustainability of the behavioural and health outcomes. Culturally sensitive and technologically enhanced programs, such as online health education programs, need to be developed to improve scalability and efficacy. Greater teacher and parent training and policy support can also enhance program effectiveness. Further studies should also investigate tailored and inclusive strategies to meet varied adolescent needs for holistic and equitable health promotion.

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