Original Research Article

Risk Factors for Obesity in Nepalese Women: A Cross-sectional Study

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ABSTRACT

Introduction: Obesity is defined as an abnormal or excessive fat accumulation that may impair health. It is on the rise worldwide, not sparing developing countries. Both demographic and socioeconomic factors play an important part in its causation. Body mass index is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. This study was done with objectives of assessing the prevalence of overweight and obesity and its associated factors among adult women attending selected outpatient departments of tertiary care centre in western region of Nepal. **Methods**: A descriptive cross-sectional study was conducted for six months. A total of 160 female respondents aged more than 20 years attending outpatient departments were included in the study using non-probability convenient sampling technique. Data on socio-demographic status, dietary pattern, health risk behavior and presence of chronic illness were collected and anthropometric measurements were taken for all the respondents. **Results**: The prevalence of overweight and obesity were 31.8% and 3.8% respectively. There was statistically significant association between obesity and overweight with age (p=0.044), educational status (p=0.017), frequency of consumption of fruits (p=0.029), dietary pattern (p=0.023), frequency of consumption of dairy products (p=0.019), marital status (p=0.020) and drinking alcohol (p=0.022). **Conclusion**: Age, educational status, frequency of consumption of dairy products, dietary habits, marital status and drinking habits were statistically associated with obesity and overweight among adult women.

Keywords: Body Mass Index; Obesity; Prevalence; Risk factors; Women

INTRODUCTION:

Overweight and obesity are considered to be the fifth leading risk for global deaths, estimating that 2.8 million adults die each year as a result of being overweight or obese.[1] Body Mass Index (BMI) is defined as a person's weight in kilograms divided by the height in meters squared (kg/m^2). The World Health Organization (WHO) definition states a BMI greater than or equal to 30 is obesity and a BMI greater than or equal to 25 is overweight.[2] Obesity was initially most visible in developed countries but recent global figures indicated that it was increasing in the developing world as there was marked change in lifestyle.[3] Therefore, WHO has emphasized in the importance of monitoring the prevalence and secular trends for overweight and obesity in each country.[4] Women have higher rates of obesity than men globally, and positive association was seen with marriage, lower educational level, alcohol use and high socio-economic status.[5] The WHO MONICA project also stated that the lower education was associated with higher BMI in about half of the male and in almost all of the female populations.[6] The prevalence of obesity in women in South Asian countries, Nepal and Bangladesh, between 1996

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and 2006 showed increment from 1.6% to 10% and from 2.7% to 8.9%, respectively.[7] Women, in particular, have a higher prevalence of obesity that increases with age.[1] In Nepal dietary pattern has significantly changed in recent years and overweight and obesity among women were associated with fewer intakes of fruits in diet.[8]

Several national and international research studies were conducted in this topic and many national studies were limited to capital city Kathmandu and eastern Nepal but none of the studies were documented for western Nepal.[9,10] Identifying the risk factors associated with obesity and overweight may help to determine the target groups for prevention. So, this study aimed to assess the prevalence of overweight and obesity among the adult women and its risk factors in western hilly regions of Nepal.

METHODS:

This was a descriptive cross-sectional study conducted in Lumbini Medical College and Teaching Hospital (LMCTH) from July to December, 2017, after receiving permission from Institutional Review Committee of Lumbini Medical College and Teaching Hospital (IRC-LMC 121641/070/071).

Sample size was calculated using the formula $n = z^2 p(1-p)/d^2$

Where n = sample size, Z = 2.58, at level of confidence of 99%, p= 40.1%,[10] and d = 0.01 with desirable error of 10%. The sample size was calculated to be 159. For the present study the sample size was taken to be 160.

A total of 160 female respondents above 20 years of age attending Outpatient Departments (OPDs) of Obstetrics & Gynecology and Medicine were enrolled in the study using non-probability convenient sampling technique. Pregnant, non-consenting and physically disabled females were excluded from the study.

Data collection tool for the present study was a structured questionnaire which was pre-tested in 10% of the anticipated sample. All the respondents were interviewed by the principal investigator. The questionnaire consisted of two parts:

• Part one included socio- demographic data consisting of age, ethnicity, educational status, occupation, marital status, menstrual cycle, parity and anthropometric measurement (weight and height).

• Part two consisted of factors associated with obesity including dietary behavior, health risk behavior and presence of chronic illness.

Weight was taken by an electronic bathroom scale and the same scale was used for all the participants. 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.) before taking weight. 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 the respondents was measured with a standard stadio-meter, brand ROKS+ and model MI20.

