Research Article

Community-Oriented Pediatric Health Promotion Programs Preventing Lifestyle Disorders and Encouraging Healthy Adolescent Behavioral Development Today

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Abstract

Adolescent lifestyles are becoming more problematic, such as being overweight, physically inactive, having unhealthy diets, spending too much time on screens, and not sleeping well. The aim of this study was to assess the efficacy of community-based healthy lifestyle preventive interventions and support healthy behavioral development in children. This was a cross-sectional, analytical survey conducted at a community level with 400 youth aged 10–19 years using a structured questionnaire that assessed their physical activity, dietary habits, sleep quality, screen time, exposure to health education and participation in the community. Descriptive statistic, Pearson correlation, one-way ANOVA and logistic regression analyses were applied for data analysis. The results showed that there was a significant association between more frequent participation in community health promotion programs and healthier lifestyle behaviors ($p < 0.05$), better behavioral development ($p < 0.05$) and a lower risk of developing a lifestyle disorder ($p < 0.05$). Community-based pediatric health promotion initiatives can be effective approaches to promoting long-term healthy behavioral development and improving the health of adolescents.

Keywords: Adolescent Health, Community Health Promotion, Lifestyle Disorders, Behavioral Development, Preventive Healthcare, Health Education.

1. Introduction

Adolescence is a period of life of rapid changes in body, mind, social and behavioral functioning, which has a profound impact on the health of the future. In this time, healthy lifestyle choices are central to good health and to preventing adult chronic diseases. But in today's lifestyle, there has been an increasing trend towards lifestyle diseases in adolescents all over the world. Obesity/overweight, physical inactivity, poor diet, excessive screen time and poor sleep are now leading public health issues. These risk factors can have an impact on emotional, learning, and behavioral development in addition to impacting physical health.

Pediatric health promotion programs that are oriented towards the community have emerged as effective methods to prevent these, offering health education, promoting healthy behaviors, engaging community members, and encouraging positive living choices among youth. The goal of such programs is to provide supportive environments that promote physical activity, nutritious diets, healthy sleep habits and responsible technology use. While these programs continue to be put into place, issues of access, participation, and sustainability still exist. Prior research has centered on examination of single or small groups of lifestyle risk factors and no overall examination of community-based interventions and their effects on overall behavioral

development. This research gap indicates the need to explore community-based approaches to health promotion in more detail.

So, the purpose of this study is to assess the impact of the community-based pediatric health promotion programs on the lifestyle disorders and healthy lifestyle development among adolescents. The hypothesis is that the more adolescents are involved in community health promotion activities, the better their behaviors, the less prevalent lifestyle disorder risk, and the better the behavioral outcomes.

2. Related Work

The interest lies with community-based health promotion programs as effective methods for improving adolescent health and preventing lifestyle-related disorders. These are usually an integrated approach between schools, health services, families, and community partners that are working together to support healthy behaviors in the child. Past research has shown that community-based programs can have a positive effect on adolescents' physical activity involvement, eating patterns, health literacy and general health [4, 7, 13]. These are especially significant in adolescence when the lifestyle can have a profound impact on the life outcomes of adulthood, and often be sustained habits developed in this age [1], [6].

Studies on prevention of lifestyle disorders have shown that there is a rise in the lifestyle burden of adolescents due to obesity, sedentary lifestyle, unhealthy food habits, and less sleep [5] [10] [13]. Community intervention for health education, recreation and behavior modification has demonstrated positive effects in reducing these risk factors [5, 7]. Physical activity promotion programs have been linked to better health outcomes with regards to cardiovascular fitness, healthy weight management, healthy body image and mental health [1], [8] and [11]. Likewise, there is evidence that nutrition education programs have boosted vegetable and fruit consumption among participants [10], [14] and raised awareness about nutrition, and decreased the intake of energy-dense foods and sugar-sweetened drinks [14].

