ORIGINAL ARTICLE
Requency of Over Weight and Obesity and its Determinants Among Adult Population of District Swat Khyber Pakhtunkhwa Pakistan

NAEEMULLAH[1], NADIA KHAN[2], MUHAMMAD JIBRAN KHAN[3], ANWAR KHAN WAZIR[4], ARIF IQBAL[5], MUHAMMAD ISHTIAQ[6], SAID AKBAR KHAN[7], JAWAD ALI[8]

[1]Department of Community Medicine, Saidu Medical College, Saidu Sharif, Swat
[2]Department of Community Medicine, Northwest School of Medicine, Hayatabad, Peshawar
[3]Department of Community Medicine, KIMS (KMU-Institute of Medical Sciences), Kohat
[4]Department of Physiology, Nowshera Medical College, Nowshera
[5]Specialist Family Physician, Hallonbergen Vardcentral, Stockholm, Sweden
[6]Department of Community Medicine, Nowshera Medical College, Nowshera
[7]Department of Earth & Environmental Sciences, Bahria University, Islamabad, Pakistan
[8]Environmental Science, Faculty of Life Sciences & Informatics, BUITEMS, Quetta, Balochistan, Pakistan
Correspondence author: Muhammad Ishtiaq, Email: drishtiaq250@yahoo.com, Cell: 0334-9121822

ABSTRACT

Background: In both emerging and wealthy nations, the epidemic of overweight and obesity has exploded in the last several decades, becoming a huge public health concern.
Objective: To estimate the frequency of overweight and obesity and its important determinants among the adult population of Selected Districts of Khyber Pakhtunkhwa Pakistan
Methods: A descriptive cross sectional study was conducted by the Department of Community Medicine, Saidu Medical College, Swat Khyber Pakhtunkhwa Pakistan; from January to April 2022. A total of 410 adults were selected and a structured questionnaire was used to collect relevant information.
Results: Results showed that 67.07% had age above 30 years; 72.44% were males, 37.32% were illiterate; 51.95% had monthly income less than 25000/ PKR; 54.39% were married; and 26.34% had family history of overweight and obesity. Moreover, 52.93% had sedentary life; 37.56% watch television; and 15.85% & 17.80% had diabetes mellitus & hypertension respectively. Furthermore, 26.34% prefer carbohydrates; and 44.15$ prefer soft drinks. 63.66% and 58.05% didn't prefer vegetables and fruits respectively.
Conclusions: It was concluded that prevalence of overweight and obesity showed moderate to high frequency among adults, and showed relationship was age, gender, marital status, tobacco smoking, dietary habits, and social habits. Thus effective educational, behavioral and social strategies are needed to prevent and control overweight and obesity in the population.
Keywords: Prevalence, Determinants, Developing, Adults, Obesity, Overweight, Pakistan

INTRODUCTION

According to the World Health Organization, 1.9% of the global population is overweight or obese; this number is expected to rise to 3.0% by 2030 [1,2]. It is attributed to high morbidity and mortality due to its strong association with stroke, , asthma, skeleton diseases [5,6,7], cancer, poor mental health [8], hypertension, and type II diabetes mellitus [9] [10] [11]. Moreover, prevalence of obesity was higher in individuals with diabetes mellitus 39.3% and hypertension 34.3% [12] [13].

The nutritional imbalance is shifting from under-nutrition to over-nutrition and causing overweight and obesity, and thus poses a huge financial burden on the public health care system [10] [14]. Moreover, advanced age [13], female gender, unemployment, and urban residence showed strong association with obesity [9] [15] [16]. Furthermore, tobacco smoking, elevated blood pressure, female gender, unemployment, depression, unhealthy dietary pattern, low SES [8] [17] [18].

Many international studies revealed that social, nutritional and epidemiological transitions along with rapid urbanization and modernization are risk factors of obesity and overweight [6] [19]. A combination of a lack of physical activity and being a woman was also thought to play a significant role in the prevalence of overweight women [19] [20] [21]. The genetic, nutritional, social and environmental determinants play a key role in the development of obesity [7] [22] [23]. Furthermore, obesity prevalence is less among poor and high among wealthier individuals [24] [17] [8]. Moreover, low fruits and vegetables intake, unhealthy cheap foods, extensive marketing, high caloric fatty diet, fast foods, soft drinks, and sugar sweetened beverages consumption [14] [15] [16]. The nutritional and epidemiological transitions due to demographic changes, rising income, urbanization, unhealthy lifestyles, and consumption of highly processed fatty diets and carbohydrates are risk factors for development of obesity [21] [23] [24]. Moreover, high intake of red and processed meat was associated with lower food quality and is risk factor of obesity.

