INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

PREVALENCE OF OBESITY AND ITS ASSOCIATED RISK FACTORS AMONG UNDERGRADUATE STUDENTS

Original Research

Zahid Hussain Chandio[1], Abdul Haque*[1], Mehwish Noor Chnadio[2], Manzoor Ahmed[1], Muhammad Numan[3], Lachaman Das Malhi[4], Shagufta Gul[5]
[1]Nursing Instructor, College of Nursing, Female, Nawab shah, Shaheed Benazir Abad. Sindh, Pakistan
[2]Lecturer Institute of Public Health Sciences, Peoples University of Medical & Health Sciences, Nawab shah, Shaheed Benazir Abad. Sindh, Pakistan
[3]Dow Institute Medical Technology.
[4]Principal, College of Nursing, MirpurKhas, Sindh, Pakistan.
[5]Registered Nurse, College of Nursing, Female, Nawab shah, Shaheed Benazir Abad. Sindh, Pakistan.

Corresponding Author: Abdul Haque, Nursing Instructor, College of Nursing, Female, Nawab shah, Shaheed Benazir Abad. Sindh, Pakistan, ahaquekhoso@yahoo.com

Conflict of Interest: None | Grant Support & Financial Support: None | Publication Date: 06-01-2025

ABSTRACT

Background: The prevalence of obesity has escalated dramatically since 1975, becoming a severe public health issue. By 2016, nearly 39% of adults were overweight, contributing to over 4 million global deaths annually. Projections indicate that by 2030, more than half of the adult population worldwide will be overweight or obese.

Objective: This study aimed to determine the prevalence of obesity and its associated risk factors among students at the Prime Institute Health Sciences Islamabad.

Methods: A cross-sectional study was conducted at the Prime Institute Health Sciences from July 20, 2021, to December 20, 2021. The study employed non-probability sampling to enroll 300 participants, focusing on various demographic and lifestyle factors as potential contributors to obesity.

Results: The prevalence of obesity among the participants was 17%, with an additional 19% classified as pre-obese. Significant associations were found between obesity and being a young adult ($p = .001$), male ($p = .021$), residency in hostels, higher socioeconomic status ($p = .011$), family history of obesity, reduced sleep duration, and extensive gadget use.

Conclusion: The study confirms a significant prevalence of obesity of 17% at the Prime Institute Health Sciences. Key risk factors include demographic variables, socioeconomic status, lifestyle choices such as sleep patterns and gadget usage, and genetic predisposition.

Keywords: Body Mass Index, Epidemiology, Obesity, Overweight, Prevalence, Risk Factors, Students.

© 2025 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

INTRODUCTION

Obesity has emerged as a paramount dietary disorder, escalating dramatically since 1975 and posing significant global health challenges. By 2016, nearly 39% of men and 40% of women aged 18 and older were overweight, affecting approximately 2 billion adults worldwide (2,3). The condition not only contributes to over 4 million deaths annually but is also projected to encompass 57.8% of the adult population by 2030 according to the World Health Organization (2,4). This rising trend is evident across various regions; for instance, between 1980 and 2015, Europe saw an increase in overweight and obesity rates from 48% to 59.6% and 14.5% to 22.9%, respectively (6,7). Similarly, the Eastern Mediterranean and Africa also reported significant rises in these conditions (8-10). The widespread prevalence of obesity is linked to substantial risks for chronic non-communicable diseases such as cardiovascular disease, diabetes mellitus type II, hypertension, stroke, and hyperlipidemia. It also predisposes individuals to obstructive sleep apnea, musculoskeletal disorders, asthma, certain infections, and poses extensive economic burdens (11-13). This public health issue is not confined to developed countries but is increasingly problematic in developing nations due to nutritional transitions marked by increased consumption of high-calorie junk foods and sedentary lifestyles (15,16).