In recent years, there has also been a focus on promoting health and reducing screentime [2, 3]. There are numerous studies that show that overuse of digital devices may lead to sleep disturbances, lack of exercise, and negative psychosocial consequences [2, 3, 13]. There is moderate evidence for the effectiveness of community-based awareness campaigns and educational interventions to promote healthier technology use and sleep habits [2, 7]. Additionally, there is evidence from behavioral development models in public health for childhood that family engagement, positive environment and peer support are important factors influencing healthy behaviors among adolescents [4] [8] [12] [14].

Despite the progress, current research tends to focus on single health behaviors in isolation from the study of community-wide programs. The majority of studies are small in sample size or duration of intervention or scope of outcomes measured [6, 9, 14]. However, current evidence on the effect of community health promotion activities on the prevention of lifestyle disorders and healthy behaviors in adolescents is not complete, and there is a need to scrutinize the combined impact in adolescents [7], [11], [14].

3. Methodology

3.1 Study Design and Setting

The community based cross sectional analytical design was used to assess the effectiveness of community oriented pediatric health promotion programmes in preventing lifestyle disorders in the community and promoting healthy behavioural development of children and adolescents. The cross-sectional approach was chosen to evaluate health behaviors, lifestyle risk factors, and program participation in a target population at a certain time. Adolescent health and wellness interventions were implemented in a six-month period in community health centers, secondary schools and youth development centers that were active in supporting adolescent health and wellness efforts. They were selected because they offer direct access to a cross section of adolescent population, across a variety of socioeconomic and educational levels, and they are crucial locations

for the implementation of community-based health promotion activities. CHC provided health education and other health care interventions, and schools and youth centers offered opportunities for health awareness campaigns, physical activity promotion, nutrition education, sleep health promotion, and behavioral development intervention. The study took place in several community settings, providing a comprehensive assessment of the impact of the health promotion programs on adolescent lifestyle behaviours and outcomes. This design enabled the identification of links between community program involvement and important health outcomes such as physical activity, eating habits, screen time control, sleep habits, and behavioral development among adolescents.

3.2 Study Population and Sampling

The population of the study comprised teenagers aged 10–19 years at selected secondary schools and those who actively participated in community health centre and youth development centre activities. Adolescence was chosen as the age group because it is a developmental time when health acts, lifestyle choices, and behavioral patterns are set for the future and can carry over into adulthood. To assure representativeness and statistical reliability, a total sample of 400 adolescents was used. The participants were selected on the basis of multistage random sampling technique. During first stage, community health centers, schools, and youth development centers were selected at random from the study area. In stage 2, eligible adolescents were randomly selected from the selected institutions and recruited to take part in the study.

Inclusion criteria were: adolescents age 10-19, regular attendance at the institutions selected, and informed consent of the participants and/or their guardians. Adolescents with severe chronic conditions that could impact lifestyle behaviors, those not able to complete the questionnaire independently, and those that provided incomplete or inconsistent responses were excluded. Multistage random sampling increased the representativeness of the sample and reduced selection bias, which increased the generalizability of the results of this study regarding the effectiveness of community-oriented pediatric health promotion programs in supporting healthy behavioral development in youth and prevention of lifestyle-related disorders.

3.3 Study Variables and Research Framework

The study design aimed to explore the link between community-based pediatric health promotion efforts and health outcomes among adolescents. The framework is made up of indicators that represent inputs—factors that play an important role in the lifestyle determinants of health and are related to community-based interventions targeting adolescents and their behavioral and health outcomes. Input variables were: Physical Activity Score (PAS), Dietary Behavior Score (DBS), Sleep Quality Score (SQS), Screen-Time Score (STS), Community Participation Score (CPS), and Health Education Exposure Score (HES). These variables distinguish the health and lifestyle disorder prevention factors that can be changed in the lives of adolescents.