According to the World Health Organization (WHO), overweight and obesity are global public health problems and becomes global epidemics [27]. The frequency of overweight and obesity is higher among women [28]; and thus increases risk of caesarean section, postpartum hemorrhage, high birth-weight babies, and infant overweight and obesity [5] [21] [29]. It has been shown by previous studies that socioeconomic and behavioral factors have a significant association with overweight/ obesity [5] [28] [30].

According to 2017 Global Burden of Disease, overweight/ obesity was considered as fourth leading cause of death [20] [31]. Pakistan being a developing country has both communicable and non-communicable diseases. This cross-sectional study was performed to determine the burden of obesity and overweight among adults in the district of Swat in Khyber Pakhtunkhwa, Pakistan, and to identify the important factors of these conditions, as well as to disseminate this information to the relevant sectors so that it can be prevented and controlled.

MATERIALS & METHODS

A descriptive cross sectional study was conducted by the Department of Community Medicine, Saidu Medical College, Swat, Khyber Pakhtunkhwa from January to April 2022. A total sample of n=410 male and female adults were selected; using a 95% confidence range and 5% precision based on a 50% prevalence. A structured questionnaire was used to collect preliminary information; along with anthropometric measurements; and then face to face interview was conducted in which questions regarding social, demographic, dietary and behavioral determinants i.e. direct and indirect variables affecting overweight and obesity, were asked from the study participants [9] [17]. Data entry and analysis were performed employing Microsoft Office 2010 and SPSS 26 respectively.

RESULTS

Results showed that 67.07% had age above 30 years; 72.44% were males, 37.32% were illiterate; 51.95% had monthly income

less than 25000/ PKR; 54.39% were married; and 26.34% had family history of overweight and obesity. Moreover, 52.93% had sedentary life; 37.56% watch television; and 15.85% & 17.80% had diabetes mellitus & hypertension respectively. Furthermore, 26.34% prefer carbohydrates; and 44.15$ prefer soft drinks. 63.66% and 58.05% didn't prefer vegetables and fruits respectively

Table 1: Demographics Of Adults N=410 Of District Swat Khyber Pakhtunkhwa Pakistan

Variable	Response	Frequency	Percentage
Age	< 30	135	32.93
(Years)	30 to 45	162	39.51
	45 to 60	78	19.02
	> 60	35	8.54
Gender	Male	297	72.44
	Female	113	27.56
Marital Status	Married	223	54.39
	Unmarried	135	32.93
	Separated/ Divorced	39	9.51
	Spouse Died	13	3.17
BMI	Undernourished	57	13.9
	Normal BMI	177	43.17
	Overweight	101	24.63
	Obese I II III	75	18.29
Education Status	Illiterate	153	37.32
	Literate	257	62.68
Monthly Income	< 10000	128	31.22
(PKR)	10000 - 25000	85	20.73
	25000 - 40000	115	28.05
	> 40000	82	20
Residence	Rural	127	30.98
	Urban	283	69.02
Job Status	No Job	41	10
	Has Job	369	90

Table 2: Social & Behavioral Determinants of Adults n=410 Of District Swat Khyber Pakhtunkhwa Pakistan

Variable	Response	Frequency	Percentage
Are you diabetic?	Yes	65	15.85
	No	218	53.17
	No idea	127	30.98
Are you hypertensive?	Yes	73	17.8
	No	236	57.56
	No idea	101	24.63
Are you suffering from hyperlipidemia?	Yes	39	9.51
	No	105	25.61
	No idea	266	64.88
Do you current smoke tobacco?	Yes	219	53.41
	No	191	46.59
Do you smoked in past?	Yes	45	10.98
	No	146	35.61
Are you addicted to any other drugs?	Yes	75	18.29
	No	335	81.71
Are you physically active in your daily activities?	Yes	193	47.07
	Sedentary Life	217	52.93
How are your sleeping habits?	Normal	239	58.29
	Abnormal	171	41.71
Do you have any mental problem?	Yes	58	14.15
	No	352	85.85
Do you watch TV?	yes	154	37.56
	no	256	62.44

Table 3: Dietary Pattern of Adults n=410 Of District Swat Khyber Pakhtunkhwa Pakistan

Variable	Response	Frequency	Percentage
Do you prefer vegetables?	Yes	149	36.34
	No	261	63.66
Do you prefer carbohydrates?	Yes	108	26.34
	No	302	73.66
Do you prefer fruits?	Yes	172	41.95
	No	238	58.05
Do you prefer soft drinks?	Yes	181	44.15
	No	229	55.85
Do you like snacks?	Yes	95	23.17
	No	315	76.83
Family history of obesity	Yes	108	26.34
	No	302	73.66
Family history of chronic diseases	Yes	92	22.44
	No	318	77.56