In the context of Pakistan, a developing nation, there is a particularly acute dual burden of malnutrition, with significant segments of the population facing both underweight and overweight conditions, especially among younger age groups (19,20). The Body Mass Index (BMI), a standard measure calculated by dividing an individual's weight in kilograms by the square of their height in meters, is widely utilized to classify overweight (BMI of 25.0 to 29.99 kg/m²) and obesity (BMI of 30.0 kg/m² or higher) (21-23). Addressing overweight in youth has shown to yield substantial health benefits, including improved physical fitness, psychosocial well-being, and a decreased risk of developing related dietary disorders (24,25). This study aims to ascertain the prevalence of obesity and identify its associated risk factors among undergraduate students at the Prime Institute of Health Sciences in Islamabad. Establishing a clear understanding of these parameters is crucial for developing effective interventions and promoting sustainable health outcomes among this vulnerable population.

METHODS

This cross-sectional study was carried out at the Prime Institute of Health Sciences in Islamabad from October to December 2021, utilizing a non-probability sampling technique to select participants. To determine the required sample size, the formula $n=z^2\times p(1-p)/e^2$ was used, where n is the sample size, z is the z-value corresponding to a 95% confidence level (1.96), p is the anticipated prevalence of obesity (25%) based on past studies, and e is the margin of error (5%). This calculation yielded a sample size of 288; however, to account for potential sampling errors, 300 participants were enrolled. Data collection involved recording demographic details such as age, sex, marital status, and area of residence, alongside health-related metrics including height and weight. Heights were accurately measured using a wall-mounted tape measure, and weights were assessed with an analogue scale. Participants' nutritional statuses were then categorized based on the international BMI cutoffs recommended by the World Health Organization: underweight (BMI < 18.5 kg/m²), normal weight (18.5 ≤ BMI < 25.0 kg/m²), overweight (25.0 ≤ BMI < 30.0 kg/m²), and obese (BMI ≥ 30.0 kg/m²) (19). Inclusion and exclusion criteria were strictly adhered to in order to control confounding variables.

The data were analyzed using SPSS software (version 23). The Chi-square test and ANOVA were employed to assess qualitative data, with a p-value of ≤ 0.05 considered statistically significant, under a 95% confidence interval. Findings were expressed numerically and as percentages to effectively summarize the results. Ethical considerations were approved by the Ethical Committee of Peoples University of Medical & Health Sciences for Women in Nawabshah, Shaheed Benazir Abad, Sindh, Pakistan. This study adhered to the highest standards of research ethics and integrity, ensuring confidentiality and respect for all participants involved.

RESULTS

The prevalence of obesity among participants in this study was observed to be 17%, with pre-obese and normal weight categories comprising 19% and 25.6% respectively, while the underweight category was notably higher at 38.3%. In an analysis of sociodemographic variables, significant associations were found between age and body mass index (BMI), particularly among those up to 20 years of age, where the distribution spanned from underweight to obese statuses with statistical significance ($p = .001$). Similarly, gender differences indicated a stronger association with BMI, where males exhibited a higher prevalence of being pre-obese and obese compared to females ($p = .021$).