This consisted of three output variables which encompassed Healthy Behavior Score (HBS), Lifestyle Disorder Risk Index (LDRI), and Behavioral Development Score (BDS). The effectiveness of community health promotion programs in fostering healthy behaviors, decreasing lifestyle-related health risk behaviors and supporting positive behaviors among adolescents was assessed using these indicators. Other factors excepted to have influenced the association between health promotion activities and health outcomes – including age, gender, socioeconomic status, family support, peer influence, and environmental conditions – were also included as moderators.

The conceptual framework of the study is shown in figure 1.The framework illustrates the linkages between lifestyle related input variables in community health promotion programs (CHPP): health education, physical activity promotion, nutrition education, sleep health promotion, screen-time management and community engagement activities, and the resulting health and behavioral outcomes for adolescents.

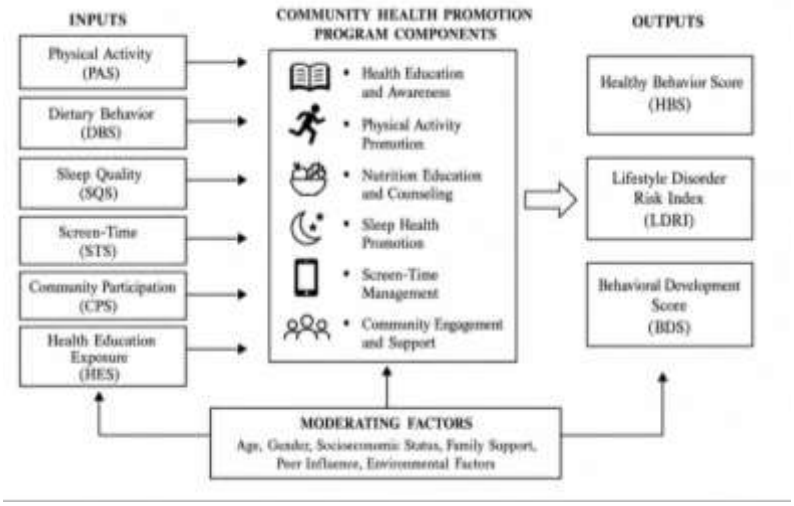

Figure 1. Community Health Promotion Framework

The framework represents a systematic representation of the mechanisms through which an action of community health promotion contributes to healthy behaviors, to a reduction in the risk of lifestyle disorders and to better adolescent behavioral development.

3.4 Data Collection Instrument and Procedure

Data were gathered using a prevalidated and structured questionnaire designed to gather information about the demographic data, lifestyle behaviors and participation in community based health promotion activities among the adolescents. The instrument had six sections including demographic characteristics (age, gender, and level of education), physical activity behaviors, dietary habits and nutrition practices, sleep quality and sleep related behaviors, digital device use and screen-time exposure, and community health promotion programs and health education activities. The questionnaire was developed on the basis of literature sources related to the public health and adolescent health realm and content validity was determined with expert opinions in this area.

There was very high Cronbach's alpha coefficient (0.89) demonstrating the high reliability of the questionnaire. The instrument was given a pilot test before the actual process of data collection to ensure clarity, relevance and understanding of the instrument. The data were gathered using the questionnaire which was administered directly to the eligible respondents in selected CHCs, Secondary schools and Youth development centers. The participants were informed about the purpose of the study and their answers were extracted under the guidance of the researcher so as to ensure the complete and accurate responses of the participants. The questionnaires that had been completed were verified, checked, coded into a data base to be analysed statistically in greater depth. This systematic process guaranteed the consistency, validity and reliability of the data collected as well as reducing response errors and missing data.

