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ORIGINAL RESEARCH

Impact of an Information, Education, and Communication Package on Knowledge, Attitude, and Quality of Life Regarding Obesity Among College Students in Kerala: A Mixed-Methods Study

El impacto de un Paquete de Información, Educación y Comunicación sobre los Conocimientos, Actitudes y Calidad de Vida en Relación a la Obesidad entre Estudiantes Universitarios de Kerala: un estudio de métodos mixtos

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Abstract

Background. Obesity during early life increases the risk of developing physical and psychosocial health problems later on. Information, Education, and Communication (IEC) initiatives can be effective in improving knowledge and promoting positive behavioral changes to prevent excess weight gain among students. **Objective.** To evaluate the effectiveness of an IEC package on students' knowledge and attitudes regarding obesity and related lifestyle factors, and to explore their psychosocial quality of life. **Methods.** A mixed-method sequential explanatory design was employed among 400 college students in selected colleges in Thrissur, Kerala, India. Quantitative data were collected using a structured knowledge questionnaire and an attitude scale, while qualitative insights were obtained through focus group discussions. **Results.** The IEC package significantly improved knowledge ($t = 48.92$, $p < 0.001$) and attitudes ($t = 70.65$, $p < 0.001$) among students. Qualitative findings provided deeper insight into the emotional and social dimensions of obesity, underscoring the need for ongoing support to address body image concerns, social exclusion, and emotional well-being. **Conclusion.** The combined quantitative and qualitative findings reveal substantial gaps in knowledge and attitudes toward obesity, as well as the significant psychosocial challenges faced by obese students.

Keywords: IEC package, students, knowledge, attitude, quality of life, obesity and related lifestyle diseases

Resumen

Antecedentes. La obesidad durante la primera infancia aumenta el riesgo de desarrollar problemas de salud física y psicosocial posteriormente. Las iniciativas de Información, Educación y Comunicación (IEC) pueden ser eficaces para ampliar conocimientos y promover cambios de comportamiento positivos para prevenir el sobrepeso en los estudiantes. **Objetivo.** Evaluar la efectividad de un paquete de IEC sobre el conocimiento y las actitudes de los estudiantes con respecto a la obesidad y los factores de estilo de vida relacionados, explorando su calidad de vida psicosocial. **Métodos.** Se empleó un diseño explicativo secuencial de métodos mixtos con 400 estudiantes universitarios de universidades seleccionadas de Thrissur, Kerala, India. Se recabaron datos cuantitativos mediante un cuestionario estructurado de conocimientos y una escala de actitudes, mientras que los datos cualitativos se obtuvieron mediante debates en grupos focales. **Resultados.** El paquete de IEC incrementó significativamente los conocimientos ($t = 48.92$, $p < 0.001$) y cambió las actitudes ($t = 70.65$, $p < 0.001$) de los estudiantes. Los hallazgos cualitativos proporcionaron una comprensión más profunda de las dimensiones emocionales y sociales de la obesidad, lo que subraya la necesidad de apoyo continuo para abordar inquietudes sobre auto-imagen corporal, exclusión social y bienestar emocional. **Conclusión.** Los hallazgos cuantitativos y cualitativos combinados revelan brechas sustanciales en el conocimiento y actitudes hacia la obesidad, así como importantes desafíos psicosociales que enfrentan los estudiantes obesos.

Palabras clave: Paquete IEC, estudiantes, conocimiento, actitud, calidad de vida, obesidad y enfermedades relacionadas con el estilo de vida.

Introduction

Maintaining an ideal body weight carries both physical and psychological importance, influencing overall health status, body image, and self-esteem. Globally, the prevalence of obesity has risen sharply over the past three decades, signaling an impending obesity pandemic with long-term health implications [1]. Obesity, defined as the excessive accumulation of body fat, is now recognized as a disease due to its adverse effects on health and quality of life [2].

Data from the National Family Health Survey–5 and the National Health and Nutrition Examination Survey reveal a growing trend of overweight and obesity in India [3,4]. Obesity contributes to the development and progression of chronic conditions such as cancer, cardiovascular disease, diabetes, metabolic syndrome, and stroke [5]. Adults are not exempt from these risks; worldwide, adult obesity has more than doubled, and adolescent obesity has quadrupled [1]. In South Kerala, obesity prevalence is particularly high and increases with age [6,7].

