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Original Research Article

Prevalence and Associated Factors of Overweight and Obesity in Reproductive Women of a Municipality in Western Nepal

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ABSTRACT:

Introduction: Overweight and obesity are major health related problems and cause economic burden on societies around the world. This study aimed to estimate the prevalence of overweight and obesity, and to determine the associated factors among reproductive women in a municipality in western Nepal. **Methods:** A community-based cross-sectional study was performed and data was collected by convenience sampling method including 353 women aged 15-45 years. Overweight and obesity were defined according to WHO body mass index classification. Chi-Square test was used to assess the factors associated with overweight and obesity. Odds ratio was computed using binary logistic regression analysis. **Results:** The prevalence of overweight and obesity was 55% (overweight 49% and obesity 6%). Age ($p < 0.001$), education ($p = 0.02$), occupation ($p = 0.012$), marital status ($p = 0.008$), presence of chronic disease ($p < 0.001$), dietary pattern ($p = 0.01$), restaurant visit ($p = 0.002$) and stress ($p = 0.003$) were significant associated factors for overweight including obesity among reproductive age women. The odds of being overweight or obesity was higher but not statistically significant in women aged 25-35 years (OR = 2.57 ; 95% CI: 0.89-7.4, $p = 0.082$), in married women (OR = 1.54; 95% CI: 1.08-2.02), and in parous women (OR = 2.38; 95 % CI: 4.05-27.57). The odds of being overweight or obesity were significantly higher in the respondents who had no chronic disease compared to those who had a chronic disease (OR = 6.81, 95% CI: 2.10-10.16). **Conclusion**: We observed a high prevalence of overweight and obesity in our sample. Age, education, occupation, marital status, presence of chronic disease, dietary pattern, restaurant visit and stress were associated with overweight or obesity.

Keywords: Obesity, Overweight, Prevalence, Reproductive age, Women

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INTRODUCTION:

Overweight and obesity refer to a body weight greater than what is healthy. Obesity is a chronic condition defined by an excess amount of body fat. A certain amount of body fat is required for conserving energy, thermoregulation, shock absorption, and other functions.[1] The prevalence of obesity has nearly tripled worldwide since 1975. In 2016, more than 1.9 billion (39%) adults, aged 18 years and above, were overweight and more than 650 million (13%) were found to be obese.[2]

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Obesity is best determined by body mass index (BMI). It is measured as a person's weight in kilograms (kg) divided by height in meters (m) squared. Because a person's weight relative to height is explained by BMI, the strong correlation was found with total body fat content in adults.[1]

Overweight and obesity are major risk factors for a variety of chronic diseases, including diabetes, cardiovascular diseases, and cancer. The mortality rates also increase with increase in BMI.[3] The prevalence of overweight and obesity combined was over one third among women in a health center-based study in Palpa.[4] The risk of obesity is increasing in reproductive age group.[5] So this study was carried out to determine the prevalence of overweight and obesity, and to identify the associated factors in a community in Palpa district.

METHODS:

This cross-sectional study was conducted among 15-49 year-old women in Tansen Municipality ward number 7 by convenience sampling technique from November 2021 to January 2022. According to Koirala M et al., the prevalence of obesity and overweight in women was 35.6%.[4] Taking this study as a reference, the required minimum sample size calculated was 353 at 5% level of significance and 5% margin of error. Women aged 15-49 years were included in the study. The women who reported pregnancy and who were not able to participate in the study due to any illness were excluded from the study.

A structured questionnaire was used in this study as a data collection tool. The women were explained about the objectives of the study. The questionnaire was then distributed to the women who provided informed consent to participate in the study. Confidentiality of the women was maintained as no individual identification was included in the questionnaire.

Weight was taken in an electronic bathroom scale and the same scale was used for all the respondents. Before measurement, the scale of the machine was set to zero and respondents were asked to remove any 'heavy' items (key, mobile, hand bag etc.). The respondents were weighed barefoot and dressed in the lightest clothes possible. While measuring weight, they were asked to look straight ahead and stay still on the scale. The height of each respondent was measured with a standard Stadiometer. BMI was then calculated for each respondent. Overweight was defined as having a BMI between 25.0 and 29.9 kg/m^2 and obesity as having a BMI equal or greater than 30 kg/m^2.[2]

This study included some selected socio-demographic variables (age, ethnicity, education, occupation, marital status, family structure), behavioral variables (exercise, sleeping pattern, restaurant visit, dietary pattern, consumption of alcohol, consumption of junk food, diet schedule, fasting, habit of food choice, time spent sitting in a day at same place, presence of stress), reproductive factor (parity) and presence of any chronic disease.