3.5 Statistical Analysis and Ethical Considerations

Data was collected, coded, organized and analyzed in SPSS Version 29. Demographic and lifestyle variables were summarized using descriptive statistical methods, such as frequencies, percentages, means and standard deviations. To explore the relationships between community program participation and health related outcomes, such as healthy behavior scores, dietary behavior, physical activity and sleep quality, were examined using Pearson correlation analysis. One-way analysis of variance (ANOVA) was used to compare health outcome measures among varying levels of community program participation. In addition, logistic regression analysis was performed to determine the factors related to adolescent behavioural development and healthy lifestyle

preventive factors. According to the results p-value < 0.05 at 95% confidence level was considered statistically significant.

The ethical issues were carefully adhered to during the study. There was no requirement for anyone to participate and informed consent was obtained from all participants and/or guardians before data collection. Participants were informed about the study, and that their responses and the responses from other participants would be kept private and only used for research. The data has been anonymised and personal identifiers removed to maintain anonymity and privacy. The study was approved by the relevant institutional ethics committee and all the procedures performed were considered to be ethically sound in relation to adolescent participants.

4. Health promotion assessment model

4.1 Healthy Behavior Score (HBS)

A Healthy Behavior Score (HBS) was created by combining the major components of lifestyles to quantify the overall health related behaviors of the adolescents, such as dietary behaviors, participation in the community, quality of sleep and amount of screen time. The model splits the contribution to the improvement in positive health outcomes into a weighted contribution for each of the factors, which indicates the relative importance of each of the factors. The more higher the HBS, the more healthier the lifestyle habit and more active in health promoting activity.

$$HBS = (0.30 \times PAS) + (0.25 \times DBS) + (0.20 \times SQS) + (0.15 \times CPS) - (0.10 \times STS)$$

PAS = Physical activity score, DBS = Dietary behavior score, SQS = Sleep quality score, CPS = Community participation score, STS = Screen-time score. In this model, physical activity and dietary behaviour has the highest weights due to their significant contribution to the health and wellbeing of adolescents. The quality of sleep and belonging to the community has a positive impact on the overall score, promoting healthy lifestyle and social involvement. On the other hand, exposure to screen time gets a minus number because excessive use of digital devices is linked to sedentary lifestyle, sleep problems and unhealthy effects. For this reason the Healthy Behavior Score is a holistic measure of the impact of community pediatric health promotion efforts on healthy behavioral development and minimizing adolescent lifestyle-related health risks.

4.2 Lifestyle Disorder Risk Index (LDRI)

In order to gauge the overall risk of lifestyle related health disorders among adolescent, a Lifestyle Disorder Risk Index (LDRI) was developed by aggregating major factors associated with unhealthy behaviors with those of adverse health outcomes. The index includes BMI, screen time exposure, unhealthy dietary habits, and physical inactivity – factors that have been well established as risk factors for obesity, metabolic diseases, and chronic diseases in the long term. LDRI scores coincide with a higher risk of lifestyle-related health risks and poorer overall health status with higher scores.

$$LDRI = (0.35 \times BMI) + (0.25 \times STS) + (0.20 \times UDS) + (0.20 \times PIS)$$

BMI stands for Body Mass Index, STS for Screen-Time Score and UDS for Unhealthy Diet Score, PIS for Physical Inactivity Score. BMI's represent the highest scoring variable in the model due to its relationship with overweight and obesity health issues. Excessive screen time is associated with a significant amount of time sitting and activity level decreases, and poor diet choices and physical inactivity add to the likelihood of developing lifestyle disorders. The Lifestyle Disorder Risk Index can be used to identify early indicators of lifestyle disorder among adolescents and assess the impact of community-based pediatric health promotion programs on reducing lifestyle risk factors. The LDRI combines several behavioral and physiological data into a single index, allowing for comprehensive evaluation of the effects of adolescent health and prevention interventions.

5. Results and discussion

5.1 Demographic Characteristics of Participants

An understanding of the demographic profile of the participants is needed for interpretation of the effectiveness of community-based pediatric health promotion programmes and the impact on lifestyle behaviours. Physical activity levels, nutrition habits, sleep, screen time and behavioral development can be influenced by the age, gender, education, and level of participation within a community. Thus, these characteristics were explored providing a background about the context before evaluating the health-related outcomes. Table 1 shows the distribution of the 400 adolescents included in the study by their age and sex.

