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Research Article

Assessment of Obesity-Related Risk Factors and the Effectiveness of an Eating Well Programme among Professional College Students

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Abstract

Background: Obesity among young adults has emerged as an important public health concern because of unhealthy dietary practices, physical inactivity, and other modifiable lifestyle behaviours. Professional college students are particularly vulnerable to these risk factors during the transition to independent living. Institution-based nutrition education programmes may improve awareness and promote healthier lifestyle practices.

Methods: A longitudinal observational study was conducted among 380 undergraduate students aged 18–30 years at a tertiary teaching institution in North India. Participants were selected by simple random sampling. Baseline assessment included socio-demographic characteristics, dietary and lifestyle risk factors, anthropometric measurements, and knowledge regarding healthy eating. A structured Eating Well Programme was implemented, and participants were reassessed after six months. Data were analysed using appropriate descriptive and inferential statistics, with $p<0.05$ considered statistically significant.

Results: Overall, 50.0% of participants were either overweight or obese. Frequent meal skipping, inadequate fruit and vegetable intake, regular consumption of junk food and sugar-sweetened beverages, and eating outside the home were common obesity-related risk factors. No significant association was observed between body mass index and the selected demographic variables. Following the Eating Well Programme, awareness regarding healthy eating and knowledge of the health effects of excess sugar, salt, and trans-fat improved substantially. Significant reductions were also observed in body mass index, waist circumference, and neck circumference after six months ($p<0.001$).

Conclusion: Professional college students exhibited several modifiable obesity-related risk factors. The Eating Well Programme significantly improved nutrition-related knowledge and produced favourable changes in obesity-related anthropometric indicators. Institution-based nutrition education programmes may contribute to obesity prevention and promotion of healthier lifestyle behaviours among young adults.

Keywords: Obesity; Risk factors; Nutrition education; Eating Well Programme; College students; Anthropometry.

Introduction

Obesity has become one of the most important public health challenges worldwide and is a major contributor to the growing burden of non-communicable diseases (NCDs). Cardiovascular diseases, type 2 diabetes mellitus, hypertension, several cancers, and other chronic conditions share

obesity as an important modifiable risk factor. Rapid urbanization, changing dietary patterns, reduced physical activity, and increasingly sedentary lifestyles have accelerated the rise of obesity, particularly among young adults, making prevention during early adulthood a public health priority[1,2].

Young adults enrolled in professional colleges represent a population particularly susceptible to unhealthy lifestyle behaviours. The transition from home to college is often accompanied by irregular meal timings, frequent meal skipping, dependence on convenience foods, increased consumption of sugar-sweetened beverages and fast foods, inadequate fruit and vegetable intake, prolonged screen time, academic stress, and declining physical activity. These behavioural changes contribute substantially to excess weight gain and increase the future risk of metabolic disorders. Studies conducted among university students from different countries have consistently identified dietary habits, sedentary behaviour, and lifestyle practices as important determinants of overweight and obesity[3,4].

Recent studies among medical and university students have further demonstrated that obesity-related risk factors frequently coexist despite reasonable awareness regarding healthy lifestyles. Frequent eating outside the home, inadequate physical activity, unhealthy snacking, poor sleep, and low adherence to healthy dietary patterns have been associated with increased body weight and adiposity in this age group[5,6].

Professional colleges therefore provide an ideal setting for implementing preventive interventions. Campus-based nutrition education programmes can reach a large number of young adults during a period when lifelong dietary habits are being established. Previous intervention studies have shown that structured nutrition education, behavioural counselling, and healthy eating programmes improve nutrition knowledge and encourage healthier food choices, although the magnitude of anthropometric improvement varies according to programme duration and participant engagement[7,8].

The Food Safety and Standards Authority of India introduced the Eat Right India movement to encourage healthier dietary practices and reduce the burden of lifestyle-related diseases through sustained nutrition awareness. Educational institutions are considered important platforms for translating these recommendations into practice by promoting balanced diets, healthier food environments, and nutrition literacy among students. The present study therefore assessed obesity-related risk factors among professional college students and evaluated the effectiveness of a structured Eating Well Programme on improving nutrition-related knowledge and obesity-related anthropometric outcomes. The study was conducted among 380 undergraduate students using baseline assessment followed by a six-month educational intervention and post-intervention evaluation.

Methodology

A longitudinal observational study was conducted over a two-year period from December 2023 to November 2025 at tertiary care hospital of North India. The study included undergraduate professional college students aged 18-30 years. Participants were selected by simple random sampling to ensure equal probability of inclusion. Students who were available during both baseline and follow-up assessments and provided informed consent were included, whereas those unwilling to participate were excluded. The calculated sample size was 380 after accounting for a 5% non-response rate.

