

Impact of Nutritional Education Intervention on Knowledge, Attitude, Practices, and Nutrient Intake Related to Obesity Management

Deepali Rai¹, Shalini Kushwaha², Shweta Chaudhary³, Manjuree Bhattacharjee⁴

¹*M.Sc. Scholar, Indira Gandhi National Open University, New Delhi*

²*Assistant Professor, Discipline of Nutritional Sciences, Indira Gandhi National Open University, New Delhi*

³*Assistant Professor, Department of Food and Nutrition, College of Community Science, ANDAUT, Kumarganj Ayodhya*

⁴*M.Sc. Scholar, Department of Food and Nutrition, College of Community Science, ANDAUT, Kumarganj Ayodhya*

Abstract: Obesity is an escalating public health issue among college-going girls, driven by unhealthy dietary patterns, sedentary lifestyles, and lifestyle transitions during adolescence and early adulthood. This interventional study assessed the Knowledge, Attitude, and Practice (KAP) related to nutrition and physical activity among overweight and obese college-going girls before and after a structured nutritional intervention. The findings indicate that low awareness, high consumption of fast foods, insufficient physical activity, and excessive screen time contribute significantly to poor health outcomes and increased risk of metabolic disorders. Post-intervention results demonstrated notable improvements in knowledge, attitudes, and health-related practices, highlighting the effectiveness of nutrition education and physical activity promotion in fostering positive behavioral changes. The study further emphasizes the importance of early and sustained interventions, incorporating psychological, cultural, and environmental considerations, along with personalized nutrition strategies and institutional support. Overall, a comprehensive, multi-faceted approach is essential to promote long-term healthy behaviors and reduce the burden of obesity and related non-communicable diseases among college-going girls.

Key-words: Adolescence, attitude, knowledge, post-intervention, practice.

I. INTRODUCTION

In contemporary society, there has been a marked shift from traditional home-prepared meals toward greater

consumption of fast food and processed foods. This transition is driven by factors such as time limitations, urbanization, rising disposable incomes, and evolving social lifestyles that prioritize convenience and dining out. Among college-going girls, these dietary changes are often accompanied by reduced physical activity due to demanding academic schedules, supplementary coaching classes, prolonged screen exposure, and limited engagement in recreational sports.

Such lifestyle changes contribute significantly to the growing prevalence of overweight and obesity among adolescents and young adults. Inappropriate dietary habits, combined with sedentary behavior, are widely recognized as key risk factors for weight gain and associated health complications [25] [9]

Furthermore, studies indicate that many college-going girls lack adequate knowledge regarding balanced nutrition and recommended physical activity levels. This knowledge gap highlights the need for targeted interventions that not only enhance awareness but also build the practical skills necessary to adopt healthier lifestyles. Nutrition education programs, particularly when implemented in college settings, are an effective approach to improving dietary behaviors and promoting physical activity [4] [16].

Adolescence is a critical period for establishing lifelong habits. Health behaviors developed during this stage tend to persist into adulthood, influencing long-

term health outcomes. Therefore, addressing obesity-related issues during adolescence can significantly reduce the risk of chronic diseases and improve overall productivity and quality of life [33].

1.2 Problem Statement

The increasing prevalence of overweight and obesity among college-going girls is a growing public health concern. Despite having basic awareness about health and nutrition, many individuals fail to translate this knowledge into practice due to various barriers such as time constraints, social influences, and environmental factors. There is a need to evaluate whether structured nutrition education interventions can effectively improve knowledge, attitudes, and practices (KAP) related to diet and physical activity.

1.3 Objective:

- To assess the baseline knowledge, attitude, and practices related to nutrition among overweight and obese college-going girls.
- To design and implement a nutrition education intervention program.
- To evaluate the effectiveness of the intervention on improving KAP scores.
- To compare pre- and post-intervention outcomes between control and experimental groups.

1.4 Significance of the study:

This study is significant as it provides insights into the effectiveness of nutrition education in modifying health-related behaviors among young women. The findings can be used to design future health promotion programs in educational institutions and contribute to reducing obesity-related health risks.

1.5 Challenges faced by Adolescents:

Adolescents often fail to meet WHO recommendations for physical activity and screen time, contributing to inadequate nutrition and increased risk of obesity [29]. Urban school-going adolescents in India exhibit insufficient physical activity levels and prolonged screentime [23]. Changes in dietary habits and activity levels during adolescence can cumulate as risk factors for obesity and related diseases [35].