DISCUSSIONS

In our study, 24.635 were found over weight and 18.29% were found obese; whereas in studies of Hemmingsson et al., 2021; and Ofori-Asenso et al., 2016; had 55.1% overweight and 17.1% obesity respectively [6] [9]. Moreover, in study of Chan et al., 2017; and Okati-Aliabad et al., 2022; found 39% and 33% overweight, & 13% and 21.17% obesity respectively [10] [19]. Furthermore, the cumulative prevalence of overweight and obesity in our study was 42.92%, while in studies of Lima et al., 2022; Pengpid & Peltzer, 2021; and Su, Y et al, 2021; revealed 78.3%, 65.7% and 63% respectively, and showed higher prevalence as compared to our study results [12] [15] [20]. Our study showed consistency with international studies of Keetile et al., 2019; Lemamsha et al., 2019; and Oguoma et al., 2021, by showing prevalence of overweight and obesity of 41.3%, 42.4% and 40.6% respectively [17] [21] [28].

According to our study, 27.54% had age above 45 years and 72.46% had age less than 45 years; and 72.44% of participants enrolled were males. In our study, 54.39% of adults were married while in a study conducted by Lemamsha et al., 2019; found marital status of 67% among the study participants for assessment of obesity and overweight [28]. In study conducted by Keetile et al., 2019; found that approximately 37.5% of study population were unemployed whereas in our study, only 10% showed prevalence of unemployed [21].

In studies conducted internationally by Hemmingsson et al., 2021; and Tekalegn et al., 2021; reported that individuals having urban residence showed high prevalence of overweight and obesity as was supported and found in our study which revealed 69.02% [9] [32]. In our study, 14.15% had mental conditions i.e. anxiety and depression, whereas in studies conducted internationally by Cuevas et al., 2019; and Pengpid & Peltzer, 2021; also revealed that psychological problems showed strong relationship with obesity and overweight [15] [22].

In study of Keetile et al., 2019; found that consumption of carbohydrates and snacks were common among the obese individuals, as were reported and confirmed by our study findings of 26.34% and 23.17% respectively [21]. In our study, 44.15% had prefer soft drinks as was found in study of Pengpid & Peltzer, 2021 [15]. Moreover, in our study, 36.34% and 41.95% prefer vegetables and fruits respectively; while in study of Keetile et al., 2019; had 78.29% of vegetables and fruits preference among individuals [21].

In study of Oguoma et al., 2021; found 22% and 18% prevalence of current and past tobacco smoking history respectively while our study had 53.41% and 10.98% prevalence [17]. Moreover in study of Lima et al., 2022; only 10.6% had history of tobacco smoking [12]. In our study, 47.07% were physically active whereas in study of Chan et al., 2017; had 69% individuals physically active [19]. Moreover, in study of Lima et al., 2022; only 13.9% were having sedentary life style activities [12]. Thus our prevalence of physical activity was less as compared to studies of Chan et al., 2017; and Lima et al., 2022 [12] [19].

In our study, 15.85% were diabetic and 17.8% were hypertensive; while in studies of Lima et al., 2022; and Ofori-Asenso et al., 2016; found 6.2% and 8.6% of diabetes respectively [6] [12]. Moreover, in studies of Lima et al., 2022; and Chan et al., 2017; found 20.7% and 13.8% of hypertension respectively [12] [19]. Moreover, in our study, 41.71% had abnormal sleep and 37.56% watched TV; and such relationship was also found by international studies of Balhareth et al., 2019; and Tekalegn, 2021 [16] [32].

CONCLUSIONS

Prevalence of overweight and obesity showed moderate to high frequency among the studied population. Moreover, the overweight and obesity showed relationship was age, gender, marital status, monthly income, tobacco smoking, and social habits. Furthermore, urban residence, dietary patterns, food preference, consumption of fruits, vegetables, snacks and soft drinks; along with acute and chronic diseases in family and participants showed significant relationship with overweight and obesity. Thus effective educational policies and interventions are needed to improve reduction of tobacco smoking habits and healthful diet to reduce

overweight and obesity. Furthermore; nutritional awareness, population based education strategies and promotion of healthy life style activities are urgently needed to prevent and control overweight and obesity; and to avoid the associated complications in the population.