Baseline information was collected using a predesigned, pre-tested structured questionnaire. Data included socio-demographic characteristics, parental education, lifestyle practices, dietary habits, physical activity, sleep patterns, awareness regarding healthy eating, and obesity-related risk factors. Anthropometric measurements included height, weight, waist circumference and neck circumference which were measured in standard ways. Body Mass Index (BMI) was computed and categorized using the Asia-Pacific guidelines. Prior to intervention, participants' knowledge, attitudes and practices around healthy eating and the Eating Well Programme were assessed in addition to anthropometric assessment.

A structured Eating Well nutrition education programme based on healthy dietary practices was undertaken after baseline assessment. Health education sessions were held regularly during the follow-up period to boost awareness of balanced diet, healthy food selections, and the negative health impacts of overconsuming sugar, salt, and trans-fat. The same questionnaire and anthropometric measurements were used to reassess the participants after six months in order to measure the changes in knowledge and obesity-related outcomes. All information was entered into Ms. Excel and analysed with SPSS version 25. Descriptive and inferential statistical tests were used appropriately and a P value < 0.05 was taken as statistically significant.

RESULTS

All 380 professional college students completed the baseline assessment and six-month follow-up. The results are given under the two study objectives: (i) Assessment of obesity related risk factors and (ii) Evaluation of outcome of the Eating Well Programme.

Most of the participants were between 18 and 22 years old (51.3%) and male accounted for 55.0% of the study population. Overall, the prevalence of overweight and obesity was 50.0% among professional college students, reflecting a higher prevalence of excess body weight in this population. (Table 1)

Overweight and obesity were seen in all the demographic categories but there were no significant differences between BMI and age, gender, family type, socioeconomic status, family history or physical activity ($p>0.05$). (Table 2)

Students were found to engage in a large number of unhealthy dietary behaviours, which included skipping meals often, consuming a small amount of fruit and vegetables, eating a large amount of junk food, consuming a large amount of sugar-sweetened beverages, and eating out more often, suggesting multiple modifiable obesity-related risk factors. (Table 3, Figure 1)

There was a significant increase in nutrition-related knowledge as a result of the Eating Well Programme. Post intervention, there was a significant increase in awareness of Eat Right India campaign and awareness of the health risks of consuming sugar, salt and trans-fat. (Figure 2)

There was a favourable effect of the Eating Well Programme on anthropometric outcomes of obesity, as changes in body mass index, waist circumference and neck circumference were all statistically significant ($p<0.001$ for all). (Figure 3)

Discussion

The current study aimed at evaluating obesity-related risk factors in a group of professional college students and to determine the impact of a structured Eating Well Programme on nutrition knowledge and anthropometric parameters. Excess body weight was observed in this young adult population as half of participants were overweight or obese. Similar results were found by Seyam, who noted the overweight and obesity status of university students were high and the diet, sleep and physical activity were considered as the most important factors affecting the university students' body mass index (BMI)[4]. Alqassimi et al. also reported the prevalence of overweight and obesity among medical students at Jazan University, and noted the role of diet and lifestyle factors[6]. By contrast, higher educational institutions in Western Balkans, Ilić et al. had reported comparatively lower overweight/obesity prevalence in medical students, indicating that the extent of the issue might be different depending on the characteristics of the population and lifestyle of the region[9].

The high prevalence of overweight and obesity among young adults is especially significant since the college years are when the transition to adult food patterns and behaviors, independence, academic stressors, and decreased physical activity occurs. In a followup study of medical students over a 2-year period, Szemik et al. found increasing prevalence of overweight and obesity over time, with male sex, financial difficulties, being dissatisfied with health, and consuming meat frequently being important factors[10]. In a similar study, Bai et al. found regular meals, late night snacking, exercise, dietary pattern, and sex to be

obesity risk factors among college students[3]. The results indicate obesity in professional students is not due to one specific determinant, but due to a behaviour-environment interaction.

In the present study, no statistically significant association was observed between nutritional status and age, gender, family type, socioeconomic status, family history, or physical activity. Seyam also found no significant difference in BMI according to age, gender, or region, although diet, sleep, and physical activity explained a considerable proportion of BMI variation[4]. Ilić et al., however, reported that male gender and smoking were positive predictors of overweight and obesity, while regular physical activity and preventive health check-ups were associated with lower odds[9]. The difference between these findings may reflect variation in sample composition, measurement methods, and the distribution of risk behaviours across study settings.