Statistical analysis was performed with Statistical Package for Social Sciences (SPSS V.23) software. Chi-square test was used to find the association between BMI classification and different categorical variables and odds ratio (OR) was calculated by using binary logistic regression analysis. A p-value less than 0.05 was considered statistically significant. Ethical clearance for the study was obtained from the Institutional Review Committee of the institution (IRC-LMC 06-C/021).

RESULTS:

A total of 353 reproductive age women with average age 30 ± 0.56 years having minimum and maximum age 16 years and 49 years respectively were included in the study. About half of the women (172, 49%) belonged to the age group 15-25 years and almost one-fourth (80, 23%) to the age group 36 - 49 years (Table 1). Representatives from various ethnic groups namely Janajati (176, 50%), Brahmin/Chhetri (150, 42%) and Dalit (27, 8%) were included in the study. Most of the women (168, 48%) had

completed at least bachelor level of education and a few of them (30, 8%) had completed basic level schooling only. The majority of the women were housewives (216, 61%) and were married (276, 78%).

Table 1. Demographic profile of the respondents (N= 353)

Variables		Frequency (%)
Age (years)	15-25	172 (49)
	26-35	101 (28)
	36-49	80 (23)
Cast	Brahmin/Chhetri	150 (42)
	Janajati	176 (50)
	Dalit	27 (8)
Educational Level	Informal	43 (12)
	Basic	30 (8)
	Secondary	112 (32)
	Higher	168 (48)
Occupation	Housewife	216 (61)
	Job	40 (11)
	Business	26 (8)
	Student	71 (20)
Marital Status	Married	276 (78)
	Unmarried	77 (22)
Family structure	Nuclear	184 (52)
	Joint	169 (48)

The mean BMI of the women was 24.7 ± 3.56 kg/m^2 ranging from 18.5 to 30.36 kg/m^2. More than half (55%) of the women were overweight or obese and 4% of the women were underweight (Table 2).

Table 2. Body mass index (BMI) classification of the respondents according to WHO guideline

BMI Category	Frequency (%)
Underweight	15 (4)
Normal Weight	146 (41)
Overweight	173 (49)
Obese	19 (6)

Table 3 shows that two thirds of the women were non-vegetarian (243, 69%). All of the women consumed junk food and more than half of the women (216, 61%) had a habitual diet as 'Lunch, Snacks and Dinner' in a day. More than half of the women (197, 56%) would visit a restaurant for their meal one or more times a week. The prevalence of fasting in a week and having a habit of food choice were 45% and 5% respectively.

Table 4 shows that age, education, occupation, marital status and parity were statistically significantly associated with overweight including obesity.

Table 5 shows that women who were already suffering from other diseases had significantly higher chance of being overweight or obese. The prevalence of being overweight including obesity (55%) in vegetarian women was comparatively greater than non-vegetarian women (40%) which was statistically significant (p = 0.01). Women with no stress were likely to have normal weight as compared to those who were always stressed.

Binary logistic regressions were used for statistically significant variables. Table 6 shows the output of logistic regression of BMI for different characteristics. Regarding the age, respondents in the age group 15-25 years had higher odds of being overweight or obese (OR = 1.628, 95% CI: 0.43-6.126) as compared to those respondents who were in the age group more than 35 years and the odds of the respondents in

Table 3. Lifestyle profile of the respondents (N= 353)

Variables		Frequency (%)
Diet	Vegetarian	110 (31)
	Non- vegetarian	243 (69)
Alcoholic habit	Yes	3 (1)
	No	350 (99)
Consumption of Junk Food	Yes	353 (100)
Diet Schedule	Breakfast, Lunch, Snacks, dinner (Four times a day)	137 (39)
	Lunch, Snacks, dinner (Three times a day)	216 (61)
Restaurant Visit	2-3 times a week	72 (20)
	Once in a week	125 (36)
	Occasionally	156 (44)
Fasting In a week	1 day in a Week	160 (45)
	Never	193 (55)
Habit of Food Choice	Yes	16 (5)
	No	337 (95)
Sitting at the same place continuously	Less than two hours	166 (47)
	Two hours or more	187 (53)

the age group 25-35 years were 2.565 (95% CI: 0.886-7.426) times higher as compared to those respondents who were more than 35 years. This result was found to be statistically insignificant. Regarding the education, the odds of being overweight or obese in respondents who had primary education were 1.286 (95% CI: 0.419-3.943) times higher as compared to those respondents who had informal education and 2.342 (95% CI: 0.855-6.417) times higher in those with secondary education as compared to those respondents who had informal education. This result was also found to be statistically insignificant. Regarding the occupation, the odds were raised in respondents who were housewives by 5.673 (95% CI: 0.595-14.119) times as compared to those respondents who were students. This result was also found to be statistically insignificant. Regarding marital status, respondents who were married were more likely (OR = 1.540, 95% CI: 1.08-2.020) to be overweight as compared to those respondents who were unmarried. This result was also found to be statistically insignificant. Regarding the presence of chronic disease, respondents who had no chronic disease were more likely to be overweight (OR = 6.819, 95% CI: 2.098-10.160)

