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Research Article

A Prevalence study on Obesity and risk factors among Professional College students in Kanpur

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Abstract

Background: Overweight and obesity are increasing among young adults because of unhealthy eating habits, lack of physical activity, and changing lifestyles. College students are especially at risk due to irregular meals, stress, and easy availability of junk food. The Eat Well / Eat Right India programme was started to promote healthy eating and prevent lifestyle diseases. **Objectives:**
1.To study the prevalence of obesity & overweight in Rama Medical College, Kanpur.
2.To study risk factor related to obesity & overweight.
3.To Measure the outcome of knowledge imparted according eating well programme.
Methods: This study was carried out among 380 college students aged 18–30 years. Students were selected by simple random sampling. Information on diet, physical activity, and awareness about healthy eating was collected using a structured questionnaire. Height, weight, BMI, waist and neck circumference were measured using standard methods. A nutrition education programme was given, and the students were re-examined after six months.
Results: Half of the students (50%) were either overweight or obese. Many students had low physical activity, skipped meals, consumed junk food and sugary drinks, and ate fewer fruits and vegetables. After the education programme, awareness about Eat Right India and knowledge about the harmful effects of excess sugar, salt, and trans-fat improved. There was a significant reduction in BMI, waist circumference, and neck circumference after six months.
Conclusion: The study shows a high level of overweight and obesity among college students. The Eat Right India–based nutrition education program improved knowledge and led to small but meaningful changes in body measurements. Regular health education and promotion of healthy lifestyles in colleges are important for preventing obesity and related diseases in young adults.

Introduction

Non-communicable diseases (NCDs) represent one of the most significant global public health challenges of the 21st century, accounting for a substantial proportion of morbidity, mortality, and disability worldwide (1). NCDs primarily include cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes mellitus, all of which share common modifiable risk factors such as unhealthy diet, physical inactivity, tobacco use, and harmful alcohol consumption. According to estimates published in 2005, NCDs were responsible for approximately 35 million deaths annually, constituting nearly 60% of all global deaths (2). Alarmingly, nearly 80% of these deaths occurred in low- and middle-income countries (LMICs), underscoring the disproportionate burden borne by economically transitioning nations. Furthermore, around 16 million deaths attributed to NCDs occurred among individuals below 70 years of age, reflecting a substantial burden of premature mortality with profound social and economic consequences (3).

The NCD burden is expected to escalate further in the coming decades. Projections indicate that NCD-related deaths may increase by approximately 17% over a ten-year period, driven largely by demographic transitions, urbanization, globalization, and rapid lifestyle changes (4). Increased life expectancy, population aging, and urban migration have collectively altered dietary habits and physical activity patterns. The widespread adoption of sedentary lifestyles, increased psychological stress, reduced physical labor, and heightened exposure to environmental pollutants have collectively contributed to a surge in NCDs such as obesity, cardiovascular diseases, stroke, atherosclerosis, and several forms of cancer (5). These conditions not only reduce life expectancy but also impose long-term disability, reduced productivity, and escalating healthcare costs (6). Recognizing the magnitude of this challenge, World Health Organization has proposed a structured, three-step framework for the prevention and control of NCDs (7). The first step involves assessing population health needs by systematically evaluating risk factor prevalence and disease burden, thereby identifying priority areas for intervention. The second step emphasizes the formulation and adoption of comprehensive national and regional policies targeting NCD prevention and management (8). The third step focuses on translating policies into actionable strategies through effective implementation, monitoring, and evaluation. Central to this framework is the promotion of preventive approaches, particularly health education and lifestyle modification, aimed at reducing exposure to modifiable risk factors before disease onset (9).

Research question and hypothesis

- What is the prevalence of obesity among college students?
- What risk factors are associated with obesity among college students, including age, gender, family history of non-communicable diseases or obesity, socioeconomic status, physical inactivity, unhealthy meal patterns, low fruit and vegetable intake, frequent consumption of junk foods and sugary beverages, high salt intake, frequent eating outside, and inadequate nutrition knowledge?
- What is the effect of the Eat Well programme on obesity-related outcomes among college students after six months of intervention?

MATERIAL AND METHODS

Study Design

This study was designed as a longitudinal observational study to evaluate the prevalence of overweight and obesity, its determinants and the effect of a nutritional education intervention over a specified follow-up period. The study was carried out over a period of two years, from December 2023 to October 2025, which allowed sufficient time for baseline assessment, implementation of the nutritional education intervention, follow-up and outcome evaluation.

Study Setting

The study was conducted at Rama Medical College Hospital & Research Centre (RMCH & RC), Kanpur, a recognized tertiary health care institution.

Study Population

The study population comprised medical undergraduate college students aged 18-30 years enrolled at RMCH & RC, Kanpur. This age group represents young adults who are particularly vulnerable to lifestyle-related health problems due to academic stress, 3 transition to independent living, and adoption of unhealthy dietary and physical activity behaviours.

Sampling Methodology

Participants were selected using simple random sampling, ensuring that every eligible student had an equal probability of inclusion, thereby minimizing selection bias and improving representativeness.

Inclusion Criteria

- Students aged 18-30 years
- Students available during both study visits

Exclusion Criteria

- Students unwilling to participate

Sample Size Estimation

The sample size was calculated based on the prevalence of obesity (3.9%) reported by using the standard formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

Where:

- n = required sample size
- Z = Z-score for 95% confidence level (1.96)
- p = prevalence (3.9%)
- q = 100 - p = 96.1
- d = allowable absolute error (2%)

$$n = \frac{(1.96)^2 \times 3.9 \times 96.1}{2^2}$$

$$n = 359.9 \approx 360$$

After accounting for a 5% non-response rate, the final estimated sample size was 380.

Data Collection Method

Data were collected using a predesigned, pre-tested, structured questionnaire, which included:

- **General information:** age, gender, socio economic status, father & mother education.
- **Lifestyle factors:** dietary habits, physical activity, sleep patterns, and sedentary behaviours.
- **Anthropometric details:** Anthropometric measurements were performed as per WHO standard guidelines (10).
- **Height:** Measured using a stadiometer with participants standing erect in the Frankfurt plane. Measurements were recorded to the nearest 0.1 cm (11).
- **Weight :** Measured using a calibrated digital weighing scale with participants wearing light clothing and no footwear. Weight was recorded to the nearest 0.5 kg.