Table 1. Demographic Characteristics of Adolescents (n = 400)

Variable	Category	Frequency (n)	Percentage (%)
Age Group	10–13 Years	120	30.0
	14–16 Years	160	40.0
	17–19 Years	120	30.0
Gender	Male	210	52.5
	Female	190	47.5
Educational Level	Middle School	135	33.8
	High School	175	43.7
	Higher Secondary	90	22.5
Community Program Participation	Low	85	21.3
	Moderate	145	36.2
	High	170	42.5

Overall, as revealed in Table 1, 40.0% of the adolescents belonged to the age group of 14-16 years, while 30.0% were between the ages of 10-13, and 30.0% adolescents were aged between 17-19 years. Gender distribution was relatively balanced with 52.5% males and 47.5% females with sufficient representation of both sexes. In terms of education, most of the participants were in high school (43.7%), followed by middle school (33.8%) and higher secondary school (22.5%). In addition, 42.5% of adolescents said that they participated high, 36.2% moderate, and 21.3% low in the community health promotion activities.

The findings on the demographics set the baseline characteristics of the study population and provide important context for the subsequent evaluation of lifestyle risk factors, healthy behavior scores, lifestyle disorder risk indices and behavioral development outcomes presented in the following sections. The relatively high percentage of adolescents involved in community programs is also worthy of further investigation to assess the impact of participation levels on adolescents' health outcomes.

5.2 Lifestyle Risk Factors and Community Program Participation

The proportion of the adolescent population who had lifestyle-related risk factors and their engagement in community health promotion programs were measured to gauge the overall health status of the adolescents. Modifiable risk factors for lifestyle included poor dietary habits, lack of physical activity, excess screen time, poor sleep hygiene, and overweight/obesity. Along with this, adolescents were also placed into categories based on the extent to which they were involved in health promotion activities in the community. Table 2 shows the distribution of these variables; this is graphically displayed in Figure 2 which shows the prevalence of the main lifestyle risk factors.

Table 2. Distribution of Lifestyle Risk Factors and Community Program Participation (n = 400)

Variable	Category	Frequency (n)	Percentage (%)
Physical Inactivity	Present	164	41.0

Unhealthy Diet	Present	172	43.0
Excessive Screen Time	Present	236	59.0
Poor Sleep Quality	Present	148	37.0
Overweight/Obesity	Present	128	32.0
Community Program Participation	Low	85	21.3
	Moderate	145	36.2
	High	170	42.5

As detailed in Table 2, the most common lifestyle risk factors were excessive screen-time exposure (59.0%), unhealthy dietary behaviour (43.0%) and physical inactivity (41.0%). 37.0% of the adolescents reported poor sleep quality and 32.0% of the adolescents were overweight or obese. When asked about engagement in community health promotion activities, 42.5% of respondents reported high levels of engagement, with 36.2% and 21.3% reporting moderate and low levels of engagement, respectively.