BMI was 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 30.0 kg/m^2.[5] Separate room was used for data collection to maintain the confidentiality of the respondents.

Data was collected using face to face interview technique and then entered and analyzed using Statistical Package for Social Sciences (SPSS™) software version 16. Descriptive statistics were measured by mean, median and standard deviation (SD), whereas inferential statistics like chi square test was used for association-values and Odds Ratios (OR) and their 95% confidence intervals (CI) were computed. Analysis was done with binary logistic regression analysis with obesity as the dependent variable and other factors as the independent variables. P-value <0.05 was considered to be significant.

RESULTS:

The study included 160 females with a mean age of 40.17 ± 12.49 years, of which the most belonged to the age range of 21-39 years. Majority of the respondents were Janajati (45%). More than half of the respondents were job holders, businesswomen/shopkeeper, students and engaged in farming (61.3%) and 38.7% were housewives. Majority of the respondents were Janajati (45%), hailed from rural locality (63.7%) and were multi para (82.9%) (Table 1).

Table 1. Socio-demographic distribution of the study population (N=160)

Variables		Frequency N (%)
Age	21-39 years	96 (60.0)
	40-59 years	55 (34.4)
	≥ 60 years	9 (5.6)
Ethinicity	Janajati	72 (45.0)
	Dalit	20 (12.5)
	Brahmin/ Chhetri	68 (42.5)
Education	Illiterate	19 (11.9)
	Literate	141 (88.1)
Occupation	Housewife	62 (38.7)
	Business/Shopkeeper	37 (23.1)
	Student	12 (7.5)
	Job holder	22 (13.8)
	Farming	27 (16.9)
Marital status	Married	146 (91.3)
	Unmarried	14 (8.7)
Parity (n=146)	Primipara	16 (10.9)
	Multipara	121 (82.9)
	Nullipara	09 (6.2)
Menstrual cycle	Yes	101(63.1)
	No	59 (36.9)
Residence	Rural	102 (63.7)
	Urban	58 (36.3)
Diet	Vegetarian	26 (16.2)
	Non- vegetarian	134 (83.8)

The mean BMI of the respondents was 23.81±3.42 kg/m2. There were 64.4% respondents with normal BMI whereas 31.8% and 3.8% of respondents were overweight and obese respectively. The combined prevalence of overweight and obesity was 35.6% (Table 2).

Table 2: Distributions of respondent's BMI (N=160)

BMI classification	Frequency N(%)	Mean ± SD
Normal weight	103 (64.4)	3.81 ± 3.423
Overweight	51 (31.8)	
Obese	6 (3.8)	

Based on the result for association of BMI with independent variables, age (p=0.044), educational status (p=0.017), frequency of consumption of fruits (p=0.029), dietary pattern (p=0.023), frequency of consumption of dairy products (p=0.019), marital status (p=0.020) and drinking alcohol (p=0.022) were found to be independently associated with BMI (Table 3).

Analysis of risk factors with overweight and obesity showed that those women who consumed fruits more than three times a week were 80% less likely to get overweight/obese than those who consume fruits once a week (OR=0.192, 95% CI:0.044-0.838, p=0.028) (Table 4).

The overall model significant value for those variables is <0.001. The covariates which were found as the risk factors of obesity had an impact of 19 to 26 percent in overall study. (Table 5)

DISCUSSION:

The present study revealed the prevalence of overweight and obesity in Nepalese women of western hilly region to be 35.7% which is consistent with another Nepalese study conducted by Vaidya A et al. where the prevalence of obesity was 33%.[9] Similar findings were noted among Turkish women where prevalence of overweight/obesity was 35%. [11] There was positive association between age of the respondents and overweight/obesity which was in line with the study conducted by Vaidya A, et al.[9] Such high incidence in prevalence of overweight and obesity may be due to urbanization, lifestyle and nutritional pattern. But negative association was reported by the study conducted by Ghorbani R, in Iranian women and Shahi M et al., in Nepal.[4,8]

Education is an important factor for women to be healthy. Similar to our findings, Saeed et al. also noted significant association between level of education and overweight/obesity.[12] Literate women are more health conscious and less likely to be overweight/obese than illiterate woman. However, a Nepalese study noted negative association of education with obesity.[8] The present study did not show significant association between place of residency (urban versus rural) and overweight and obesity, the findings of which are similar to studies conducted in Iranian middle aged women.[4] A study conducted by Weng HH et al., 7% increase in risk of obesity was noted for each additional child, which is in contrast to the recent study which shows parity is not associated with overweight and obesity.[13]

Likewise, this study revealed that there is

Table 3: Association between socio-demographic variables and respondent's BMI (N=160)