Young people are especially vulnerable to obesogenic environments, peer influence, and mass media, which encourage junk food consumption, sedentary behaviors, and overnutrition. Addressing these environmental factors early is essential. Preventive strategies include improving food habits, increasing physical activity, adopting healthier sleep routines, practicing stress management, and using modern technologies like computers and mobile devices wisely.

Beyond chronic disease risk, excess weight significantly affects psychosocial well-being [8,9]. Overweight individuals often experience despair, dissatisfaction, insecurity [2], diminished self-esteem, negative body image, and social isolation resulting from stigma and peer rejection [5]. Many encounter bullying, which contributes to anxiety, depression, and lower academic engagement. Students may adopt maladaptive coping strategies, such as emotional eating [10], and frequently lack sufficient social support. Addressing these challenges is essential for improving mental health and academic performance. Prevention and management of obesity are therefore crucial not only for physical health but also for psychosocial well-being.

Most of the causative factors for obesity can be controlled or managed through self-determination and healthy behavioral modification. College awareness programs provide an effective avenue for such interventions, as they are central to students' lives and enable rapid dissemination of information. Preventive initiatives at this level can generate positive changes among individuals, families, and schools, particularly for adolescents and young adults.

This study drew on **Nola J. Pender's Health Promotion Model**, which emphasizes behavior change and prevention, aligning closely with the goal of reducing obesity through education. The model effectively links personal factors, perceived barriers, and motivations with health behaviors, making it a strong framework for evaluating the impact of the Information, Education, and Communication (IEC) package on students' lifestyle choices.

Accordingly, this study evaluated the efficacy of the IEC package in improving students' knowledge and attitudes regarding obesity and related lifestyle diseases, as well as in exploring their psychosocial quality of life.

Materials and Methods. A sequential explanatory mixed-method design was adopted for this study, consisting of two phases: quantitative data collection followed by a qualitative approach.

Quantitative Approach. In the first phase, a one-group pre-test–post-test design was employed. Data were collected from five colleges across different areas of Thrissur. Initially, Body Mass Index (BMI) was assessed for all available students from various departments after the study was explained to them.

The sample size was estimated using Cochran's formula, considering a large population. A total of 400 students classified as overweight or obese according to the Asian BMI classification and meeting the inclusion criteria were selected using purposive sampling for the quantitative phase.

Data Instruments

A socio-demographic and clinical variable proforma was developed to collect socio-personal and clinical data. Structured knowledge questionnaires and attitude scales were used to assess the dependent variables—knowledge and attitudes regarding obesity and related lifestyle diseases.

The self-structured knowledge questionnaire contained 24 items addressing the meaning and causes of obesity, assessment methods, and the prevention and management of obesity and related lifestyle diseases. Reliability, assessed using the split-half method, yielded a coefficient of 0.80, indicating good internal consistency.

The attitude scale, consisting of 20 items, measured students' attitudes toward obesity, their self-perception of weight, societal attitudes, and determination to control or maintain weight. This five-point Likert scale demonstrated acceptable reliability, with a Cronbach's alpha of 0.72.

An Information, Education, and Communication (IEC) package on obesity and related lifestyle diseases was also developed. It covered definitions, risk factors, causes, assessment methods, and both physical and psychological consequences of obesity. The package aimed to raise student awareness of obesity management and prevention, emphasizing diet, exercise, and active living. Delivery was planned via classroom teaching using audio-visual aids such as PowerPoint presentations and real-life case scenarios of individuals who successfully managed obesity to enhance understanding and engagement.

Data Collection Procedure

Ethical clearance was obtained from the college administration, and informed consent was secured from all participants prior to data collection. The Information, Education, and Communication (IEC) package on obesity and related lifestyle diseases was then administered to the students. During the educational sessions, students' questions were addressed, and active participation in discussions was encouraged.
Thirty days after the pre-test, a post-test was administered to assess improvements in knowledge and attitudes toward obesity and related lifestyle diseases. Students scoring ≥70% were classified as having good knowledge and a favorable attitude, whereas those scoring <40% were classified as having poor knowledge and attitude. All ethical guidelines were strictly adhered to throughout the data collection process.

Qualitative Phase

In the second phase of the study, a phenomenological qualitative design was adopted to explore the psychosocial quality of life of the students. Those who had participated in the quantitative phase were informed about the focus group discussion, and 156 students expressed interest in participating. From this group, twenty were randomly selected for qualitative data collection. After the study was explained, informed consent was obtained from all selected participants.