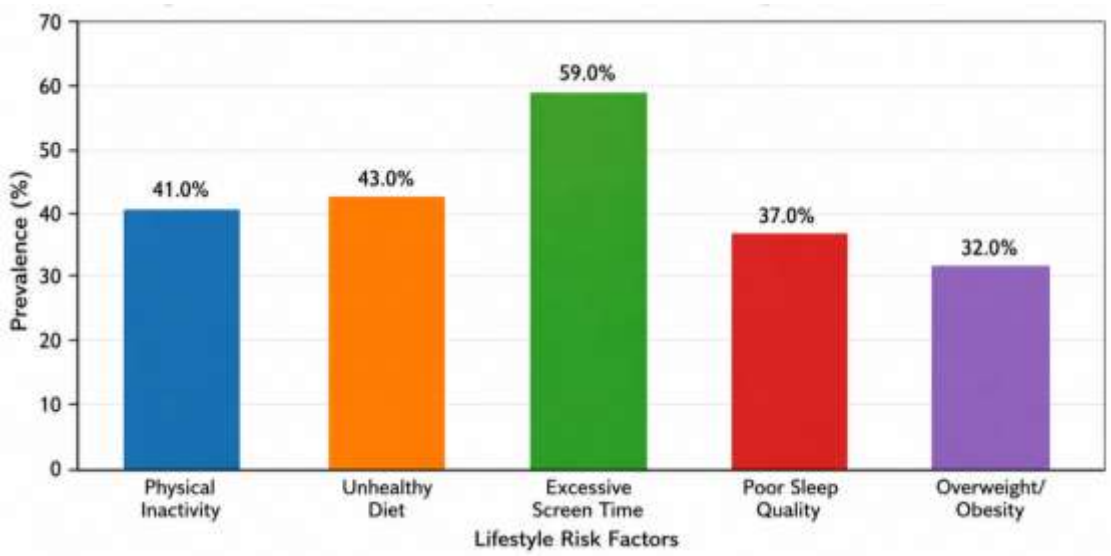

Figure 2. Prevalence of Lifestyle Risk Factors Among Adolescents

Excessive screen time was the most prevalent lifestyle risk factor, far outpacing the rate of overweight/obesity and poor sleep quality among adolescents, as shown in Figure 2. The results showed that there is a high prevalence of potentially modifiable health risk factors among the study and community-based health promotion programs are needed. The baseline patterns of the risk factors are used as a baseline for evaluating healthy behavior scores, behavioral development outcomes, and the effectiveness of community-based pediatric health promotion programming that are described later.

5.3 Healthy Behavioral Development Outcomes

For community-oriented pediatric health promotion to be effective, the effect of program participation on healthy behavior outcomes in children was measured by varying levels of participation. The Healthy Behavior Score (HBS), Physical Activity Score (PAS), Dietary Behavior Score (DBS), Sleep Quality Score (SQS), and Behavioral Development Score (BDS) were the key outcome measures. Table 3 presents the mean scores for adolescents who have participated in low, moderate and high levels of community health promotion programs. In addition, the trends in these outcomes by participation level are graphically depicted in Figure 3.

Table 3. Healthy Behavior, Physical Activity, Dietary Behavior, Sleep Quality, and Behavioral Development Scores

Outcome Variable	Low Participation (n = 85)	Moderate Participation (n = 145)	High Participation (n = 170)
Healthy Behavior Score (HBS)	58.4 ± 8.3	69.7 ± 7.6	82.5 ± 6.8
Physical Activity Score (PAS)	56.2 ± 9.1	68.4 ± 8.2	81.7 ± 7.1
Dietary Behavior Score (DBS)	60.1 ± 8.5	71.5 ± 7.4	84.3 ± 6.2
Sleep Quality Score (SQS)	57.3 ± 8.9	67.8 ± 7.9	80.2 ± 6.7
Behavioral Development Score (BDS)	61.5 ± 7.8	73.6 ± 7.1	86.1 ± 5.9