BMI

Calculated from height and weightmeasurements by Asian-Specific Classification

- Overweight: 23.0-24.9 kg/m^2
- Obesity: ⩾25.0 kg/m^2

Waist Circumference (WC)

Measured at the midpoint between the lower costal margin and iliac crest at the end of normal expiration. (12)

- Males >90 cm
- Females >80 cm

Neck Circumference (NC)

Measured just below the thyroid cartilageusing a non-stretchable tape (13).

- **Overweight:**
- Males ⩾34.75 cm
- Females ⩾31.75cm
- **Obesity:**
- *Males ⩾35.25 cm*
- *Females ⩾34.25cm*

Study Tools:

a.Demographic Characteristics

Information regarding age, gender, socioeconomic status, and socio-economic status, father & mother education was collected.

b.Obesity/Overweight Related Characteristics

Anthropometric measurements and dietary patterns such as junk food intake, eating outside, and family history of obesity or non-communicable diseases were assessed.

c.Behaviour-Related Characteristics

- Knowledge regardingeat right programmeand other aspects.
- Attitude towardshealthy lifestyle or objectives of eat right programme

- Practice about lifestyle modification & dietary practices.

Operational Definitions

Obesity

Obesity was defined as excessive accumulation of body fat associated with increased risk of morbidity and mortality.

Body Mass Index(BMI)

BMI was calculated using the formula:

$$BMI = \frac{Weight\ (kg)}{\text{Height (m)}^2}$$

WHO Classification (103):

- Underweight: <18.5 kg/m^2
- Normal: 18.5-24.9 kg/m^2
- Overweight: 25-29.9 kg/m^2
- Obesity: ⩾30 kg/m^2

Asian-SpecificClassification (14):

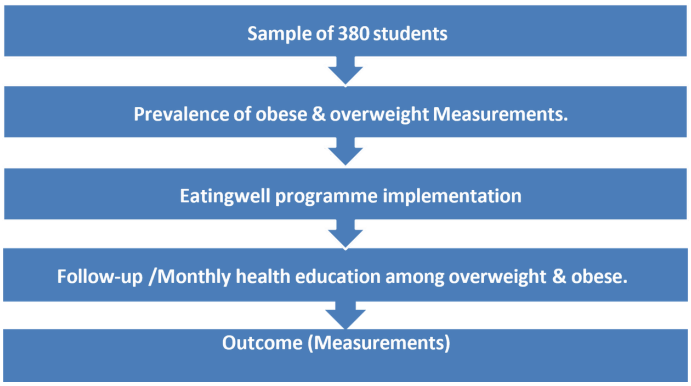
- Overweight: 23.0-24.9 kg/m^2
- Obesity: ⩾25.0 kg/m^2

Outcome Measures

1.BMI Classification (Asia-Pacific Guidelines)

Plan of Action

1. Baseline assessment of anthropometric and lifestyle parameters
2. Implementation of the Eat Well nutrition education programme
3. Follow-up monthly
4. Post-intervention reassessment



Statistical Analysis

- Data were enteredinto Microsoft Excel and analysedusing SPSS software (Version 26) (15).
- Categorical variables were expressed as frequencies and percentages
- Continuous variables were expressed as mean ± standard deviation or median (IQR) depending on the normality of data.
- Associations were assessedusing Chi-square test.
- Changes in anthropometric measurements were assessed using paired t-test/Willcoxon rank test according to normality of data.
- A p-value <0.05 was considered statistically significant.
- To measure respondents' attitudes, a structured questionnaire consisting of four items was utilized. Each item was graded on a 4-point Likert scale (e.g., 1 = Strongly Disagree to 4 = Strongly Agree),resulting in a cumulative score range of 4 to 16. To facilitate data interpretation, thesescores were classified into three distinct categories: a score of 4-7 indicates an 'Unfavourable Attitude,' 8-12 represents a 'Moderate Favorable Attitude,' and 13-16 signifies a 'High Favorable Attitude'. This forced-choice 4-point scale was specifically selected to eliminate neutral bias and ensure clear directional feedback from the participants (16).

Ethical Considerations

- Ethical approval was obtained from the Institutional Ethics Committee of Rama Medical College Hospital and Research Centre (RMCH & RC)
- Written informed consentwas obtained from all participants
- Confidentiality and anonymitywere strictly maintained

RESULTS

The present chapter describes the results of the study conducted among 380 college students aged 18–30 years to assess the prevalence of overweight and obesity, associated risk factors. All statistical analyses were performed using SPSS software, and results are presented under the domains of socio-demographic profile, nutritional status, determinants of obesity, awareness and knowledge regarding healthy eating, dietary practices, and effect of intervention on anthropometric parameters. Unless otherwise stated, all percentages are calculated using the total sample size of 380.

Socio-Demographic Characteristics of the Study Population

Age group (years)	n	%
18–22	195	51.3
23–26	143	37.6
27–30	42	11.1
Total	380	100

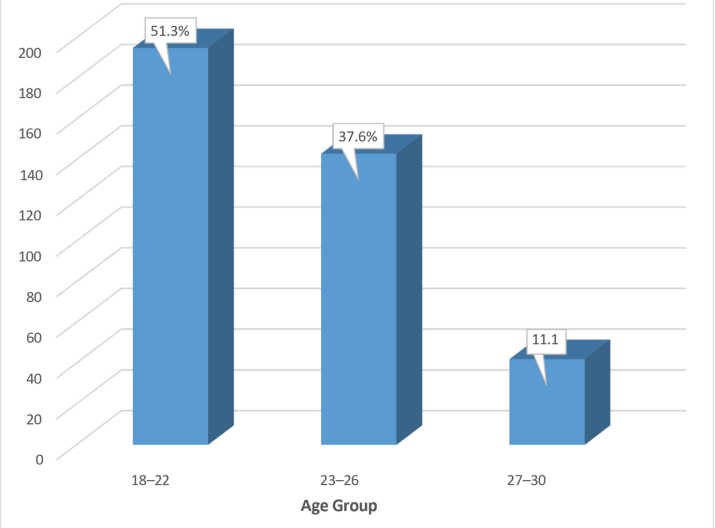


Fig. 1 : Bar chart for Age Group Distribution

With regard to sex distribution, the study population comprised 209 males(55.0%) and 171 females (45.0%), yielding a male-to-female ratio of approximately 1.2:1. This slight male predominance reflects the gender composition of the institution. Sex distribution is shown in Table.2, Fig.2.