Tool for Data Collection

The investigator employed focus group discussions using a series of semi-structured, open-ended questions to gain insight into students' psychological well-being. These questions were designed to explore the problems and stigmas faced by students in society, family, and among peers due to being overweight. The tool also examined how being overweight affects confidence, academic performance, and emotional state, as well as the support systems available to students.

The open-ended questions were organized under five themes related to students' psychosocial quality of life:

1. Social discrimination and exclusion
2. Family and social support
3. Emotional and psychological well-being
4. Effects on daily life
5. Impact on academic performance

Focus group discussions were audio-recorded with participants' consent, alongside field notes. After an average of three sessions with six to seven students per group, data saturation was achieved, enabling an in-depth exploration of students' lived experiences.

Results

The data obtained from the quantitative research was analyzed SPSS version 29 and was summarized applying both descriptive and inferential statistics.

Table 1 frequency and percentage distribution of socio demographic and clinical variables of participants (N=400)

Socio demographic variables		Frequency	Percentage
Age in years	18-20 Years	108	27
	21-23 Years	292	73
Gender	Male	168	42
	Female	232	58
Year of study	First Year	56	14
	Second Year	120	30
	Third Year	172	43
	Fourth Year	52	13
Religion	Hindu	152	38
	Christian	169	42.25
	Muslim	79	19.75
	Others	0	0
Fathers' education	Primary	84	21
	Secondary	197	49.25
	Degree and above	119	29.75
	No formal education	0	0
Mothers' education	Primary	125	31.25
	Secondary	188	47
	Degree and above	87	21.75
	No formal education	0	0
Family monthly income	Below 25000	77	19.25
	25001-50000	131	32.75
	50001-75000	127	31.75
	Above 75000	65	16.25

Type of family	Nuclear family	226	56.5
	Extended family	111	27.75
	Joint family	52	13
	Single parent family	11	2.75
Leisure time activity	Indoor games	53	13.25
	Outdoor games	63	15.75
	Watching TV/ or using social media	284	71
	Others specify	0	0
Food preference	Vegetarian	22	5.5
	Non vegetarian	281	70.25
	Fast food	97	24.25
Hours of sleep	< 7 Hours	223	55.75
	≥7hrs	177	44.25
Mode of transport to college	By walking	75	18.75
	By cycling	13	3.25
	By vehicle	312	78
Previous knowledge	Yes	189	47.25
	No	211	52.75
Clinical variables		Frequency	Percentage
BMI	23-24	139	34.75
	25-26	261	65.25
	27-28	0	0
Blood pressure	Hypotension	99	24.75
	Hypertension	0	0
	Normal	301	75.25

Results – Quantitative Phase

Out of the 400 respondents, most (73%) were between 21 and 23 years old. The sample consisted of 42% male and 58% female students. The largest group (43%) comprised third-year students, with fewer participants from the first and second years. A substantial majority (71%) reported spending their leisure time watching television or engaging in social media and other screen-based activities.

Regarding dietary habits, 70.25% reported consuming non-vegetarian meals. More than half of the participants (55.75%) did not meet the commonly recommended seven hours of sleep. The predominant mode of transportation to college was by vehicle (78%). About 47.25% of participants had prior knowledge of obesity, while the remainder lacked awareness of obesity and related lifestyle diseases.

Most participants (65.25%) fell within the obesity category (BMI 25–26.9 kg/m²), while 34.75% had a BMI between 23 and 24.9 kg/m². Blood pressure results showed that the majority (75.25%) maintained normal blood pressure, a significant minority experienced hypotension, and there were no reported cases of hypertension in the sample.

Pre-test Knowledge Regarding Obesity and Related Lifestyle Diseases

In the pre-test, more than half of the students (56.15%) answered questions about the meaning and causes of obesity. However, despite this awareness, they lacked knowledge on other aspects such as assessment, complications, prevention, and management.

Although 69.25% of students had heard that Body Mass Index (BMI) is a tool to identify obesity, very few were aware of the waist–hip ratio. Only one-fourth of the participants (24.5% and 25.25%, respectively) correctly identified the equation for .

calculating BMI and normal weight. Overall, fewer than half of the students (43%) answered preventive aspects correctly.