Table 4. Association of obesity with demographic variables

	Variables	BMI category, n (%)		p-value*
		BMI ≤25	BMI >25	
Age (years)	15-25	116 (67)	56 (33)	< 0.001
	25-35	42 (42)	59 (58)	
	>35	38 (48)	42 (52)	
Education	Informal	19 (44)	24 (56)	0.002
	Primary	15 (50)	15 (50)	
	Secondary	51 (45)	61 (55)	
	Higher	111(66)	57 (34)	
Occupation	Housewife	108 (50)	108 (50)	0.012
	Job	24 (60)	16 (40)	
	Business	13 (50)	13 (50)	
	Student	51 (72)	20 (28)	
Marital status	Unmarried	53 (88)	24 (32)	0.008
	Married	143 (52)	133 (48)	
Parity	None	59 (71)	24 (29)	
	1 Time	20 (38)	33 (62)	< 0.001
	2 time	80 (60)	54 (40)	
	>2 times	37 (45)	46 (55)	

**Chi-Square test.*

as compared to those respondents who had a chronic disease. This result was found to be statistically significant.

DISCUSSION:

The present study was undertaken to assess the prevalence of overweight and obesity and their associated factors among reproductive age group women at Tansen Municipality, where socio-demographic, behavioral and reproductive factors were assessed.

This study reported the prevalence of overweight/obesity to be 55% (overweight 49% and obesity 6%) with the mean BMI of 24.7±3.56 kg/m^2. According to Tripathi N et al.,the prevalence of overweight including obesity was 49.6% (overweight 33.7% and

Table 5. Association of BMI with lifestyle related variables

	Characteristics	BMI category n (%)		p value*
		BMI ≤25	BMI >25	
Presence of chronic disease	No	161 (62)	98 (38)	<0.001
	Yes	35 (37)	59 (63)	
Dietary pattern	Vegetarian	50 (45)	60(55)	0.01
	Non Vegetarian	146 (60)	97 (40)	
Restaurant visit	2-3 times a week	53 (74)	19 (26)	0.002
	Once a week	62 (50)	61 (50)	
	Occasionally	81 (52)	75 (48)	
Stress	Always	12 (55)	10 (45)	0.003
	Sometimes	130 (51)	127 (49)	
	Never	54 (73)	20 (27)	

**Chi Square test*

obesity 15.9%) with the mean BMI of 25.67±4.5 kg/m^2.[6] Similarly, studies from Dharan, Bharatpur, and Bhaktapur reported 42%, 50.48%, and 32.1% of reproductive age women to be overweight/obese respectively.[7,8,9] The national level Nepal Health and Demographic Survey (NDHS) and Nepal Maternal Mortality Survey (NMMS) 2016 reported the prevalence of overweight including obesity among 15-49 years women to be 22% which was lower than the finding of the present study.[10] According to Koirala M et al. and Vaidya A et al., the prevalence of overweight including obesity were 35.6% and 33% in their studies respectively.[4,11]

The socio-demographic significant factors associated with obesity among respondents were age, education, occupation, marital status and parity of the women and lifestyle related significant factors were presence of chronic disease, dietary pattern, and restaurant visit for meal and stress. A study conducted in Bharatpur Metropolitan showed that age, marital status, parity, stress, sleeping time, calorie intake, carbohydrate intake, physical activity and fruits consumption were found to be significantly associated factors of overweight.[8] Also, a study in Kaski district concluded that factors associated with overweight/obesity were age (AOR= 13.85, 95% CI: 5.77-40.80), business as occupation (AOR=7.39, 95%CI: 2.25-14.17), fast food consumption of three or more times a week (AOR=3.42, 95% CI: 1.01-11.63), energy intake above the recommended daily allowances (RDA) (AOR=5.45; 95% CI: 2.19-13.55), low or moderate physical activity level (AOR=2.84; 95% CI: 1.18-6.83) and multiparty (AOR=17.80; 95% CI: 4.04-89.06).[6]