Table 2: Sex Distribution of Study Participants (N = 380)

Sex	n	%
Male	209	55
Female	171	45
Total	380	100

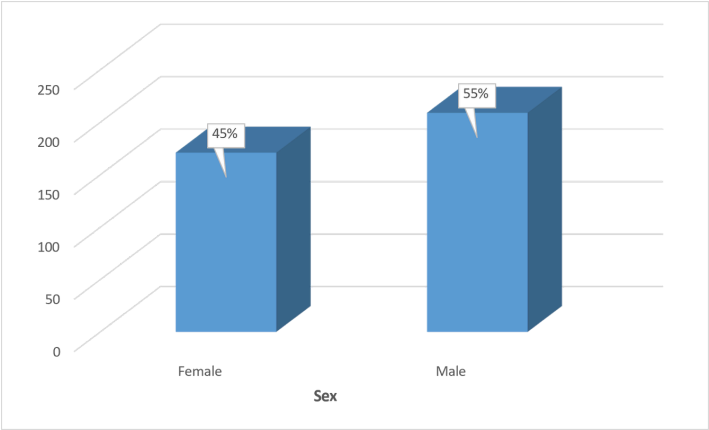


Fig. 2 : Bar chart forSocio-demographic Characteristics

Most participants belonged to nuclear families (63.2%), followed by joint families (28.7%), while only 8.2% resided in extended families. A positive family history of non-communicable diseases (NCDs) and/or obesity was reported by 31.6% of respondents. According to the Modified BG Prasad socioeconomic classification, the largest proportion of students belonged to the middle socioeconomic class (37.6%), followed by upper middle (31.8%) and upper class (16.3%). These findings are summarized in Table.3, Fig.3.1- 3.3.

Table 3 : Family Characteristics and Socioeconomic Status(N=380)

Variable	Category	n	%
Family type	Nuclear	240	63.2
	Joint	109	28.7
	Extended	31	8.2
Family history of NCD/obe	Yes	120	31.6
	No	260	68.4
Socioeconomic status	Upper	62	16.3
	Upper middle	121	31.8
	Middle	143	37.6
	Lower middle	39	10.3
	Lower	15	3.9

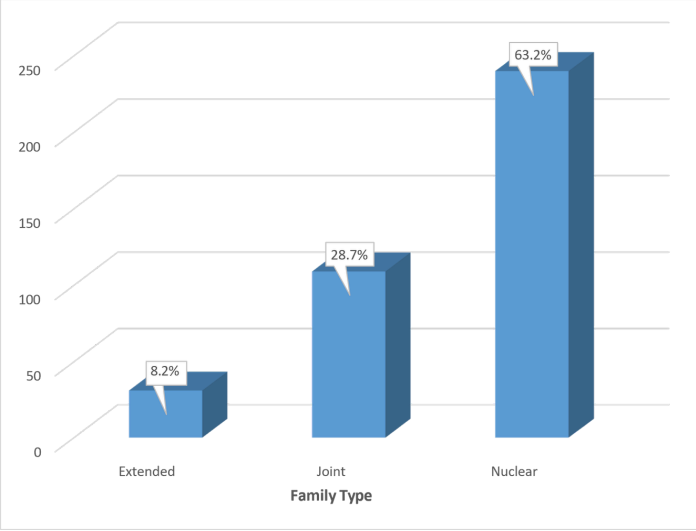


Fig. 3.1 : Bar chart for Socio-demographic Characteristics

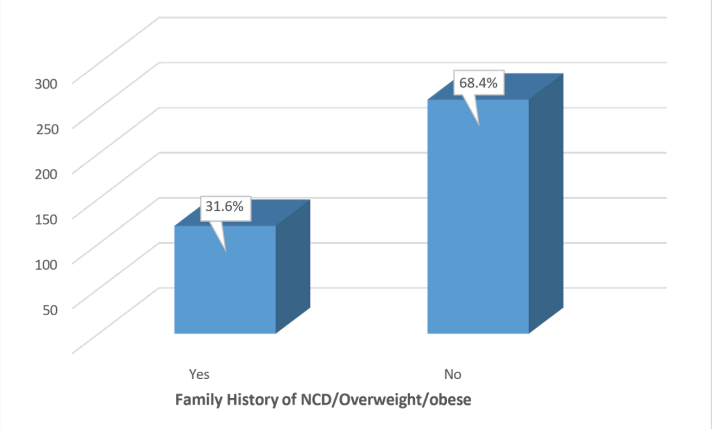


Fig. 3.2 : Bar chart for Socio-demographic Characteristics

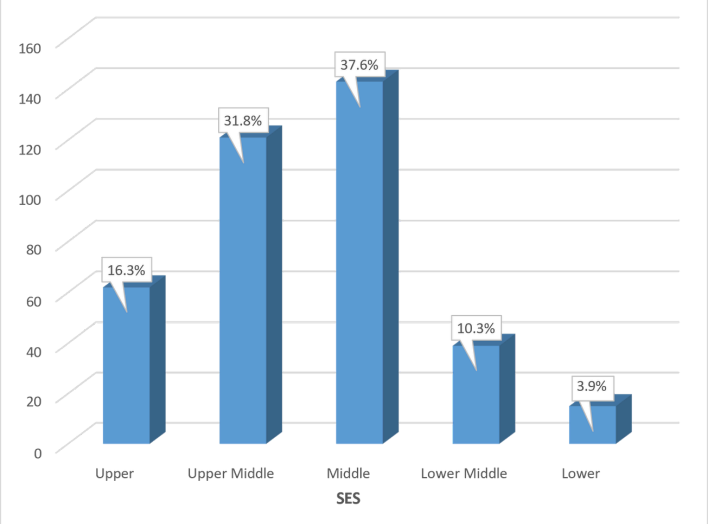


Fig. 3.3 : Bar chart for Socio-demographic Characteristics

Parental Characteristics and Physical ActivityProfile

Parental education and occupation profilesare presented in Table 4, Fig.4.1-4.5. Nearly 45.0% of fathersand 38.4% of mothers were graduates or above. The majority of fathers were self-employed (36.3%), while 65.8% of mothers were homemakers. Assessment of physical activityrevealed that only 28.7% of students had adequate physicalactivity, whereas a substantial 71.3% reported inadequate physical activity, indicating a predominantly sedentary lifestyle among the study population.