REFERENCES

1   W. H. Organization, "World Health Statistics 2021," 2021.
2   F. S. B. Dias, Y. de Moura Magalhães Lima, F. A. Martins, M. da Silva-Nunes, A. M. de Andrade, and A. A. Ramalho, "Time Trend of Overweight and Obesity in Adults from Rio Branco, Acre, Western Brazilian Amazon (2006–2020)," Nutrients, vol. 14, no. 4, pp. 1–12, 2022, doi: 10.3390/nu14040742.
3   R. Turé, A. Damasceno, M. Djicó, and N. Lunet, "Prevalence of underweight, overweight and obesity among adults in urban bissau, Western Africa," Nutrients, vol. 13, no. 12, pp. 1–12, 2021, doi: 10.3390/nu13124199.
4   C. T. Damsgaard, K. F. Michaelsen, D. Molbo, E. L. Mortensen, and T. I. Sørensen, "Trends in adult body-mass index in 200 countries from 1975 to 2014: A pooled analysis of 1698 population-based measurement studies with 19.2 million participants," Lancet, vol. 387, no. 10026, pp. 1377–1396, 2016.
5   A. M. Kassie, B. B. Abate, and M. W. Kassaw, "Prevalence of overweight/obesity among the adult population in Ethiopia: A systematic review and meta-analysis," BMJ Open, vol. 10, no. 8, pp. 1–10, 2020, doi: 10.1136/bmjopen-2020-039200.
6   R. Ofori-Asenso, A. A. Agyeman, A. Laar, and D. Boateng, "Overweight and obesity epidemic in Ghana - A systematic review and meta-analysis," BMC Public Health, vol. 16, no. 1, 2016, doi: 10.1186/s12889-016-3901-4.
7   J. L. Coll, M. Del Mar Bibiloni, R. Salas, A. Pons, and J. A. Tur, "Prevalence and Related Risk Factors of Overweight and Obesity among the Adult Population in the Balearic Islands, a Mediterranean Region," Obes. Facts, vol. 8, no. 3, pp. 220–233, 2015, doi: 10.1159/000435826.
8   F. Najafi et al., "Socioeconomic - Related inequalities in overweight and obesity: Findings from the PERSIAN cohort study," BMC Public Health, vol. 20, no. 1, pp. 1–13, 2020, doi: 10.1186/s12889-020-8322-8.
9   E. Hemmingsson et al., "Prevalence and time trends of overweight, obesity and severe obesity in 447,925 Swedish adults, 1995–2017," Scand. J. Public Health, vol. 49, no. 4, pp. 377–383, 2021, doi: 10.1177/1403494820914802.
10 H. Okati-Aliabad, A. Ansari-Moghaddam, S. Kargar, and N. Jabbari, "Prevalence of Obesity and Overweight among Adults in the Middle East Countries from 2000 to 2020: A Systematic Review and Meta-Analysis," J. Obes., vol. 2022, 2022, doi: 10.1155/2022/8074837.
11 Y. Tekalegn et al., "Individual and community-level determinants of overweight and obesity among urban men: Further analysis of the Ethiopian demographic and health survey," PLoS One, vol. 16, no. 11 November, pp. 1–14, 2021, doi: 10.1371/journal.pone.0259412.
12 Y. de M. M. Lima, F. A. Martins, and A. A. Ramalho, "Factors Associated with Overweight and Obesity in Adults from Rio Branco, Acre in the Western Brazilian Amazon," Nutrients, vol. 14, no. 5, pp. 1–12, 2022, doi: 10.3390/nu14051079.
13 C. C. Ho, P. F. Lee, H. L. Chen, C. Y. Tseng, X. Y. Hsieh, and C. H. Chiu, "Poor health-related physical fitness performance increases the overweight and obesity risk in older adults from Taiwan," BMC Geriatr., vol. 21, no. 1, pp. 1–13, 2021, doi: 10.1186/s12877-021-02112-1.
14 M. K. Boachie, E. Thsehla, M. Immurana, C. Kohli-Lynch, and K. J. Hofman, "Estimating the healthcare cost of overweight and obesity in South Africa," Glob. Health Action, vol. 15, no. 1, 2022, doi: 10.1080/16549716.2022.2045092.
15 S. Pengpid and K. Peltzer, "Overweight and obesity among adults in iraq: Prevalence and correlates from a national survey in 2015," Int. J. Environ. Res. Public Health, vol. 18, no. 8, 2021, doi: 10.3390/ijerph18084198.
16 A. Balhareth, R. Meertens, S. Kremers, and E. Sleddens, "Overweight and obesity among adults in the Gulf States: A systematic literature review of correlates of weight, weight-related behaviours, and interventions," Obes. Rev., vol. 20, no. 5, pp. 763–793, 2019, doi: 10.1111/obr.12826.