Variables	BMI classification (Frequency)		X^2	df	p value
	Normal (< 25kg/ m^2)	Overweight/ Obese(≥ 25kg/m^2)			
Age					
21-39 years	69	27	6.231	2	0.044
40-59 years	30	25			
Above 60 years	04	05			
Education status					
Illiterate	07	12	12.003	4	0.017
Literate	15	06			
Primary	20	14			
Secondary	33	19			
Higher secondary	28	06			
Marital status					
Married	90	56	5.427	1	0.020
Unmarried	13	01			
Type of diet					
Vegetarian	23	05	0.031	1	0.023
Non- vegetarian	80	52			
Frequency of consumption of fruits					
Once a week	05	10	9.013	3	0.029
twice a week	28	18			
thrice a week	39	19			
> thrice a week	31	10			
Frequency of consumption of dairy product					
once a week	16	19	9.957	3	0.019
twice a week	16	13			
thrice a week	41	15			
> thrice a week	29	11			
Drinking habits of respondents					
Yes	14	16	5.049	1	0.022
No	89	41			

statistically significant association between dietary habit of respondents and overweight / obesity which is dissimilar to the previous study conducted by Almeida Silva et al.[14]

The present study showed the association between the frequency of consumption of fruits and overweight/ obesity is significant at p=0.029 which is supported by the study conducted by Shahi M et al.,[8] but it is has different results from the study conducted by Sharma SK et al., which reports that more the fruit intake higher the prevalence of obesity.[3] The current study showed the association between frequency of dairy products and overweight/ obesity (p=0.019) which is comparable with the study conducted by Joyce N in Kenya.[15] Dietary pattern is also associated with the obesity. The study reveals that vegetarian are less likely to be obese than non-vegetarian.[16] This study reveals that there is strong association between marital status and overweight/obesity (p=0.020), this may be defined as consumption of more calories and less physical activities and this result is supported by study conducted in Spain.[17]

Other socio-demographic variable including

Table 4: Risk factors associated with obesity (N=160)

Variables		*p*-value	Exp (B) / odds ratio	95% C.I. for OR	
				Lower	Upper
Age	21-39 years	0.194			
	40-59 years	0.080	2.037	0.918	4.522
	Above 60 years	0.404	2.226	0.339	14.609
Education	Illiterate	0.211			
	Literate	0.211	0.456	0.133	1.560
Frequency of consumption of fruits	Once a week	0.175			
	twice a week	0.165	0.380	0.097	1.488
	thrice a week	0.106	0.322	0.082	1.274
	> thrice a week	0.028	0.192	0.044	0.838
Frequency of consumption of diary product	once a week	0.208			
	twice a week	0.733	0.823	0.269	2.520
	thrice a week	0.055	0.361	0.128	1.022
	> thrice a week	0.271	0.538	0.178	1.624
Drinking habits	Drinking	0.103	0.453	0.175	1.174
Type of diet	Diet	0.097	2.586	0.842	7.942
Marital status		0.218	0.260	0.031	2.219
Constant		0.240	3.757		

ethnicity, occupation, parity, residency (rural and urban) and menstrual cycle didn't show statistically significant association with obesity/overweight in current study. These results confirm the finding from some previous studies.[8,18,19] Age of the respondents, marital status, level education, dietary pattern, consumption of fruits, frequency of consumption of dairy products and alcohol consumption were found to have statistically significant association with obesity. [9,11,15,20,21,22] This study confirms the findings of other study in associating increasing BMI with age.[12,23] Except the variable, frequency of fruits consumption, all other independently associated factors didn't show any association with overweight /obesity with binary logistic regression.

Table 5: Model summary

Cox & Snell R²	Nagelkerke R²	*p* value
0.192	0.264	<0.001

The present study is not without limitations. As data were collected conveniently, it may not be generalized outside of Western region of Nepal. The results did not show statistically significant association between ethnicity, resident, type of occupations, parity and menstrual status. Finding of this study cannot be generalized to male respondents. A comparative study between male and female regarding the prevalence and it impact in health of both gender and factors affecting can be conducted. However, this study also may create a small basis for conducting large population-based studies in the future.

CONCLUSION:

The combined prevalence of overweight and obesity in the present study is 35.6%. Increasing age, educational status, frequency of consumption of fruits and dairy products, dietary pattern, habits of drinking alcohol and marital status were strongly detected risk factors of obesity and overweight among the adult women. The finding highlights overweight and obesity is more in women of middleaged group. It is paramount for health care service provider to create awareness regarding the impact of overweight and obesity on health and sensitize them for lifestyle modification.

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