Table 4 : Parental Education, Occupation, and PhysicalActivity Status (N=380)

Variable	Category	Frequency (n)	Percentage (%)
Father's education	Graduate & above	171	45
	Middle/High school	89	23.4
	Intermediate	77	20.3
	Illiterate/Primary	43	11.3
Mother's education	Graduate & above	146	38.4
	Middle/High school	106	27.9
	Intermediate	80	21.1
	Illiterate/Primary	48	12.6
Father's occupation	Self-employed	138	36.3
	Private sector	134	35.3
	Government	108	28.4
Mother's occupation	Homemaker	250	65.8
	Private sector	74	19.5
	Government	56	14.7
Physical activity	Adequate	109	28.7
	Inadequate	271	71.3

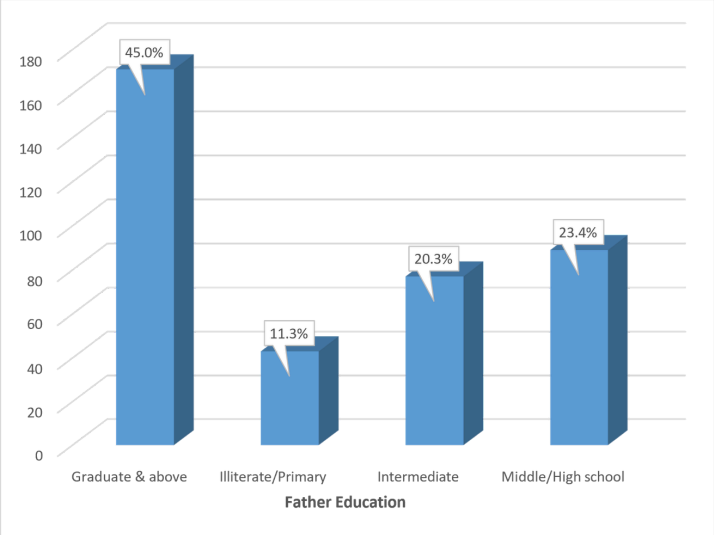


Fig. 4.1: Bar chart forSocio-demographic Characteristics

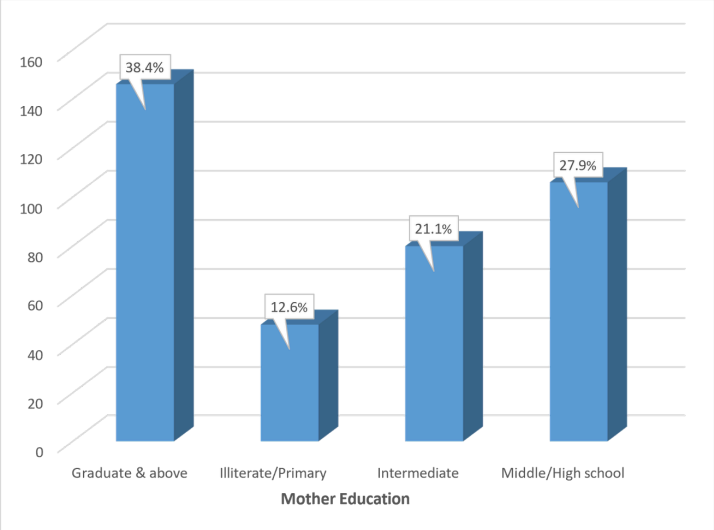


Fig.4.2 Bar chart for Socio-demographic Characteristics

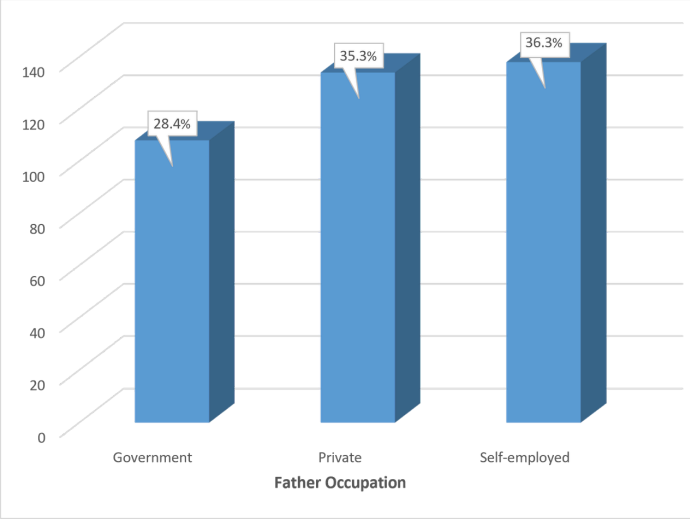


Fig.4.3 Bar chart forSocio-demographic Characteristics

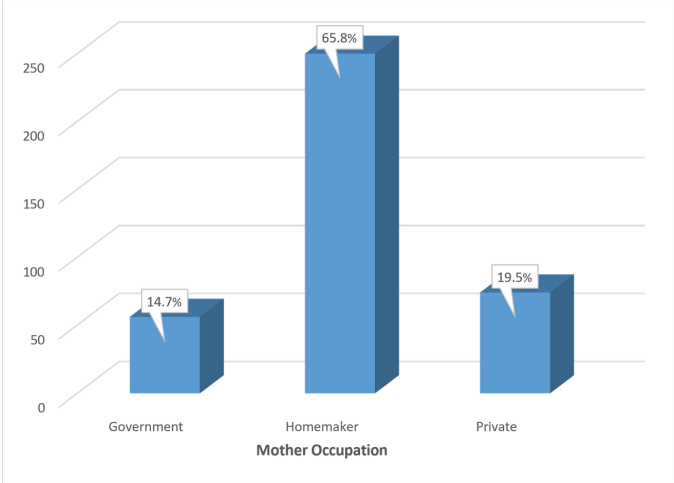


Fig.4.4 Bar chart forSocio-demographic Characteristics

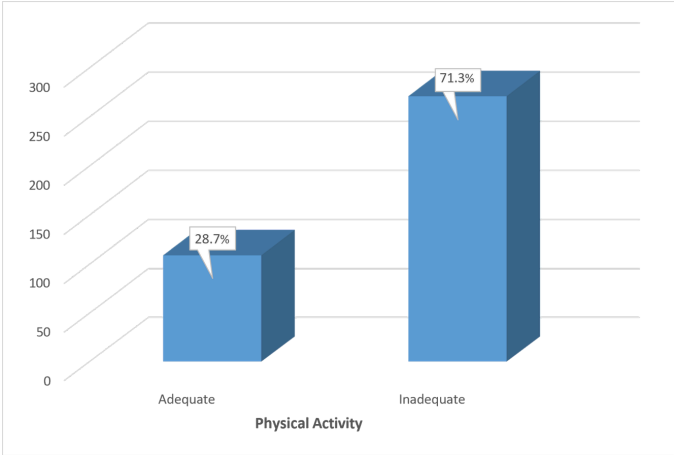


Fig.4.5 Bar chart forSocio-demographic Characteristics

Nutritional Status of Study Participants

Nutritional statuswas assessed usingBody Mass Index (BMI). As shown in Table 5, Fig.5, 42.6% of participants had normal BMI, while 32.1% were overweight and 17.9% were obese. Thus, the combined prevalence of overweight and obesity was 50.0%. Underweight was observed in 7.4% of participants.