Dietary assessment in the present study showed that meal skipping, low fruit and vegetable intake, junk food consumption, sugar-sweetened beverages, and eating outside the home were common. Faris et al. also reported unhealthy dietary behaviours among adult college students in Hail and emphasized the relationship between body fatness and poor food habits[11]. Telleria-Aramburu and Arroyo-Izaga found that breakfast-related behaviours, diet quality, alcohol intake, sleep duration, and physical activity differed according to sex and were associated with excess body fat among university students[5]. Bai et al. further demonstrated that dietary patterns rich in vegetables, meat, grains, milk, and eggs were associated with lower obesity risk, whereas snack-based and certain meat-based dietary patterns increased risk[3]. These studies are consistent with the dietary profile observed in the present population and indicate that irregular and energy-dense eating practices are important targets for preventive intervention.

The impact of the college setting should also be taken into account. The behaviours around food and weight on campus, as well as opportunities for physical activity and institutional policies, may influence students' behaviours, as noted by Bailey et al.[12]. Bruna et al. stated that among the students of Vigan City, s

stress, lack of sleep, irregular eating, lack of physical activity and predisposition to obesity in the family were the factors that put the students at risk of obesity[13]. Therefore, dietary advice on an individual basis is not enough without the provision of healthier foods in the campus and having regular opportunities for physical activity.

A major finding of the present study was the improvement in nutrition-related knowledge after the Eating Well Programme. Awareness of the Eat Right India campaign increased from 61.1% to 89.2%, while knowledge regarding sugar, salt, and trans-fat also improved markedly. Shrivastava et al. found that although medical students were generally aware of obesity-related risk factors, important gaps remained in their knowledge, especially regarding fat distribution and obesity-related health risks[14]. Bakarman et al. similarly observed that healthcare students possessed reasonable knowledge about obesity, but their actual lifestyle practices were not consistently healthy[15]. These observations support the need for structured educational interventions even among students from health-related disciplines.

The improvement seen after intervention is in agreement with Abd El Samad et al., who reported significant improvement in health belief scores and obesity-related knowledge following a nutritional education programme among medical students at Ain Shams University[7]. Sakhardande et al. also demonstrated that a structured teaching programme improved knowledge regarding obesity and obesity-related disorders among obese adults[16]. In school-based settings, Mettu et al. reported improved knowledge after video-assisted teaching The improvement seen after intervention is in agreement with Abd El Samad et al., who reported significant improvement in health belief scores and obesity-related knowledge following a nutritional education programme among medical students at Ain Shams University[7]. Sakhardande et al. also demonstrated that a structured teaching programme improved knowledge regarding obesity and obesity-related disorders among obese adults[16]. In school-based settings, Mettu et al. reported improved knowledge after video-assisted

teaching on childhood obesity, while Bashir observed a significant rise in knowledge regarding the health hazards of junk food following a planned teaching programme[17,18]. Although these studies involved different age groups, they consistently indicate that structured and repeated nutrition education can improve awareness.

The present study also showed statistically significant reductions in BMI, waist circumference, and neck circumference after six months. Faiz et al. reported that structured nutrition education combined with physical activity guidance resulted in significant improvements in BMI, waist circumference, waist-to-hip ratio, and body fat percentage among overweight and obese adults[8]. Han et al. similarly found that web-based education, particularly when combined with tailored feedback, produced significant weight reduction and improved selected psychological outcomes among women with overweight and obesity[19]. Abd El Samad et al. also reported favourable changes in BMI after a nutritional education programme among medical students[7].

Not all educational interventions have produced uniform anthropometric benefits. Silva et al. observed improvements in dietary intake and lipid parameters after a healthy eating programme among adolescents, but no significant anthropometric change was detected[20]. Martínez-Rodríguez et al. found that an educational programme promoting Mediterranean dietary habits did not produce clear between-group differences in diet adherence or body composition among university students[21]. These differences suggest that intervention duration, intensity, adherence, participant characteristics, and the presence of behavioural reinforcement may influence measurable outcomes.

Overall, the present findings show that professional college students are exposed to several modifiable obesity-related behaviours, but they also respond favourably to structured nutrition education. The observed improvement in both knowledge and anthropometric parameters indicates that institution-based programmes can be useful when education is sustained and accompanied by follow-up. Integration of dietary counselling, healthier campus food environments, and regular physical activity opportunities may strengthen the long-term impact of such interventions.

Conclusion

The present study identified a high burden of overweight and obesity among professional college students, together with frequent meal skipping, low fruit and vegetable intake, junk food consumption, sugar-sweetened beverage use, and eating outside the home. Although no significant association was observed between BMI and the selected demographic variables, the clustering of unhealthy dietary and lifestyle practices indicated substantial modifiable risk. The Eating Well Programme significantly improved awareness regarding healthy eating, sugar, salt, and trans-fat, and was followed by reductions in BMI, waist circumference, and neck circumference. These findings support the use of structured, institution-based nutrition education programmes for promoting healthier behaviour and reducing obesity-related risk among young adults.