1.6 Factors that contribute to obesity:

Various factors contribute to childhood and adolescent overweight and obesity, including improper eating habits and lack of physical exercise [25]. College-going girls face challenges such as overtime college hours and increased sedentary behaviour, further exacerbating the risk of obesity [9].

II. REVIEW OF LITERATURE

Adolescents often fail to meet recommended guidelines for physical activity and tend to engage in excessive screen time, contributing to unhealthy lifestyle patterns [29]. In India, urban adolescents have been reported to exhibit low levels of physical activity and prolonged sedentary behavior [24].

Dietary and lifestyle changes during adolescence play a crucial role in determining long-term health outcomes. These behaviors, if unhealthy, can accumulate over time and increase the risk of obesity and related diseases [35].

Nutrition education has been identified as an effective strategy for improving knowledge and promoting positive behavior change. Structured interventions in educational settings can significantly influence dietary habits and physical activity levels [4]. However, a lack of awareness and practical knowledge remains a challenge among college students [16].

III. METHODOLOGY

3.1 Research Design

The study employed a quasi-experimental design involving control and experimental groups to assess the effectiveness of a nutrition education intervention.

3.2 Participants

The study included overweight and obese college-going girls. Participants were divided into two groups:

- Control group (no intervention)
- Experimental group (received intervention)

3.3 Data Collection Tool

A structured and validated questionnaire was used to assess:

- Knowledge (nutrition concepts and health risks)
- Attitude (beliefs and perceptions)

- Practice (dietary and physical activity behaviors)
- Data were collected through face-to-face interviews.

IV. INTERVENTION

The intervention was conducted over one month and included:

- Weekly interactive sessions (4 sessions)
- Educational materials such as posters and brochures
- Topics including balanced diet, portion control, healthy cooking, and lifestyle modification

V. DATA ANALYSIS

Data were analyzed using SPSS (Version 20). The study questionnaire data were entered into an Excel spreadsheet. Qualitative data were analysed using summary statistics such as frequencies and percentages. Scores (knowledge, attitude, and practice) were calculated and expressed as a percentage. The statistical tests – independent T-test (in between groups) and paired T-test (within groups),

and correlation were used. The quantitative data were expressed as mean, standard deviation, minimum, and maximum. All the statistical analyses were done using SPSS version 20.

- Descriptive statistics: mean, standard deviation, percentage
- Inferential statistics: paired t-test, independent t-test, correlation

VI. RESULT AND DISCUSSION:

6.1 KAP Comparison

The control group showed minimal changes in KAP scores, indicating that no significant improvement occurred without intervention.

In contrast, the experimental group demonstrated substantial improvements:

- Knowledge scores nearly doubled
- Attitude scores improved significantly
- Practice scores showed the highest increase

This confirms that the intervention was effective in enhancing awareness and promoting behavioral change.

6.2. Comparison table

Category	Control group		Experimental group	
	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Knowledge (mean±STD)	22.3 ± 3.5	23.1 ± 3.6	21.9 ± 3.7	45.0 ± 3.5
Attitude (mean±STD)	28.1 ± 4.2	28.4 ± 4.3	27.8 ± 4.5	43.8 ± 3.5
Practice (mean±STD)	24.6 ± 3.8	24.9 ± 3.9	24.2 ± 4.0	44.2 ± 3.6

The study investigating the impact of an intervention on Knowledge, Attitude, and Practice (KAP) among overweight or obese college-going girls yielded significant findings. The participants were divided into a control group and an experimental group, with data collected before and after the intervention. In the control group, there were minor improvements across all KAP categories. The Knowledge scores slightly increased from (22.3 ± 3.5) pre-intervention to (23.1 ± 3.6) post-intervention. Similarly, Attitude scores rose modestly from (28.1 ± 4.2) to (28.4 ± 4.3), and Practice scores went from (24.6 ± 3.8) to (24.9 ± 3.9).

Conversely, the experimental group demonstrated

substantial enhancements in all measured areas following the intervention. The Knowledge scores dramatically increased from (21.9 ± 3.7) to (45.0 ± 3.5). Attitude scores also saw a significant rise from (27.8 ± 4.5) to (43.8 ± 3.5). The most notable improvement was observed in Practice scores, which surged from (24.2 ± 4.0) to (44.2 ± 3.6).