© 2025 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

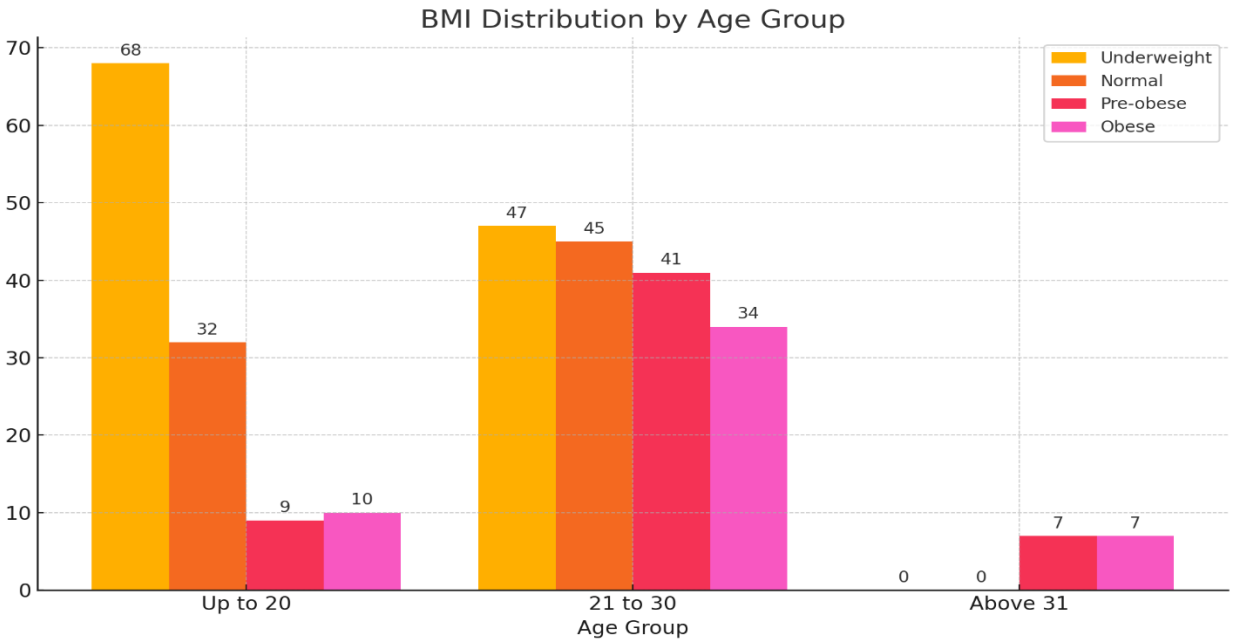
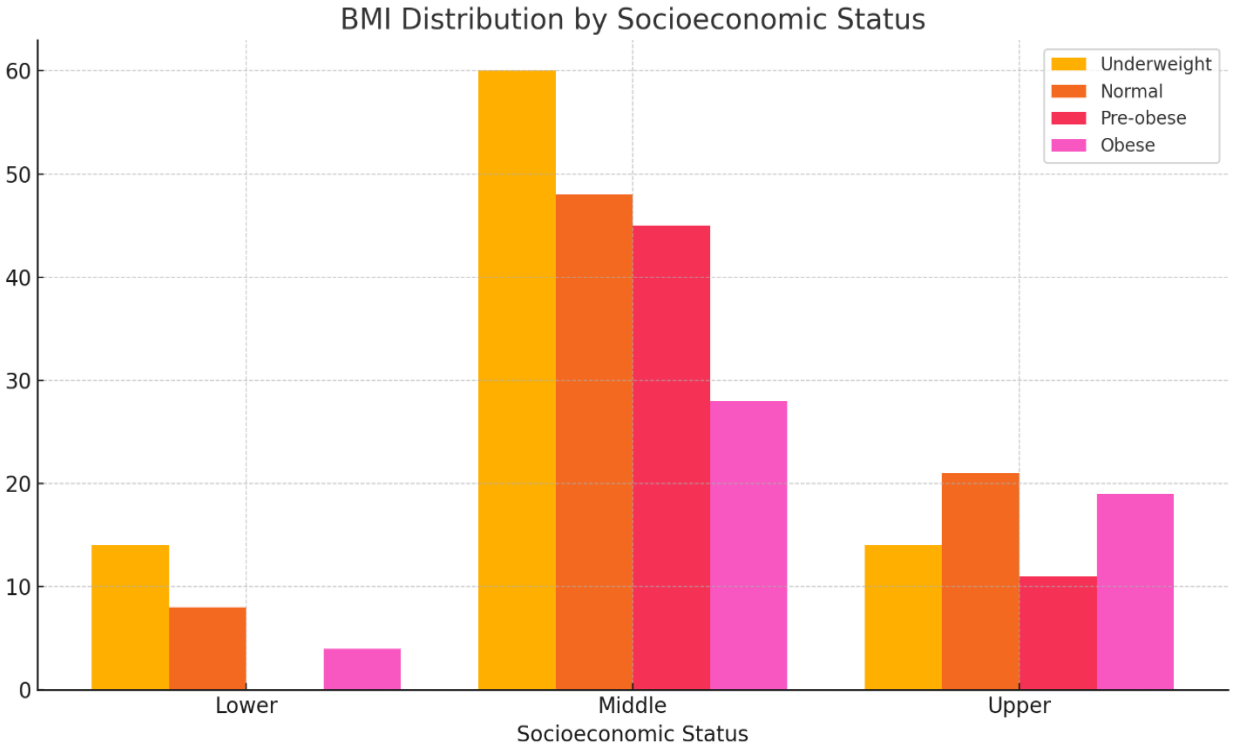


Table: Sociodemographic Variable:

	Underweight	Normal	Pre-obese	Obese	*p* value
Age of subjects					
Up to 20years	68	32	9	10	.001
21 to 30 years	47	45	41	34	
Above 31 years	0	0	7	7	
Gender					
Male	77	49	56	33	.021
Female	38	28	1	18	
Residency					
Home	43	33	8	25	.001
Hostel	72	44	49	26	
Socioeconomic Status					
Lower	14	8	0	4	.011
Middle	60	48	45	28	
Upper	14	21	11	19	
Family History					
Yes	2	8	29	22	.001
No	113	69	28	29	
Resident of					
Urban	72	49	31	40	.72
Rural	43	28	26	11	

© 2025 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.



Residency also showed a notable impact on BMI categories; participants residing at home showed different weight status distributions compared to those in hostels, with both groups showing significant statistical outcomes ($p = .001$). Socioeconomic status further influenced BMI, with statistically significant differences noted across lower, middle, and upper groups ($p = .011$). A striking correlation was observed between family history and obesity, where a positive family history was significantly associated with higher BMI categories ($p = .001$). Analyzing lifestyle factors, the study explored the relationship between BMI and duration of sleep as well as gadget usage. There was a significant difference in BMI categories based on the duration of sleep, with the analysis showing a clear influence of sleep duration on weight status ($p = .001$). Likewise, the duration of gadget usage was strongly correlated with varying BMI, indicating a significant trend that longer gadget usage was associated with higher BMI categories ($p < .001$).

Table: ANOVA Analysis for BMI in Relation to Sleep Duration and Gadget Usage

Factor	Sum of Squares	df	Mean Square	F-value	Significance
Duration of Sleep					
Between Groups	153.16	26	5.891	7.93	.001
Within Groups	229.83	1	0.743		
Duration of Gadget Usage					
Between Groups	260.14	3	86.716	17.426	.000
Within Groups	1472.98	296	4.976		

The history of smoking appeared to have no significant correlation with BMI, as both smokers and non-smokers exhibited similar weight distributions across the BMI spectrum ($p = .380$). Physical activity levels, however, were strongly associated with BMI; participants who engaged rarely in physical activities were more likely to fall into the underweight and normal weight categories, whereas more frequent physical activity was associated with a shift towards higher BMI categories ($p = .001$). This comprehensive analysis highlights several risk factors associated with obesity among undergraduate students, including sociodemographic variables, lifestyle factors, and family history, underscoring the multifaceted nature of this public health challenge.

© 2025 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

Table: Combined Analysis of BMI with History of Smoking and Physical Activity

Factor	Category	Underweight	Normal	Pre-Obese	Obese	Total	p-value
History of Smoking	Yes	95	65	42	41	243	.380
	No	20	12	15	10	57	
Physical Activity	Rarely	31	32	12	8	83	.001
	2-3 times a week	25	17	14	7	63	
	Once a week	6	1	6	25	38	
	Inconsistent & none	53	27	25	11	116	

DISCUSSION

The increasing prevalence of obesity globally is identified as a pivotal health concern, with projections indicating it will be a major contributor to mortality and morbidity by 2030. This study at the Prime Institute of Medical Health Sciences (PIMHS) reflected an obesity prevalence of 17% among young adults, primarily under 30 years of age, aligning with the alarming global rates reported by the World Health Organization, which classify over 630 million adults as obese (26). Males in this study were found to be 1.8 times more likely to be obese than females, a finding that is consistent with broader epidemiological data which suggest biological predispositions may enhance obesity risks in males (14,27). The resident status of individuals, particularly those residing in hostels, also showed a significant association with obesity ($p = .001$), likely due to factors such as increased consumption of junk food, unhealthy diet patterns, and lack of physical exercise (18,19).

Socioeconomic factors played a substantial role in obesity risks, with a notable prevalence among individuals from higher socioeconomic backgrounds in certain regions (10,13,15,18,28). This correlation may reflect the lifestyle and dietary habits prevalent within these groups. Additionally, heredity was a significant determinant of obesity in this study ($p = .001$), with a positive family history indicating a higher likelihood of genetic predispositions influencing body weight (29,30). Sleep duration emerged as a critical factor, with short sleep durations significantly predicting obesity risks ($f = 17.426$, $p = .000$). This underscores findings from other studies that link insufficient sleep—particularly less than seven hours—to increased obesity risks among youths, especially those residing in hostels (27,29,30). Conversely, the duration of gadget usage, while significant in this study, did not correlate with obesity in other studies, suggesting that the impact may vary based on specific lifestyle contexts and individual behaviors (29,31).