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Data Availability Statement

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

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Table 1. Baseline Characteristics and Nutritional Status of the Study Participants (N = 380)

Variable	Category	n (%)
Age group (years)	18-22	195 (51.3)
	23-26	143 (37.6)
	27-30	42 (11.1)
Gender	Male	209 (55.0)
	Female	171 (45.0)
BMI category	Underweight	28 (7.4)
	Normal	162 (42.6)
	Overweight	122 (32.1)
	Obese	68 (17.9)

Table 2. Association Between Nutritional Status and Obesity-Related Risk Factors (N = 380)

Variable	Statistical test	p-value
Age group	$\chi^2 = 6.44$	0.402
Gender	$\chi^2 = 2.24$	0.524
Family type	$\chi^2 = 5.68$	0.46
Family history of NCD/Obesity	$\chi^2 = 6.66$	0.084
Socioeconomic status	Fisher's Exact = 12.29	0.338
Physical activity	$\chi^2 = 1.48$	0.687

Table 3. Dietary Practices and Lifestyle Risk Factors Among Study Participants (N = 380)

Variable	Category	n (%)
Meals/day	1-2 meals	115 (30.3)
	3-4 meals	265 (69.7)
Meal skipping	Daily/Weekly	165 (43.4)
Fruit intake	⩽1 serving/day	183 (48.1)
Vegetable intake	⩽1 serving/day	165 (43.4)
Junk food intake	Daily/Weekly	164 (43.1)
Sugary drinks	Daily/Weekly	174 (45.8)
Eating outside	Daily/Weekly	135 (35.5)

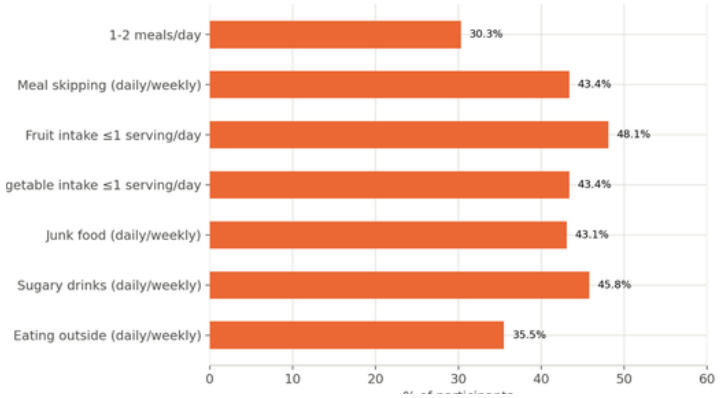


Figure 1. Dietary practices and lifestyle risk factors among study participants (N = 380).

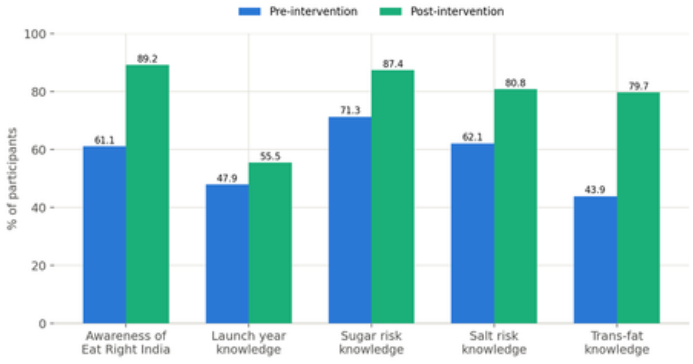


Figure 2. Knowledge outcomes following the Eating Well Programme, pre- vs post-intervention (N = 380).

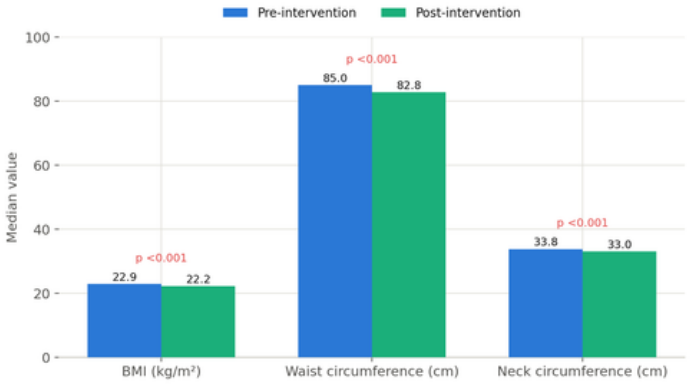


Figure 3. Effect of the Eating Well Programme on anthropometric parameters, pre- vs post-intervention (N = 380).

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• COI: Authors declare no conflicts of interest.

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