These results clearly indicate the effectiveness of the intervention in the experimental group. The marked increase in Knowledge reflects a deeper understanding and awareness of health and weight management concepts. The positive shift in Attitude suggests a more favourable outlook towards adopting healthy

behaviour. The significant enhancement in Practice highlights a successful translation of knowledge and attitude into actionable and sustained behaviours. In contrast, the control group's minimal improvements suggest that without intervention, changes in KAP are negligible. Overall, the intervention proved to be highly effective in promoting significant improvements in the KAP parameters among overweight or obese college-going girls. Before the intervention, the knowledge assessment revealed that a substantial majority (84%) understood the definition of obesity, while 76% knew what a balanced diet entailed. Awareness of the health risks associated with obesity was high (94%). However, gaps were identified in understanding BMI, hidden sugars, and the impact of sleep on weight management, with 22%, 28%, and 40%, respectively, lacking knowledge in these areas. Attitudes towards diet and exercise were generally positive. Nearly all participants recognized the importance of regular fruit and vegetable intake (98%), regular exercise (100%), and the ability to make lifestyle changes (100%). However, challenges such as busy schedules (88%), societal pressures (94%), and cultural norms (98%) were seen as significant barriers to maintaining a healthy lifestyle. In practice, only 56% of participants regularly consumed fruits and vegetables, and less than half (40%) engaged in regular physical activity. A majority (64%) attempted to reduce sugary drink consumption, and 70% consistently had breakfast. However, efforts to limit fast food intake and read food labels were lower, at 44% and 52%, respectively.

Nutrient intake analysis revealed the experimental group had marginally higher intakes of carbohydrates, proteins, fats, Vitamin A, and iron compared to the control group. Both groups' dietary patterns were relatively similar and generally aligned with recommended guidelines, providing a sound basis for evaluating the impact of the nutritional intervention.

Educational materials tailored for the target group included posters, brochures, and interactive workshops. These aids aimed to enhance understanding and support healthier lifestyle choices. Feedback indicated these tools were effective in improving nutritional knowledge and fostering positive behavioural changes.

Post-intervention, significant improvements were noted. Awareness about obesity (96%), balanced diet

(92%), health risks of obesity (98%), and the role of unhealthy food (94%) increased.

The understanding of BMI (90%), hidden sugars (86%), and sleep patterns (78%) also improved, indicating the intervention's success in closing knowledge gaps. Attitudes remained positive, with continued strong agreement on the importance of healthy eating and exercise.

More participants acknowledged the challenges posed by busy schedules (70%) and the accessibility of unhealthy foods (84%), highlighting the need for strategies to mitigate these barriers. Improvements were observed in dietary and exercise practices. Regular consumption of fruits and vegetables increased to 72%, and 62% engaged in physical activity thrice a week. Efforts to reduce sugary drinks (76%) and pay attention to portion sizes (68%) also rose. However, reliance on fast food remained a challenge, with only 56% regularly limiting intake.

KAP assessment before intervention:

Before the implementation of the intervention, the Knowledge, Attitude, and Practice (KAP) assessment provided valuable insights into participants' understanding and behaviors related to obesity and weight management. The knowledge assessment indicated that participants possessed a relatively high level of awareness regarding obesity and its associated health risks, reflecting a strong foundational understanding. However, critical gaps were observed in specific areas such as the concept and calculation of Body Mass Index (BMI), identification of hidden sugars in processed foods, and the role of sleep patterns in weight management. These deficiencies highlighted the need for targeted educational strategies to deepen participants' comprehension of these important aspects. In terms of attitude, participants generally demonstrated a positive outlook towards healthy eating and regular physical activity, acknowledging their importance in maintaining overall health and appropriate body weight. Despite this positive inclination, perceived barriers such as time constraints due to busy schedules, societal influences, and easy access to unhealthy food options posed significant challenges. These findings emphasized the importance of designing interventions that are practical, adaptable, and capable of integrating seamlessly into daily routines. The practice

assessment, however, revealed a disconnect between knowledge, attitude, and actual behavior. While participants reported good hydration habits and regular breakfast consumption, less than half engaged in consistent physical activity or actively limited fast-food intake, indicating a need for behavior-focused interventions.

The nutrient intake assessment further demonstrated that both experimental and control groups followed broadly similar dietary patterns, although the experimental group showed a slightly higher intake of both macronutrients and micronutrients. This marginal difference suggested a potential advantage in responsiveness to nutritional interventions, while also underlining the necessity of ensuring adequate nutrient intake across both groups to support overall health and effective weight management. A crucial component of the study was the development of nutritional education aids, which aimed to enhance participants' knowledge and promote healthier attitudes and practices. These tools, delivered through a combination of interactive workshops and printed educational materials, received positive feedback for their clarity, engagement, and effectiveness. Their diverse formats ensured accessibility and contributed to improved understanding and motivation among participants, thereby supporting the sustainability of behavioral changes.