Physical activity levels were inversely related to BMI, with significant findings indicating that irregular physical activities are commonly seen among those classified as pre-obese and obese ($p = .001$). This is in line with existing research which identifies a sedentary lifestyle as a prevalent factor contributing to obesity (32,33). The discussion of these findings highlights the complex interplay of genetic, behavioral, and environmental factors in the epidemiology of obesity. Addressing this issue effectively requires a multifaceted approach that includes promoting healthy lifestyle choices, enhancing public awareness of obesity-related health risks, and providing accessible support systems for weight management. This study's strengths include its comprehensive analysis of various risk factors and its contribution to the understanding of obesity trends among young adults in an academic setting. However, limitations such as the lack of direct analysis on the impact of individual dietary habits and the cross-sectional nature of the study, which restricts the ability to establish causality, should be considered in interpreting the results. Future research should aim to incorporate longitudinal data and a more detailed assessment of dietary patterns to better delineate the contributions of specific nutrients and eating behaviors to the risk of obesity.

CONCLUSION

This study at the Prime Institute of Health Sciences successfully mapped the landscape of obesity among its student population, highlighting several critical factors influencing its prevalence. Key demographic factors such as residency in hostels and urban living were significant contributors, compounded by a notable family history of obesity. Behavioral aspects, including insufficient sleep and irregular physical activity patterns, also emerged as significant influences on student health. These findings underscore the complex interplay of environmental, genetic, and lifestyle factors in shaping obesity trends and emphasize the need for targeted interventions to address these multifactorial risks effectively. The insights gained provide a solid foundation for developing tailored strategies to combat obesity in academic environments, contributing to the broader goal of enhancing student health and wellness.

© 2025 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

AUTHOR CONTRIBUTIONS

Author	Contribution
Zahid Hussain Chandio	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Abdul Haque	Methodology, Investigation, Data Curation, Writing - Review & Editing
Mehwish Noor Chnadio	Investigation, Data Curation, Formal Analysis, Software
Manzoor Ahmed	Software, Validation, Writing - Original Draft
Muhammad Numan	Formal Analysis, Writing - Review & Editing
Lachaman Das Malhi	Writing - Review & Editing, Assistance with Data Curation
Shagufta Gul	Writing - Review & Editing, Assistance with Data Curation

REFERENCES

1. Nuñez-Leyva RE, Lozano-López TE, Calizaya-Milla YE, Calizaya-Milla SE, Saintila J. Excess Weight and Body Fat Percentage Associated with Waist Circumference as a Cardiometabolic Risk Factor in University Students. Scientifica (Cairo). 2022 Jan 5;2022:1310030. doi: 10.1155/2022/1310030.

2. Whatnall MC, Patterson AJ, Brookman S, Convery P, Swan C, Pease S, Hutchesson MJ. Lifestyle behaviors and related health risk factors in a sample of Australian university students. J Am Coll Health. 2020 Oct;68(7):734-741. doi: 10.1080/07448481.2019.1611580.

3. Zein A El, Colby SE, Zhou W, Shelnutt KP, Greene GW, Horacek TM, et al. Food insecurity is associated with increased risk of obesity in US college students. Curr Dev Nutr. 2020;4(8). DOI: 10.1093/cdn/nzaa120

4. Jiang Y, Wang J, Wu S, Li N, Wang Y, Liu J, et al. Association between take-out food consumption and obesity among chinese university students: A cross-sectional study. Int J Environ Res Public Health. 2019;16(6). doi: 10.3390/ijerph16061071

5. Gažarová M, Galšneiderová M, Mečiarová L. Obesity diagnosis and mortality risk based on a body shape index (ABSI) and other indices and anthropometric parameters in university students. Rocz Panstw Zakl Hig. 2019;70(3):267-275. doi: 10.32394/rpzh.2019.0077.