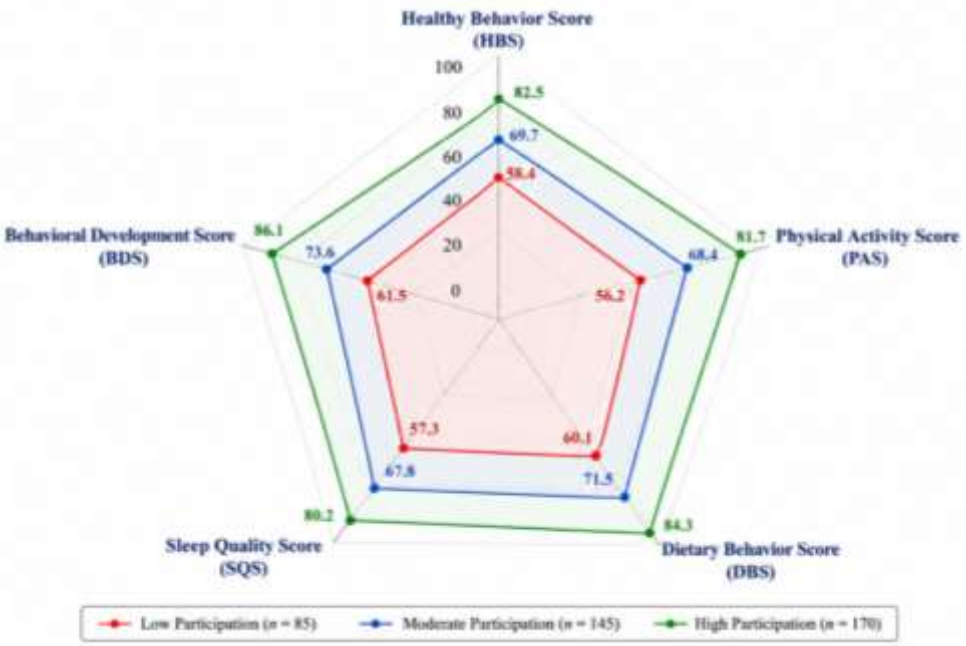

Figure 3. Healthy Behavioral Development According to Program Participation Level

Adolescents who participated more heavily in community health promotion programs had good outcomes in all dimensions measured, consistently as detailed in Table 3 and Figure 3. The participants in the high participation group had the highest scores for healthy behavior (82.5 ± 6.8), physical activity (81.7 ± 7.1), dietary behavior (84.3 ± 6.2), sleep quality (80.2 ± 6.7), and behavioral development (86.1 ± 5.9). Low participation adolescents on the other hand had significantly poorer scores on all outcome measures. In terms of participation in community oriented health promotion activities, there was also an evident improvement from low to moderate and high participation groups in the radar profile presented in Figure 3, suggesting a positive association between participation in community oriented health promotion activities with healthy adolescent development. These findings indicate that the more adolescents are engaged in community-based programs, the more likely they are to adopt healthful lifestyle habits, report good health and develop healthy behaviors.

5.4 Impact of Community Health Promotion Programs

Pearson correlation analysis, one-way ANOVA and binary logistic regression were used to assess the success of community-based pediatric health promotion efforts. The analyses were done to explore the relationships between the community program participation and the health outcomes for the adolescents, to compare the outcome measures across levels of participation, and to check for important predictors of healthy behavioral development. These statistical analyses and their results are presented briefly in Table 4.

Table 4. Correlation Analysis, ANOVA Results, and Logistic Regression Results

Statistical Analysis	Variable	Statistic	p-Value
Pearson Correlation	Program Participation vs Healthy Behavior Score	r = 0.742	<0.001
Pearson Correlation	Program Participation vs Physical Activity Score	r = 0.698	<0.001
Pearson Correlation	Program Participation vs Dietary Behavior Score	r = 0.716	<0.001
Pearson Correlation	Program Participation vs Sleep Quality Score	r = 0.673	<0.001
One-Way ANOVA	Healthy Behavior Score Across Participation Levels	F = 48.37	<0.001
One-Way ANOVA	Behavioral Development Score Across Participation Levels	F = 52.91	<0.001
Logistic Regression	Community Program Participation	OR = 2.84 (95% CI: 1.92–4.21)	<0.001
Logistic Regression	Physical Activity Score	OR = 2.17 (95% CI: 1.48–3.17)	0.002
Logistic Regression	Dietary Behavior Score	OR = 1.96 (95% CI: 1.35–2.84)	0.005
Logistic Regression	Sleep Quality Score	OR = 1.72 (95% CI: 1.21–2.45)	0.011