Following the intervention, the post-assessment of KAP revealed significant improvements across all domains. Knowledge levels increased markedly, particularly in areas that previously showed gaps, such as BMI, hidden sugars, and the influence of sleep on weight management. This demonstrated the effectiveness of the educational intervention in enhancing participants' ability to make informed health decisions. Attitudinal changes were also observed, with participants showing stronger agreement on the importance of maintaining healthy dietary habits and engaging in regular exercise. Although perceived barriers such as time limitations and societal influences persisted, participants expressed greater confidence in their ability to adopt and maintain healthier lifestyles, reflecting a more proactive and optimistic mindset. In terms of practice, there were notable improvements in dietary and lifestyle behaviors, including increased consumption of fruits and vegetables, more frequent participation in physical activity, and conscious reduction in the intake

of sugary beverages and fast foods. Despite these positive developments, certain areas, such as maintaining consistent exercise routines and avoiding unhealthy snacking, continued to require attention. Overall, the findings indicate that while the intervention was successful in improving knowledge, attitudes, and practices, ongoing support and reinforcement are essential to sustain these behavioral changes and achieve long-term health outcomes.

VII.CONCLUSION

The findings of the present study clearly demonstrate that structured nutritional education plays a significant role in improving knowledge, attitudes, and practices (KAP) among overweight and obese college-going girls. The intervention effectively enhanced participants' understanding of key concepts related to obesity, including dietary choices, hidden nutritional risks, and lifestyle factors such as physical activity and sleep. This improvement in knowledge was accompanied by a positive shift in attitudes, with participants showing greater acceptance of healthy eating habits and the importance of regular exercise in maintaining overall well-being.

Despite these encouraging outcomes, the study also highlights that behavioral change is a gradual and complex process. Factors such as busy academic schedules, social influences, limited access to healthy food options, and ingrained lifestyle habits continued to act as barriers to the consistent adoption of healthy behaviors. This indicates that knowledge and positive attitudes alone may not always translate into sustained practice without ongoing support.

Therefore, the study underscores the importance of continuous reinforcement through regular follow-up sessions, motivational strategies, and supportive environments that facilitate healthy choices. Integrating nutrition education into routine academic programs, promoting peer support systems, and ensuring the availability of healthier food options within campus settings can further strengthen the impact of such interventions. Additionally, incorporating behavior change techniques, such as goal setting, self-monitoring, and personalized guidance, can help in maintaining long-term adherence to healthy lifestyles.

While the intervention proved effective in initiating positive changes, sustained efforts are essential to

overcome existing barriers and ensure long-term success in weight management and overall health improvement. Future interventions should adopt a more holistic and continuous approach to achieve lasting behavioral transformation.