Table 5 : Sex-wise Distribution of BMI Categories (N = 380)

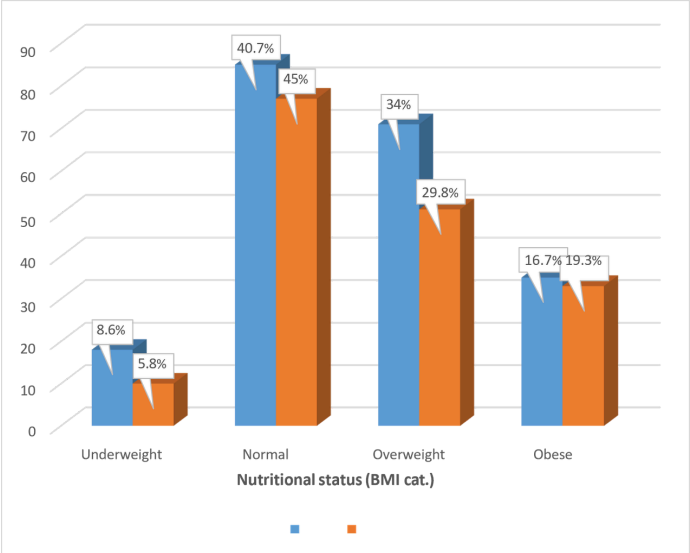


Fig. 5 : Bar chart for Prevalence (sex wise) of Overweight & Obesity

Among males, 34.0% were overweight and 16.7% obese, whereas among females, 29.8% were overweight and 19.3% obese. Although overweight was more common in males, obesity prevalence was slightly higher among females.

Determinants of Nutritional Status

The association between BMI categories and selected demographic variables was analysed using the Chi-square test.The distribution and statistical associations are shown in Table 6. Fig. 6.1-6.7

Table 6 : Association Between Nutritional Statusand Selected Variables

Variables		Under-weight n(%)	Normal n(%)	Over - weight n(%)	Obese n (%)	Statistics
Age Group	18-22	18 (9.2%)	81 (41.5%)	56 (28.7%)	40 (20.5%)	×2=6.44, P=0.402
	23-26	8 (5.6%)	60 (42.0%)	51 (35.7%)	24 (16.8%)	
	27-30	2 (4.8%)	21 (50.0%)	15 (35.7%)	4 (9.5%)	
Gender	Female	10 (5.8%)	77 (45.0%)	51 (29.8%)	33 (19.3%)	×2=2.24 P=0.524
	Male	18 (8.6%)	85 (40.7%)	71 (34.0%)	35 (16.7%)	
Family Type	Extended	3 (9.7%)	16 (51.6%)	9 (29.0%)	3 (9.7%)	×2=5.68 P=0.46
	Joint	6 (5.5%)	42 (38.5%)	35 (32.1%)	26 (23.9%)	
	Nuclear	19 (7.9%)	104 (43.3%)	78 (32.5%)	39 (16.3%)	

Family History of NCD	Yes	13 (46.4%)	44 (27.2%)	36 (29.5%)	27 (39.7%)	×2=6.664 P=0.084
	No	15 (53.6%)	118 (72.8%)	86 (70.5%)	41 (60.3%)	
SES	Upper	3 (4.8%)	20 (32.3%)	24 (38.7%)	15 (24.2%)	Fisher's Exact =12.288 P=0.338
	Upper Middle	9 (7.4%)	58 (47.9%)	34 (28.1%)	20 (16.5%)	
	Middle	13 (9.1%)	54 (37.8%)	48 (33.6%)	28 (19.6%)	
	Lower Middle	3 (7.7%)	21 (53.8%)	11 (28.2%)	4 (10.3%)	
	Low	0 (0.0%)	9 (60.0%)	5 (33.3%)	1 (6.7%)	
Physical Activity	Adequate	10 (35.7%)	42 (25.9%)	36 (29.5%)	21 (30.9%)	×2=1.480 P=0.687
	Inadequate	18 (64.3%)	120 (74.1%)	86 (70.5%)	47 (69.1%)	

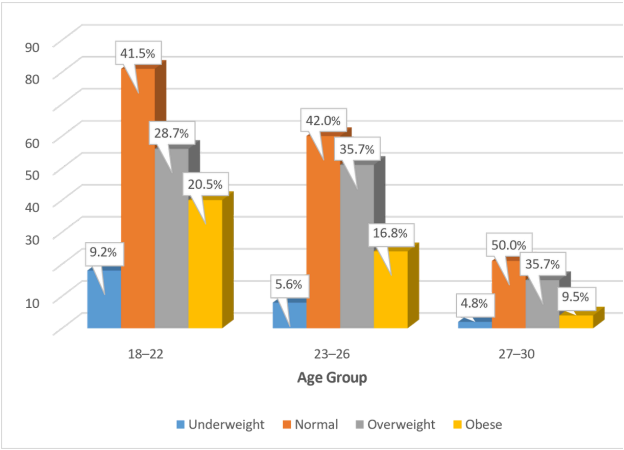


Fig. 6.1 : Bar chartfor Nutritional statusof study subjectswith Demographic variables