Only 28.5% of the participants identified fried food items as energy-dense diets, and the majority were unaware that refined foods are high in calories. More than half of the students recognized the importance of regular exercise, but a large proportion (80.25% and 76.5%, respectively) did not respond when asked about the ideal duration of exercise per week or the recommended rate of weight loss per week for an obese individual.

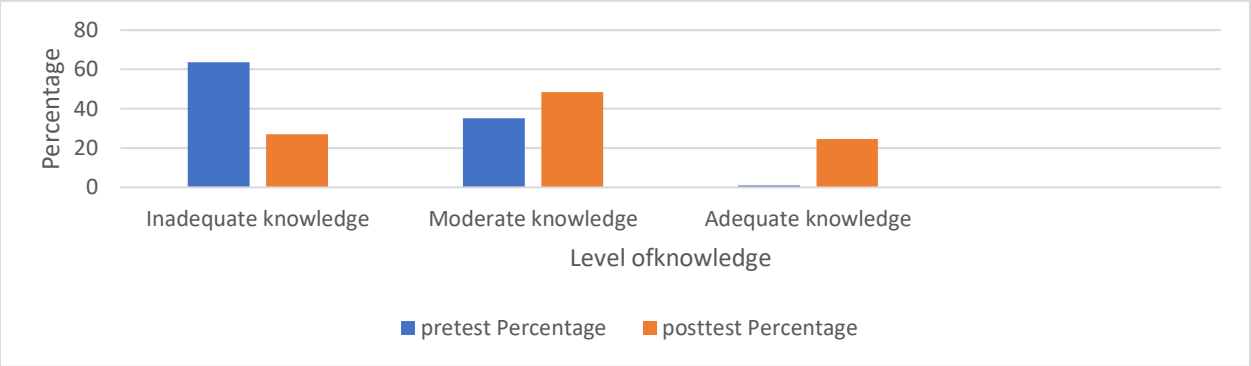
Pre-test Attitude Level Regarding Obesity and Related Lifestyle Diseases

Among the 400 students, only 7.3% strongly agreed that they were overweight or obese, while more than half (53.3%) did not believe they were overweight or obese. Similarly, just 7.3% strongly agreed that obesity could make them unhealthy. At the same time, 50.1% strongly agreed that maintaining an ideal weight throughout life is important.

Students also believed that society exhibits stigma toward individuals who are obese. Specifically, 17% strongly agreed and 41.8% agreed that societal stigma exists, and this unfavorable attitude may stem from their own personal experiences.

Fewer than 50% of the students believed that overeating is a universal habit among obese people leading to weight gain. The majority (56.4%) strongly agreed that a healthy breakfast helps keep them healthy, while 12.3% believed that skipping meals is the most effective way to lose weight. Most students expressed the importance of regular exercise to maintain fitness, and many reported confidence that they could avoid using vehicles for short distances and engage in physical activities during their leisure time

Figure 1. Effect of the IEC package on students' knowledge of obesity and related lifestyle diseases: Pre-test vs. Post-test scores



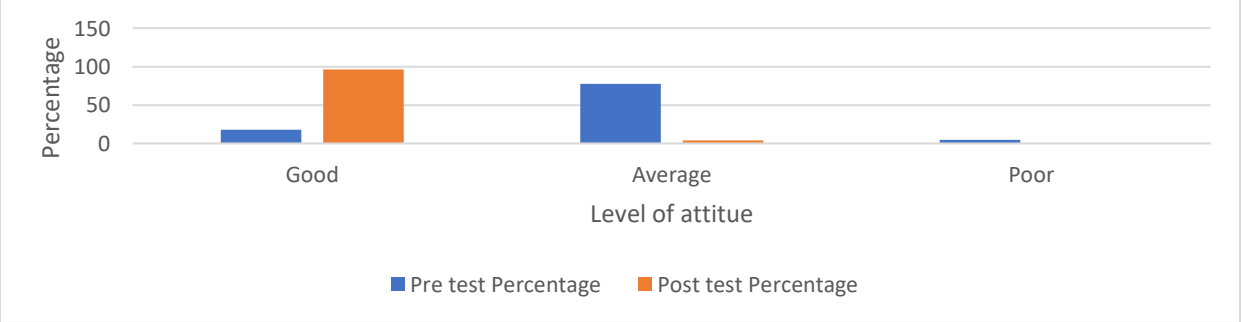
In the pre-test, 63.75% attained inadequate knowledge, 35.25% had moderate knowledge, and 1% had adequate knowledge. The knowledge level of the post-test subjects increased to 24.5% for adequate knowledge and 48.5% for moderate knowledge, respectively. This demonstrates a considerable improvement in knowledge after the intervention.