Table 6: Logistic regression of BMI for different characteristics

Characteristics		p-value	OR	95% C.I. for OR	
				Lower	Upper
Age (years)	15-25	0.471	1.628	0.433	6.126
	25-35	0.082	2.565	0.886	7.426
	>35 (ref)	0.120			
Education	Informal (ref)	0.266			
	Primary	0.660	1.286	0.419	3.943
	Secondary	0.098	2.342	0.855	6.417
	Higher	0.458	1.551	0.487	4.940
Occupation	Housewife	0.131	5.673	0.595	14.119
	Job	0.135	4.202	0.641	12.565
	Business	0.355	3.023	0.290	9.486
	Student (ref)	0.309			
Marital status	Unmarried (ref)				
	Married	0.235	1.540	1.080	2.020
Parity	None (ref)				
	Yes	0.347	2.380	4.050	27.565
Presence of chronic disease	No	0.001	6.819	2.098	10.160
	Yes (ref)				
Dietary pattern	Vegetarian (ref)				
	Non-Vegetarian	0.032	.544	0.311	.950
Restaurant visit	2-3 times a week	0.166	1.735	0.795	3.786
	Once a week	0.962	.979	0.412	2.324
	Occasionally (ref)	0.131			
Stress	Always	0.830	1.138	0.351	3.687
	Sometimes	0.000	3.438	1.723	6.860
	Never (ref)	0.001			
	Constant	0.004	0.020		

In the present study, with reference to women aged more than 35 years, the odds of overweight including obesity were 1.628 (95% CI: 0.43-6.126) times raised among the women 15-25 years and 2.56 (95% CI; 0.886-7.426) times raised among women of age 25-35 years ($p > 0.05$). This finding was consistent with the studies conducted by Koirala M. et al., Bhattarai P et al., Subedi S et al., and Shrestha S et al. which revealed that obesity was significantly associated with the age of the respondents.[4,7,8,9] Regarding the education of the women, this study revealed that education was associated with obesity as women having primary education (OR = 1.286, 95% CI: 0.419-3.943) and those having secondary education OR= 2.324, 95% CI: 0.8556.147) were more likely to be overweight as compared to those who had informal education though these results were statistically insignificant. This finding was consistent with the study conducted by Koirala M et al.[4] The study conducted by Tripathi N et al. and Shrestha S et al. showed that education was not a significant factor for overweight including obesity. The study revealed that as compared to the housewife, the overweight including obesity was likely to be more in women with job and business.[6,9] A study conducted in Kaski district showed women having self-run business as occupation (OR=7.39) exhibited significantly higher odds for being overweight including obesity ($p= 0.001$).[6] According to Shrestha S, occupation was not a significant factor associated with obesity ($p=0.808$).[9]

Married women had significantly higher odds of overweight or obesity in comparison to unmarried women (OR=2.436; 95% CI: 1.080-2.02, $p= 0.008$). This finding was consistent with a study conducted by Koirala M et al. ($p = 0.02$), and Bhattarai P et al. ($p=0.019$).[4,7] The findings of the study revealed that higher parity was significantly associated with overweight including obesity. Compared to nulliparous women or women with parity two or more than two, women with parity one were more likely to be overweight. A similar study done by Tripathi N et al. concluded that the women who had more than two parity were more likely to be overweight than nulliparous women (AOR=17.803).[6]

The prevalence of being overweight including obesity in vegetarian women was comparatively greater than in non-vegetarian women. However, a study done by Koirala M et al. concluded that non- vegetarian women are likely to be more at risk for overweight including obesity.[4] According to Shrestha S et al. there is no association between dietary pattern and obesity ($p = 0.279$).[9] The contrasting findings in this study might be due to role of other confounding factors. The prevalence of overweight including obesity in women with no chronic disease was comparatively greater than in women with such conditions which was consistent with the study conducted in Bhaktapur.[9]. In Contrast, the prevalence of overweight in chronic disease women was comparatively higher in another study.[12] The stressful women were more likely to be overweight or obese in this study which is consistent to study done in Bharatpur, Nepal.[8] .

There are some limitations of this study. The study used non-probability sampling technique (convenience sampling) rather than probability sampling which may not be representative of all women in this study area.

CONCLUSION:

The overall prevalence of overweight including obesity among reproductive age women in Tansen was high. The study concluded that age, education, occupation, marital status, parity and stress were associated with prevalence of overweight and obesity.

Conflict of Interest: The authors declare that no competing interests exist.

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