6. Chen Y, Liu X, Yan N, Jia W, Fan Y, Yan H, et al. Higher academic stress was associated with increased risk of overweight and obesity among college students in China. Int J Environ Res Public Health. 2020;17(15):1–12. doi: 10.3390/ijerph17155559.

7. Chatterjee A, Gerdes MW, Martinez SG. Identification of Risk Factors Associated with Obesity and Overweight-A Machine Learning Overview. Sensors (Basel). 2020 May 11;20(9):2734. doi: 10.3390/s20092734. .

8. Remus Popa A, Fratila O, Rus M, Anca Corb Aron R, Mihai Vesa C, Pantis C, C Diaconu C, Bratu O, Bungau S, Nemeth S. Risk factors for adiposity in the urban population and influence on the prevalence of overweight and obesity. Exp Ther Med. 2020 Jul;20(1):129-133. doi: 10.3892/etm.2020.8662.

9. Razzak HA, Harbi A, Ahli S. Depression: Prevalence and Associated Risk Factors in the United Arab Emirates. Oman Med J. 2019 Jul;34(4):274-282. doi: 10.5001/omj.2019.56.

10. Tokaç Er N, Doğan G, Meriç ÇS, Yılmaz HÖ, Öztürk ME, Ayhan NY. Prevalence of overweight, obesity and abdominal obesity in Health Sciences Faculty students. Clin Nutr ESPEN. 2021 Dec;46:466-470. doi: 10.1016/j.clnesp.2021.09.008.

11. Wang X, Li C. Knowledge, attitude, and practice of depression among university students. Brain Behav. 2024 Sep;14(9):e70030. doi: 10.1002/brb3.70030.

12. Thomas E, M G. Prevalence and Determinants of Overweight and Obesity among Medical Students. Natl J Physiol Pharm Pharmacol. 2019;1. doi: 10.5455/njppp.2020.10.1035506112019

13. Al Sabbah H. Prevalence of overweight/obesity, anaemia and their associations among female university students in Dubai, United Arab Emirates: a cross-sectional study. J Nutr Sci. 2020 Jul 6;9:e26. doi: 10.1017/jns.2020.23.

© 2025 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.

14. Sa J, Cho BY, Chaput JP, Chung J, Choe S, Gazmararian JA, Shin JC, Lee CG, Navarrette G, Han T. Sex and racial/ethnic differences in the prevalence of overweight and obesity among U.S. college students, 2011-2015. J Am Coll Health. 2021 May-Jun;69(4):413-421. doi: 10.1080/07448481.2019.1679814.

15. Alhashemi M, Mayo W, Alshaghel MM, Brimo Alsaman MZ, Haj Kassem L. Prevalence of obesity and its association with fast-food consumption and physical activity: A cross-sectional study and review of medical students' obesity rate. Ann Med Surg. 2022;79. doi: 10.1016/j.amsu.2022.104007.

16. Anderson KC, Hirsch KR, Peterjohn AM, Blue MNM, Pihoker AA, Ward DS, Ondrak KS, Smith-Ryan AE. Characterization and prevalence of obesity among normal weight college students. Int J Adolesc Med Health. 2020 Nov 5;35(1):81-88. doi: 10.1515/ijamh-2020-0240.

17. Shafiee A, Nakhaee Z, Bahri RA, Amini MJ, Salehi A, Jafarabady K, et al. Global prevalence of obesity and overweight among medical students: a systematic review and meta-analysis. BMC Public Health. 2024 Dec 1;24(1). doi: 10.1186/s12889-024-19184-4.

18. Syed NK, Syed MH, Meraya AM, Albarraq AA, Al-Kasim MA, Alqahtani S, Makeen HA, Yasmeen A, Banji OJF, Elnaem MH. The association of dietary behaviors and practices with overweight and obesity parameters among Saudi university students. PLoS One. 2020 Sep 10;15(9):e0238458. doi: 10.1371/journal.pone.0238458.

19. Asif M, Aslam M, Altaf S, Atif S, Majid A. Prevalence and Sociodemographic Factors of Overweight and Obesity among Pakistani Adults. J Obes Metab Syndr. 2020 Mar 30;29(1):58-66. doi: 10.7570/jomes19039.