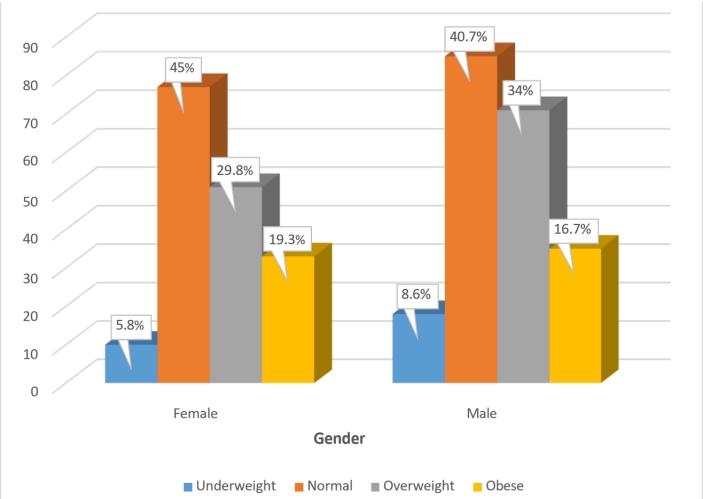


Fig.6.2 bar chart for Nutritional status of study subjects with Demographic variables

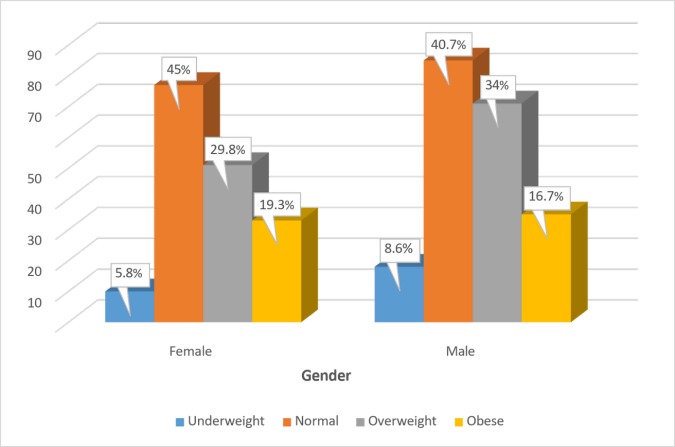


Fig. 6.3 : Barchartfor Nutritional statusof study subjectswith Demographic variables

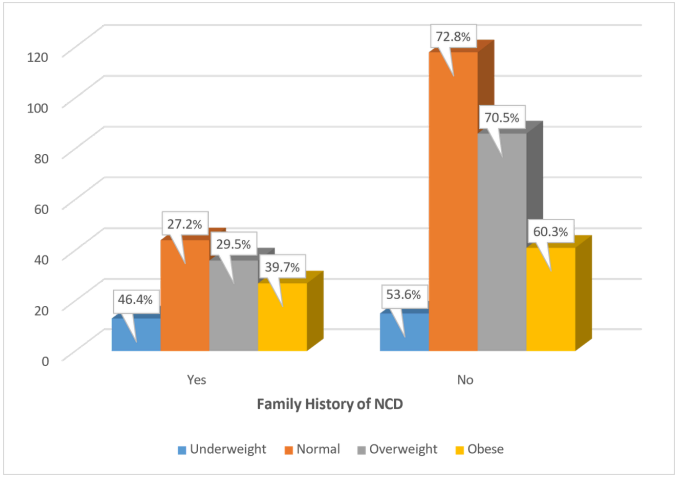


Fig. 6.4 : Bar chartfor Nutritional statusof study subjectswith Demographic variables

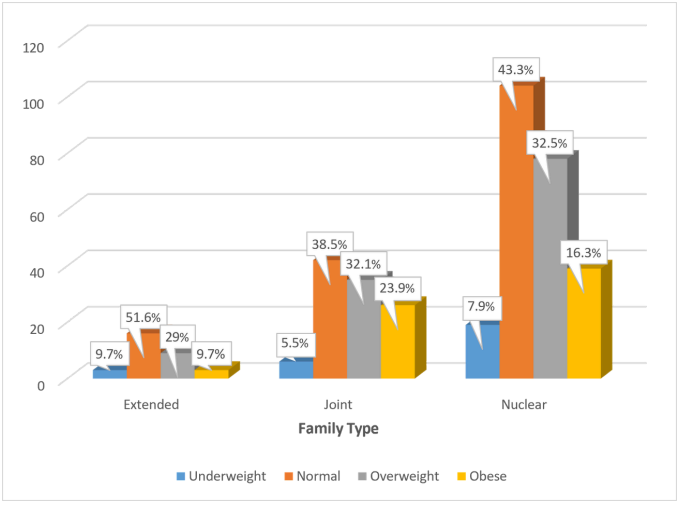


Fig. 6.5 : Bar chart for Nutritional statusof study subjectswith Demographic variables

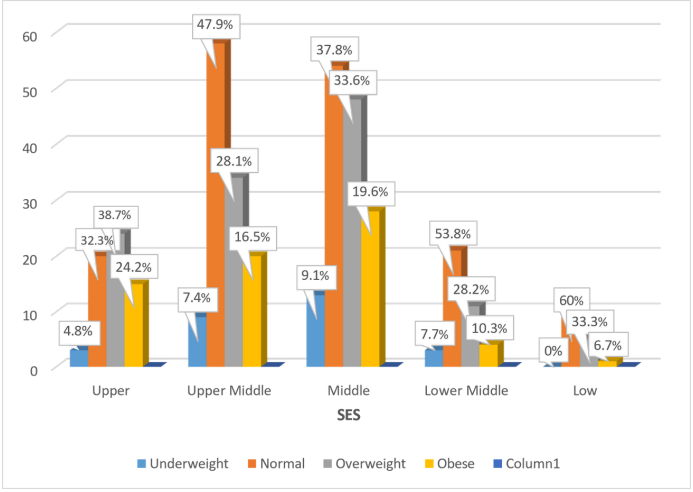


Fig. 6.6 : Bar chart for Nutritional status of studysubjects with Demographic variables

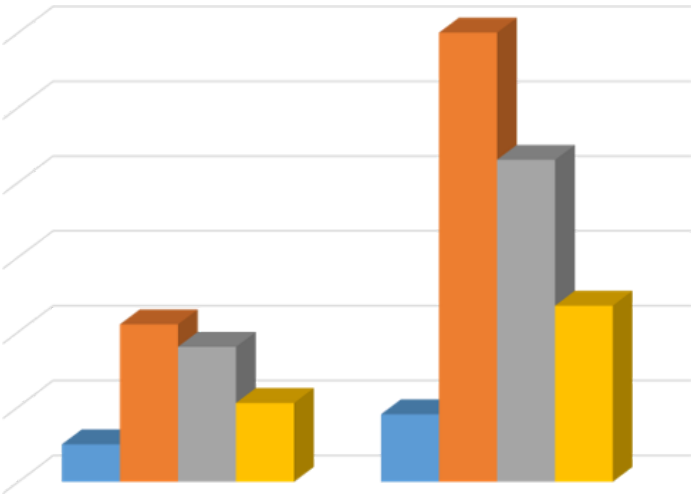


Fig. 6.7: Bar chart forNutritional status of study subjects with Demographic variables