The Healthy Behavior Score had a strong positive relationship with community program participation (r = 0.742, p < 0.001). As shown in Table 4, adolescents who were involved in community program activities at a higher level were more likely to have better healthy lifestyle behaviors. The scores for physical activity, dietary behavior and sleep quality were also significantly correlated with program participation. Table 3 and Figure 3 supported the following trends: the low, moderate, and high participation group scores for healthy behavior and behavioral development were statistically significantly different (p< 0.001) according to the one-way ANOVAs. Moreover, logistic regression analysis revealed that participation in a community program was the most significant predictor of healthy adolescent behavioral development (OR = 2.84, 95% CI: 1.92–4.21 p<0.001), followed by physical activity, dietary behavior, and sleep quality. In conclusion, the results suggest that community-based health promotion programs are an effective and important intervention for adolescents to promote positive behavioural changes and lifestyle behaviors.

5.5 Discussion

Results from this study further support the benefits of a community-based pediatric health promotion program to healthy behaviors and outcomes among youth and adolescents. The demographic analysis revealed that the adolescents from various educational and age groups participated actively in the community-based initiatives which gave a representation for the assessment of the effectiveness of the program. The prevalence assessment showed that still today the use of excessive screen time, unhealthy food choices, physical inactivity, and poor sleep are prevalent among adolescents, further underlining the need for preventive interventions.

The results from outcome analysis (Table 3 and Figure 3) showed consistent improvements in all healthy behavior, physical activity, nutritional behavior, sleep quality and behavior development scores as the level of program participation increased. Adolescent participation that was high was associated with significantly better outcomes than low participation indicating that these adolescent outcomes are influenced by community engagement, and thereby lead to healthier lifestyle choices and a stronger psychosocial development. Data analysis also in the form of statistical findings (Table 4) showed positive correlation and significant ANOVA results supporting these observations, as they reflect the positive relationship of program participation with health improvements.

Community program participation was the strongest linke d to healthy behavior development in the logistic regression analysis, and thus highlights the need for structured health promotion activities within community

settings. This study's results align with prior public health research that has shown that combined interventions that incorporate health education, physical activity promotion, nutrition education, and social support are effective at decreasing lifestyle risk factors. Overall, the findings indicate that community-based pediatric health promotion programs are a useful intervention strategy to prevent lifestyle disorders and promote healthy adolescent development and long-term public health.

6. Conclusion

The current study aimed to assess the effectiveness of community-based pediatric health promotion programs in preventing lifestyle disorders and healthy behavioral development in adolescents. The results indicated that modifiable risk factors are prevalent among adolescents, including excessive screen time, poor dietary choices, inadequate physical activity and sleep disturbance. Even with these barriers, adolescents who were more active in these community health promotion programs had significantly higher scores for healthy behavior, physical activity, dietary behavior, quality of sleep, and behavioral development as compared with those who were less active.

The positive effects of community-based interventions on adolescent health outcomes were also confirmed by statistical analysis. The results of the overarching bivariate correlations showed that participation was significantly correlated with healthy lifestyle behaviours and the results of the ANOVA showed significant differences across participation groups in health outcomes. Community program participation proved to be the most significant predictor of healthy behavioural development in logistic regression analysis, highlighting the importance of structured health promotion activities in the community.

The study underscores the critical role of community-based pediatric health promotion initiatives in the field of lifestyle disorder prevention, through promoting beneficial lifestyle behaviors and minimizing the exposure to modifiable risk factors. These programs are implemented via health education, physical activity promotion, nutrition awareness, sleep health and community engagement, and all of these contribute to building the foundation of healthy habits that will last a lifetime for adolescents. The results of this study highlight the potential of community-based health promotion programs to significantly enhance the health of adolescents, create positive behaviors and advance public health in the long term.

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