17 V. M. Oguoma et al., "Prevalence of overweight and obesity, and associations with socio-demographic factors in Kuwait," BMC Public Health, vol. 21, no. 1, pp. 1–13, 2021, doi: 10.1186/s12889-021-10692-1.
18 M. Deacon-Crouch, S. Begg, and T. Skinner, "Is sleep duration associated with overweight/obesity in Indigenous Australian adults?," BMC Public Health, vol. 20, no. 1, pp. 1–13, 2020, doi: 10.1186/s12889-020-09287-z.
19 Y. Y. Chan et al., "Physical activity and overweight/obesity among Malaysian adults: Findings from the 2015 National Health and morbidity survey (NHMS)," BMC Public Health, vol. 17, no. 1, pp. 1–12, 2017, doi: 10.1186/s12889-017-4772-z.
20 Y. Su, S. Du, M. Yang, J. Wu, H. Lu, and X. Wang, "Socioeconomic Determinants of Diet Quality on Overweight and Obesity in Adults Aged 40–59 Years in Inner Mongolia: A Cross-Sectional Study," Int. J. Public Health, vol. 66, no. November, pp. 1–7, 2021, doi: 10.3389/ijph.2021.1604107.
21 M. Keetile et al., "Socioeconomic and behavioural determinants of overweight/obesity among adults in Botswana: A cross-sectional study," BMJ Open, vol. 9, no. 12, pp. 1–9, 2019, doi: 10.1136/bmjopen-2019-029570.
22 A. G. Cuevas, R. Chen, K. A. Thurber, N. Slopen, and D. R. Williams, "Psychosocial Stress and Overweight and Obesity: Findings from the Chicago Community Adult Health Study," Ann. Behav. Med., vol. 53, no. 11, pp. 964–974, 2019, doi: 10.1093/abm/kaz008.
23 D. Adeloye et al., "Estimating the prevalence of overweight and obesity in Nigeria in 2020: a systematic review and meta-analysis," Ann. Med., vol. 53, no. 1, pp. 495–507, 2021, doi: 10.1080/07853890.2021.1897665.
24 Y. Wang, M. A. Beydoun, J. Min, H. Xue, L. A. Kaminsky, and L. J. Cheskin, "Has the prevalence of overweight, obesity and central obesity levelled off in the United States? Trends, patterns, disparities, and future projections for the obesity epidemic," Int. J. Epidemiol., vol. 49, no. 3, pp. 810–823, 2021, doi: 10.1093/IJE/DYZ273.
25 A. J. Tomiyama, "Stress and obesity," Annu. Rev. Psychol., vol. 70, pp. 703–718, 2019.
26 S. R. S. Ouakinin, D. P. Barreira, and C. J. Gois, "Depression and obesity: Integrating the role of stress, neuroendocrine dysfunction and inflammatory pathways," Front. Endocrinol. (Lausanne)., vol. 9, p. 431, 2018.
27 W. H. Organization, "Overweight and obesity," 2020.
28 H. Lemamsha, G. Randhawa, and C. Papadopoulos, "Prevalence of overweight and obesity among Libyan men and women," Biomed Res. Int., vol. 2019, 2019, doi: 10.1155/2019/8531360.
29 G. Letamo, "Dual burden of underweight and overweight/obesity among adults in Botswana: prevalence, trends and sociodemographic correlates: a cross-sectional survey," BMJ Open, vol. 10, no. 7, p. e038614, 2020, doi: 10.1136/bmjopen-2020-038614.
30 K. Stoś et al., "Prevalence and Sociodemographic Factors Associated with Overweight and Obesity among Adults in Poland: A 2019/2020 Nationwide Cross-Sectional Survey," Int. J. Environ. Res. Public Health, vol. 19, no. 3, 2022, doi: 10.3390/ijerph19031502.
31 N. Shrestha, S. R. Mishra, S. Ghimire, B. Gyawali, P. M. S. Pradhan, and D. Schwarz, "Application of single-level and multi-level modeling approach to examine geographic and socioeconomic variation in underweight, overweight and obesity in Nepal: findings from NDHS 2016," Sci. Rep., vol. 10, no. 1, pp. 1–14, 2020, doi: 10.1038/s41598-019-56318-w.
32 Y. Tekalegn, "Determinants of Overweight or Obesity among Men Aged 20-59 Years: A Case-Control Study Based on the 2016 Ethiopian Demographic and Health Survey," J. Obes., vol. 2021, 2021, doi: 10.1155/2021/6627328.