The associationbetween nutritional status(BMI categories) and selected demographic variables and physical activitywas analysed using the chi-square test. Overweight and obesity were observed across all age groups, with relatively higher proportions among participants aged 23-26 years and 27-30 years; however, the association between age group and nutritional status was not statistically significant (χ^2=6.44, p=0.402). Males showed a higher prevalence of overweight, while obesity was slightly more common among females, but gender was not significantl

associated with nutritional status (χ^2=2.24, p=0.524). Participants from jointand nuclear familieshad a higher proportion of overweight and obesity compared to those from extended families, though this association was not statistically significant (χ^2=5.68, p=0.46). A greater proportion of overweight and obese participants reported a positive family history of NCDs and/or overweight/obesity; however, this association did not attain statistical significance (χ^2=6.664, p=0.084). With respect to socioeconomic status, overweight and obesity were more prevalent among participants belongingto upper and middle socioeconomic classes, while underweight was minimal in lower socioeconomic groups, though the association was not statistically significant (Fisher's Exact=12.288, p=0.338). Participants with inadequate physical activityconstituted a larger proportion across all BMI categories, including overweight and obesity; nevertheless, the association between physical activity and nutritional status was not statistically significant (χ^2=1.480, p=0.687).

DISCUSSION

The present longitudinal observational study assessedthe prevalence of overweight and obesity, associated risk factors among professional college students at Rama Medical College, Kanpur.

Young adults represent a critical life stage during which lifestyle behaviors are consolidated, and unhealthy patterns established during this period frequently persist into later adulthood, contributing substantially to the burden of non-communicable diseases (NCDs). The findings of this study therefore have important implications for early prevention strategies within academic institutions (17).

Nutritional Status of Study Participants

In the present study, the combined prevalence of overweight and obesity was 50.0%, with 32.1% of students classified as overweight and 17.9% as obese usingAsia-Pacific BMI criteria (14). This indicates that every second student in the study population had excess body weight, underscoring the magnitude of the problem among professional college students. These findings are comparable to those reportedby Muhammed Riyas et al. (2024), who observed that 42.5% of college students in Central India were overweight or obese and Pengpid et al.(2014), documented a combined prevalence of overweight and obesity of approximately 37–40% among Indian university students. The slightly higher prevalence observed in the present study may reflect increasing urbanization, sedentary lifestyles, and easy access to calorie-dense foodsin professional college environments. (18,19)

Underweight was also observed in 7.4% of participants, highlighting the coexistence of undernutrition and overnutrition within the same population. This dual burden of malnutrition has been widely reported in Indian settingsand reflects socioeconomic diversity, variable dietary access, and differing lifestyle patterns among students. Similar observations were made by Pengpid et al. (2014), who reported both underweight and overweight coexisting among university students, emphasizing the need for balancednutrition interventions ratherthan an exclusive focus on obesityalone (19).

Determinants of Nutritional Status

Overweight and obesity were observed across all age groups, with relatively higher proportions among students aged 23–26 years and 27–30 years. However, the association between age group and nutritional status was not statistically significant. This pattern suggests a gradual accumulation of excess weight as students progress through college and early professional training, possibly due to prolonged exposure to sedentary behaviour, academic stress, and unhealthy dietary practices. Nelson et al.(2008)

highlighted that the transition from late adolescence to early adulthood is a high-risk period for weight gain, particularly among college students who experience increased autonomy over foodchoices and reducedparental supervision. Although age was not a significant determinant in the present study, the observed trend aligns with previous literature and underscores the importance of early intervention, ideally beginning in the initial years of college (20).

Gender-wise analysis revealed that overweight was more prevalent among males (34.0%) than females (29.8%), whereas obesity was slightly higher among females (19.3%) compared to males (16.7%). Although these differences did not reach statistical significance, they are epidemiologically relevant. Male students often report higher intake of energy-dense foods, larger portion sizes, and greater consumption of fast foods and sugar-sweetened beverages, while female students may experience weight gain related to hormonal factors, stress-related eating, and reduced physical activity. Previous studies have reported mixed findings regarding gender differences. Gangwar et al. (2019) observed a higher prevalence of overweight amongmale medical students, whereas other studies have reportedhigher obesity rates among females. The lack of a statistically significant association betweengender and BMI categories in the present study suggests that both male and female students are equally vulnerable to unhealthy weight gain, reinforcing the need for gender-neutral preventive interventions within college settings (21.

Students belonging to nuclear and joint families exhibited higher proportions of overweight and obesity compared to those from extended families, although the association was not statistically significant. Extended family structures may provide greater dietary supervision and more traditional eating patterns, which could have a protectiveeffect against unhealthy weight gain. Similarobservations have been reported in other Indian studies, where joint or extended family living was associated with more regular meal patterns and home-cooked food consumption (22,23).

A positive familyhistory of NCDs and/or overweight or obesity was reported by nearly one-third of participants, and a higher proportion of overweight and obese studentshad such a history. Although this association narrowly missed statistical significance, it is clinically important. Genetic predisposition, shared dietary practices, and family-level lifestyle behaviors contribute collectively to obesity risk. Pengpid et al. (2014) and Singh et al.(2024) have reported family history as an important non-modifiable risk factor that interacts with lifestyle behaviors to influence obesity outcomes in young adults (19).

Socioeconomic status showed a trend toward higher prevalence of overweight and obesity among students from upper and middle socioeconomic classes. This finding is consistent with earlier Indian studies, which have shown that higher socioeconomic status is often associated with increased consumption of processed foods, frequent eating outside the home, and sedentary lifestyles. Although the association was not statistically significant in the present study, the observed pattern reflects the ongoing nutrition transition in urban India, where affluence increasingly correlates with obesity risk (24,25).