REFERENCE

- [1] Ameer, S. R. (2021). Prevalence and risk factors of overweight and obesity among college-going adolescents in Siddipet district. *MRIMS Journal of Health Sciences*, 9(3), 96.
- [2] Amenya, P. C. A., Annan, R. A., Apprey, C., & Agbley, E. N. (2021). The relationship between nutrition and physical activity knowledge and body mass index-for-age of school-aged children in selected schools in Ghana. *Heliyon*, 7(11).
- [3] Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior*, 31(2), 143–164.
- [4] Brown, L., & Patel, R. (2018). The role of nutrition education in promoting healthy lifestyle behaviors among adolescents. *Journal of Nutrition Education and Behavior*, 50(4), 345–352.
- [5] Contento, I. R., Williams, S. S., Michela, J. L., & Franklin, A. B. (2006). Understanding the food choice process of adolescents in the context of family and friends. *Journal of Adolescent Health*, 38(5), 575–582.
- [6] Dhua, R., Das, B., Patsa, M. K., Maiti, R., & Maiti, R. Nutritional status and its associated factors among adolescents residing in different countries: A review.
- [7] Flegal, K. M., Kit, B. K., Orpana, H., & Graubard, B. I. (2013). Association of all-cause mortality with overweight and obesity using standard body mass index categories: A systematic review and meta-analysis. *JAMA*, 309(1), 71–82.
- [8] Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.). (2008). *Health behavior and health education: Theory, research, and practice*. John Wiley & Sons.
- [9] Gupta, S., & Singh, A. (2021). Sedentary lifestyle and obesity risk among college students in India. *Indian Journal of Public Health Research & Development*, 12(2), 112–118.
- [10] Hu, F. B. (2008). *Obesity epidemiology*. Oxford University Press.
- [11] Hu, F. B. (2013). Resolved: There is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption reduces the prevalence of obesity and obesity-related diseases. *Obesity Reviews*, 14(8), 606–619.
- [12] Jeffery, R. W., Linde, J. A., Simon, G. E., Ludman, E. J., Rohde, P., Ichikawa, L. E., & Finch, E. A. (2009). Reported food choices in older women in relation to body mass index and depressive symptoms. *Appetite*, 52(1), 238–240.
- [13] Joglekar, A., & Bhoi, S. Impact of nutrition education on nutritional status and daily dietary pattern of college-going girls.
- [14] Kuppaswamy, B. (1981). *Manual of socioeconomic status (urban)*. Manasayan, Delhi, India.
- [15] Lally, P., van Jaarsveld, C. H., Potts, H. W., & Wardle, J. (2010). How are habits formed: Modelling habit formation in the real world. *European Journal of Social Psychology*, 40(6), 998–1009.
- [16] Lee, H., Kim, J., & Park, S. (2022). Nutrition knowledge and dietary behaviors among young adults: A cross-sectional study. *BMC Public Health*, 22, 1456.
- [17] Ludwig, D. S., & Kabat-Zinn, J. (2008). Mindfulness in medicine. *JAMA*, 300(11), 1350–1352.
- [18] Mangla, A. G., Dhamija, N., Gupta, U., & Dhall, M. (2019). Lifestyle trends and obesity among college-going girls of Delhi. *Health*, 11(02), 201.
- [19] Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(1), 42.
- [20] Moitra, P., Madan, J., & Verma, P. (2021). Impact of a behaviourally focused nutrition education intervention on attitudes and practices related to eating habits and activity levels in Indian adolescents. *Public Health Nutrition*, 24(9), 2715–2726.
- [21] National Institute of Nutrition. (2017). *Dietary guidelines for Indians - A manual*. Indian Council of Medical Research.
- [22] O'Connor, P. J., & Puetz, T. W. (2005). Chronic physical activity and feelings of energy and fatigue. *Medicine & Science in Sports & Exercise*, 37(2), 299–305.

- [23] Ponnambalam, S., Palanisamy, S., Singaravelu, R., & Janardhanan, H. A. (2022). Effectiveness of a school-based nutrition education program on waist circumference and dietary behavior among overweight adolescents in Puducherry, India. *Journal of Education and Health Promotion*, 11.
- [24] Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51(3), 390–395.
- [25] Roberts, C. (2017). Childhood obesity: Causes and prevention strategies. *Public Health Nutrition*, 20(5), 789–796.
- [26] Rollnick, S., Miller, W. R., & Butler, C. C. (2008). *Motivational interviewing in health care: Helping patients change behavior*. Guilford Press.
- [27] Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.
- [28] Sallis, J. F., Owen, N., & Fisher, E. B. (2008). Ecological models of health behavior. In *Health behavior and health education: Theory, research, and practice* (pp. 465–485). John Wiley & Sons.
- [29] Smith, J., Anderson, L., & Brown, K. (2018). Physical activity and screen time among adolescents: A global perspective. *Journal of Adolescent Health*, 62(2), 123–130.
- [30] Sobal, J., & Bisogni, C. A. (2009). Constructing food choice decisions. *Annals of Behavioral Medicine*, 38(1), S37–S46.
- [31] Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health*, 29, 253–272.
- [32] Suri, M., Sharma, R., & Saini, N. (2018). Effect of physical education and physical activity on anthropometric measurements and flexibility among college-going girls. *European Journal of Physical Education and Sport Science*.
- [33] Taylor, D., & White, P. (2019). Adolescent health and long-term outcomes: The importance of early intervention. *Health Psychology Review*, 13(2), 145–160.
- [34] Thankachi Yamini, R. (2003). Prevalence of overweight and obesity among school and college going adolescents in rural and urban Thiruvananthapuram district, Kerala, India (Doctoral dissertation, SCTIMST).
- [35] Thomas, D. R. (2016). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27(2), 237–246.
- [36] Van Duyn, M. A., & Pivonka, E. (2000). Overview of the health benefits of fruit and vegetable consumption for the dietetics professional: Selected literature. *Journal of the American Dietetic Association*, 100(12), 1511–1521.
- [37] Wing, R. R., & Phelan, S. (2005). Long-term weight loss maintenance. *The American Journal of Clinical Nutrition*, 82(1), 222S–225S.
- [38] World Health Organization. (2018). *Global action plan on physical activity 2018–2030: More active people for a healthier world*.
- [39] World Health Organization. (2020). *Obesity and overweight*.
- [40] World Health Organization. (2021). *WHO guidelines on physical activity and sedentary behavior*