Table 2: Efficacy of the IEC package regarding obesity and related lifestyle diseases: Pretest vs. Post-test mean and standard deviation.

	Knowledge Score				**Paired t test**
	Pre test		**Post test**		
	Mean	**SD**	**Mean**	**SD**	
Students	**10.515**	**3.13**	**17.70**	**3.48**	**t= 48.9203 p < 001 significant**

As per the table 2 the mean knowledge score increased from 10.515 in the pre-test to 17.70 in the post-test. The paired t-test result (t = 48.9203) indicates a statistically significant difference between the pre-test and post-test scores, with a p-value of less than 0.001

Figure 2: Pre-test and Post-test attitude regarding obesity and related lifestyle diseases among students



The pre-test data showed that compared to pre-test results, 96% of samples attained a positive attitude on these topics. Sixteen students (4%) have average attitudes, while none have an unfavorable attitude.

Table 3: Efficacy of the IEC package on attitudes regarding obesity and related lifestyle diseases: Pre-test vs. Post-test scores.

	Attitude Score				Paired t test
	Pre test		Post test		
	Mean	SD	Mean	SD	
Students	**65.315**	**5.451**	**79.4575**	**5.34**	**t= 70.65 p < 001 significant**

Table 3 demonstrates the mean attitude score increased from 65.315 in the pre-test to 79.4575 in the post-test. The paired t-test result (t = 70.65) indicates a statistically significant improvement in attitudes, with a p-value of less than 0.001.

Association between level of knowledge on obesity and related lifestyle diseases and socio demographic variables among students

Variables such as mother's education ($\chi^2 = 14.20$, $p < 0.05$), family income ($\chi^2 = 18.32$, $p < 0.05$), leisure time activity ($\chi^2 = 11.83$, $p < 0.05$), type of food preference ($\chi^2 = 9.98$, $p < 0.05$), sleep time ($\chi^2 = 7.73$, $p < 0.05$), mode of transport ($\chi^2 = 12.99$, $p < 0.05$), height ($\chi^2 = 15.92$, $p < 0.05$), weight ($\chi^2 = 20.10$, $p < 0.05$), BMI ($\chi^2 = 10.06$, $p < 0.05$), and blood pressure ($\chi^2 = 17.38$, $p < 0.05$) showed significant associations with the level of knowledge, indicating that these factors influence students' knowledge of obesity and related diseases. Association of knowledge and attitude with clinical variables such as height, weight, BMI, and blood pressure was also found significant at $p < 0.05$.

Qualitative Analysis: Psychosocial Quality of Life of Obese Students

Qualitative data on psychosocial quality of life were collected from twenty participants and analyzed thematically using NVivo14 software. Focus group discussions revealed diverse experiences, ranging from negative self-perception and social isolation to emotional resilience and personal growth.

The following themes emerged:

Body Image and Self-Perception: Students described a wide range of experiences related to body image, spanning from self-consciousness and low self-esteem to growing acceptance and empowerment. Some students, such as Sample 1, felt defined by their weight and struggled with body image issues, while others, like Sample 6, were actively working toward body acceptance.

Social Exclusion and Discrimination: Many students reported experiencing social exclusion and discrimination due to their weight. These experiences had a profound impact on their quality of life, often leading to emotional distress and a sense of isolation.

Family and Social Support: Support from friends and family varied considerably. While some students received encouragement that boosted their confidence, others felt criticized by their families, which contributed to emotional strain. Friends and external mentors often played crucial roles in fostering the emotional stability needed for self-acceptance and resilience.

Emotional and Psychological Well-Being: Body image concerns and societal pressures deeply influenced students' emotional and psychological health. Some experienced anxiety and low self-confidence due to perceived social judgment, while others reported feelings of guilt and shame. At the same time, some students described pathways to empowerment through positive coping strategies such as mindfulness and exercise.

Impact on Daily Life and Academic Performance: Obesity had a notable impact on students' daily lives and academic performance.

Some students reported fatigue and reduced concentration in class, while others excelled academically despite weight-related challenges. Social exclusion from physical activities and self-consciousness in group settings frequently hindered full participation in academic and extracurricular activities.