20. Syed NK, Syed MH, Meraya AM, Albarraq AA, Al-Kasim MA, Alqahtani S, Makeen HA, Yasmeen A, Banji OJF, Elnaem MH. The association of dietary behaviors and practices with overweight and obesity parameters among Saudi university students. PLoS One. 2020 Sep 10;15(9):e0238458. doi: 10.1371/journal.pone.0238458.

21. Reed B, Abunnaja S. The Epidemiology of Obesity. In: Handbook of Metabolic and Bariatric Surgery. 2023. p. 20–6. DOI:10.1002/9781119521686.ch3

22. Ward ZJ, Bleich SN, Cradock AL, Barrett JL, Giles CM, Flax C, Long MW, Gortmaker SL. Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity. N Engl J Med. 2019 Dec 19;381(25):2440-2450. doi: 10.1056/NEJMsa1909301.

23. Weir CB, Jan A. BMI Classification Percentile And Cut Off Points. 2023 Jun 26. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan–. PMID: 31082114..

24. Elif Öztürk M, Yabancı Ayhan N. Evaluation of malnutrition and screening tools in hospitalized children. Clin Nutr ESPEN. 2023 Oct;57:770-778. doi: 10.1016/j.clnesp.2023.08.031.

25. Gupta R Das, Tamanna N, Akonde M, Gavi S, Haider SS, Chakraborty PA. Prevalence and factors associated with abdominal obesity among Bangladeshi adults: Evidence from a nationally representative survey. Obes Med. 2022 Aug 1;33. DOI:10.1016/j.obmed.2022.100427

26. Haththotuwa, R.N., Wijeyaratne, C.N. and Senarath, U. (2020) Worldwide Epidemic of Obesity. In: Mahmood, T.A., Arulkumaran, S. and Chervenak, F.A. Eds., Obesity and Obstetrics, Elsevier, 3-8. doi.org/10.1016/B978-0-12-817921-5.00001-1

27. Shah B, Tombeau Cost K, Fuller A, Birken CS, Anderson LN. Sex and gender differences in childhood obesity: contributing to the research agenda. BMJ Nutr Prev Health. 2020 Sep 9;3(2):387-390. doi: 10.1136/bmjnph-2020-000074.

28. Medicine SKTAJ of F, 2021 U. Prevalence of Obesity among University Students: A Cross-Sectional Study. jag.journalagent.com. DOI: 10.5505/anatoljfm.2020.38358

29. Rasooly D, Moonesinghe R, Littrell K, Hull L, Khoury MJ. Association Between a First-Degree Family History and Self-Reported Personal History of Obesity, Diabetes, and Heart and Blood Conditions: Results From the All of Us Research Program. J Am Heart Assoc. 2023 Nov 21;12(22):e030779. doi: 10.1161/JAHA.123.030779.

30. Stierman B, Afful J, Carroll MD, Chen TC, Davy O, Fink S, et al. National health and nutrition examination survey 2017–march 2020 prepandemic data files-development of files and prevalence estimates for selected health outcomes. Natl Health Stat Report. 2021;2021(158). doi: 10.15620/cdc:106273.

31. Xie YJ, Cheung DS, Loke AY, Nogueira BL, Liu KM, Leung AY, Tsang AS, Leong CS, Molassiotis A. Relationships Between the Usage of Televisions, Computers, and Mobile Phones and the Quality of Sleep in a Chinese Population: Community-Based Cross-Sectional Study. J Med Internet Res. 2020 Jul 7;22(7):e18095. doi: 10.2196/18095

32. Laar RA, Shi S, Ashraf MA, Khan MN, Bibi J, Liu Y. Impact of physical activity on challenging obesity in pakistan: A knowledge, attitude, and practice (KAP) study. Int J Environ Res Public Health. 2020 Nov 1;17(21):1–15. DOI: 10.3390/ijerph17217802

33. Kazmi T, Nagi LF, Iqbal SP, Razzaq S, Hassnain S, Khan S, Shahid N. Relationship Between Physical Inactivity and Obesity in the Urban Slums of Lahore. Cureus. 2022 Apr 1;14(4):e23719. doi: 10.7759/cureus.23719.

© 2025 et al. Open access under CC BY License (Creative Commons). Freely distributable with appropriate citation.