A striking finding of the present study was the high prevalence of inadequate physical activity, reported by 71.3% of students. Overweight and obese students were more likely to report inadequate physical activity, although the association did not reach statistical significance. This high level of physical inactivity reflects the demanding academic schedules, prolonged screen time,limited recreational facilities, and reduced emphasis on structured exercise within professional colleges. Several studies have identified physical inactivity as a key modifiable risk factor for obesity among college students. Rajasekaret al. (2021)and Thakkar et al. (2010)reported strong associations between sedentary behavior and increased BMI among medical and college-going students. The lack of statistical significance in the present study may be

due to uniformly low physical activity levels across BMI categories, limiting the ability to detect differences. Nevertheless, the findings highlight the urgent need to promote regular physical activity as part of comprehensive obesity-prevention strategies on college campuses (25,26).

Determinants of Nutritional Status

The present longitudinal observational study was undertaken to assess the prevalence of overweight and obesity, identify associated socio-demographic and lifestyle risk factors.

The study revealed a high prevalence of excess body weight, with half of the study population (50.0%) classified as either overweight or obese using Asia-Pacific BMI criteria. This findingunderscores the growingburden of obesityamong college students and reflects the ongoing nutrition and lifestyle transition in urban Indian settings. Although underweight was observed in a smaller proportion of participants, the coexistence of undernutrition and overnutrition highlights the dual burden of malnutrition within the same population.

Gender-wise analysis demonstrated that overweight was more prevalent among males, while obesity was slightly higher among females; however, these differences were not statistically significant. Overweight and obesity were observed across all age groups, with a tendency toward higher prevalence among students in the older age brackets of young adulthood. While socio-demographic variablessuch as age, gender, familytype, socioeconomic status, and family history of non-communicable diseases did not show statistically significant associations with nutritional status, consistent trends suggested their contributory role in weight gain.

Lifestyle-related factors emerged as prominent concerns. A substantial proportion of students reported inadequate physical activity, irregular meal patterns, frequent meal skipping, low intake of fruits and vegetables, and regular consumption of junk foods, sugary beverages, and meals prepared outside the home. These behaviors collectively create an obesogenic environment and are well-recognized risk factors for the development of overweight and obesity. The high prevalence of such practicesamong the study participants emphasizes the need for targeted lifestyle interventions within college campuses.

Importantly, the intervention was also associated with statistically significant reductions in anthropometric parameters, including body mass index, waist circumference, and neck circumference, over a six-month follow-up period. Although the absolute changeswere modest, they were consistent and clinically meaningful,

indicating a positive impact of the intervention on body composition and central adiposity. These findingssuggest that even low-cost, education-based interventions can contribute to measurable improvements in health outcomes when implemented systematically.

This underscores the importance of complementing educational interventions with supportive environmental and institutional measures, such as improved access to healthy food options, opportunities for physical activity, and policies that discourage unhealthy food choices within campus settings.

SUMMARY

Overweight and obesity have emerged as majorpublic health concerns globallyand in India, particularly among young adults undergoing rapid lifestyle transitions. College students represent a vulnerable group due to academic stress, irregular dietary habits, reduced physical activity, and increased exposure to unhealthy food environments. Recognizing this growing problem, the present study was undertaken to assess the prevalence of overweight and obesity, identify associated risk factors, and evaluate the effectiveness of a structured nutrition education intervention based on the Eat Well / Eat Right India programme among college studentsat Rama Medical College, Kanpur.The study was designed as a longitudinal observational study and included

380 students aged 18–30 years. Data were collected using a predesigned, pre-tested questionnaire covering socio-demographic characteristics, dietary habits,physical activity, awareness and knowledge regarding healthy eating, and anthropometric measurements. Nutritional status was assessed using Body Mass Index (BMI) based on Asia-Pacific guidelines, along with waist circumference and neck circumference. A structured nutrition education intervention was delivered, and follow-up assessments were conducted after six months to evaluate changes in knowledge, attitudes, and anthropometric parameters.

The findings revealeda high burden of excessbody weight amongthe study population. The combined prevalence of overweight and obesity was 50.0%, with 32.1% of students classified as overweight and 17.9% as obese. Underweight was observed in a smaller proportion of participants, indicating the coexistence of undernutrition and overnutrition within the same population. Overweight was more prevalent among males, while obesity was slightly higher among females; however, gender differences were not statistically significant. Excess body weight was observed across all age groups, with relatively higher proportions among students in the older age categories.

Assessment of potential determinants showed that overweight and obesity were more common among students from nuclear and joint families, those with a positive family history of non-communicable diseasesor obesity, those belonging to middleand upper socioeconomic classes, and those reporting inadequate physical activity. Although these associations did not reach statistical significance, consistent trends suggested the influence of socio-demographic and lifestyle factors on nutritional status.

Lifestyle assessment revealed a high prevalence of unhealthy dietary practices. A substantialproportion of studentsreported inadequate physical activity, irregular meal patterns, frequent meal skipping, low intake of fruits and vegetables, frequent consumption of junk foods and sugary beverages, added salt intake, and regular eating outside the home. These behaviors are recognized risk factors for overweight and obesity and reflect an obesogenic environment within the college setting.

In conclusion, the present study highlights a high prevalence of overweight and obesity among college students, driven largelyby lifestyle and behavioral factors.The findings emphasize the need for early, institution-based preventive strategies that combine nutrition education with supportive environmental and policy measures to promote healthy lifestyles and reduce the future burden of non-communicable diseases.

STRENGTH OF THE STUDY

The present study had an adequate and scientifically calculated sample size, using simple random sampling, which ensured good representativeness and minimized selection bias. The use of a predesigned and pre-tested structured questionnaire, along with standardized anthropometric measurements(height, weight, BMI, waist and neck circumference) taken according to standard guidelines, enhanced the reliability and validity of the collected data. Assessment of multiple domains including socio-demographic factors, dietary habits, physical activity, knowledge, attitude, and practices provided a comprehensive understanding of the nutritional status and lifestyle patterns of the study population.

LIMITATION OF THE STUDY

As the baseline assessment was cross-sectional in nature, the temporal relationship between risk factorsand overweight/obesity couldnot be firmly established, and causal inferences could not be drawn. Information on dietary intake, physical activity, and lifestyle practices was self-reported, which may be subject to recall bias and social

desirability bias, possibly leading to over- or under-estimation of true behaviors.

The study was conducted in a single institution and mainly included students from a limited age group, which may restrict the generalizability of the results to all college students or young adults.

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