Discussion

The integrated analysis of quantitative and qualitative data highlights both the significant gaps in knowledge and attitudes toward obesity and the profound psychosocial challenges faced by obese students. The educational intervention successfully improved knowledge and attitudes, as demonstrated by the quantitative findings. Meanwhile, the qualitative results provided deeper insights into the emotional and social dimensions of obesity, underscoring the continued need for support in addressing body image concerns, social exclusion, and emotional well-being. Enhancing students' health and quality of life requires a comprehensive strategy that combines educational interventions with sustained emotional and psychosocial support.

The study found that students had inadequate knowledge regarding obesity and related lifestyle diseases. This finding is consistent with Waghmare et al., who identified that a large proportion of non-medical students lacked adequate information on obesity [11]. Similarly, a study conducted by Alotaibi et al. among school students in Saudi Arabia also reported insufficient knowledge about obesity [12].

In the current study, the majority of participants were unaware that refined foods are high in calories. Although students recognized the importance of consuming low-calorie and low-fat foods, many failed to identify specific food items that are calorie-dense and high in fat. This aligns with previous studies that demonstrated a relationship between obesity and limited dietary knowledge [13,14].

More than half of the participants acknowledged the importance of regular exercise and expressed positive attitudes toward maintaining exercise habits. However, many could not specify the ideal duration of exercise per week or the recommended weekly weight loss for an obese individual. Understanding safe and healthy weight reduction is essential, as sudden or extreme weight changes can result in muscle wasting, malnutrition, and other health complications. A related study among overweight and obese women emphasized the importance of exercise-oriented training for increasing exercise awareness and physical activity levels [15].

Many researchers have demonstrated the effectiveness of information, education, and communication (IEC) packages [16–18], which aligns with the present study findings.

The qualitative results revealed that weight-based discrimination, whether from external sources or internalized beliefs, often leads to social isolation, diminished self-esteem, and a range of psychosocial challenges. According to the 2018 All Parliamentary Group on Obesity study, 88% of obese individuals reported experiencing stigma, criticism, or abuse related to their condition.

Ata and Thompson [19] highlighted the influence of mass media on weight bias, noting that television shows, books, newspapers, and online content frequently depict overweight and obese individuals negatively. This reflects the experiences reported by participants in the present study. Similarly, studies among children and adolescents indicated that bullying and difficulties such as clothing selection significantly diminished psychological well-being and quality of life [20,].

Rand et al. (2017) further reported that individuals struggling with obesity often felt socially unaccepted due to critical remarks from friends and family. Shame about body shape and size, coupled with a lack of acceptance of one's weight, has been shown to negatively affect both social and mental health [21].

Together, these findings underscore the profound struggles faced by obese individuals as a result of criticism, stigma, and discrimination from society as well as from close social networks. Mass media

support and broader public awareness are therefore essential in reducing weight bias and fostering a more inclusive and accepting environment for obese individuals.

Recommendations

- **Enhanced Educational Programs:** Institutions should implement ongoing IEC initiatives to strengthen students' knowledge and attitudes about obesity and related lifestyle diseases. Family-oriented sessions are also recommended to educate parents on providing positive reinforcement and non-judgmental support.
- **Integration of Mental Health Support:** Colleges should offer accessible mental health resources, including counseling and peer-support groups, to address obesity-related psychosocial challenges.
- **Promoting Healthy Lifestyle Choices:** Schools and colleges should encourage healthy habits by organizing programs that promote regular physical activity, balanced nutrition, and proper sleep hygiene.
- **Social Support and Peer Engagement:** Institutions should develop peer-support platforms or buddy programs to foster mutual encouragement, particularly around sensitive issues such as body image and self-esteem.
- **Routine Assessments and Personalized Interventions:** Regular screening should be incorporated to identify students at risk of obesity and related psychosocial difficulties, enabling timely and targeted interventions.

Conclusion

It is essential to strengthen efforts to design and implement educational programs that empower students with knowledge, enabling them to adopt and sustain healthy behaviors throughout their lives. The focused group discussions provided valuable opportunities for students to share their feelings, challenges, and experiences of discrimination from both society and loved ones due to their weight. These findings highlight the urgent need for public campaigns aimed at reducing weight stigmatization and fostering a more supportive environment.

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