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Original Article

Life style factors associated with overweight and obesity in Nepalese women of reproductive age

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ABSTRACT

Background and Objectives: Overweight and Obesity is a highly prevalent global epidemic. South Asians are more vulnerable to obesity-related diseases with rising co-morbidities when compared to developed countries. It is linked with several health complications. Globally more women are found overweight or obese compared to men. So this study is planned to examine the life-style related determinants of overweight and obesity in reproductive aged females (15-49 years) in Nepal.

Material and Methods: Analytical cross-sectional study was carried out among reproductive aged females (15-49 years) of Kathmandu Metropolitan city, Nepal. Stratified random as well as population proportionate sampling technique was used to determine number of respondents from each selected ward. A structured questionnaire for nutrition intake and various demographic and lifestyle factors reviewed by the panel of experts was administered for data collection. Overweight or obesity was considered as per BMI international cut-off points for adults.

Results: Overweight or obesity (BMI≥25) in reproductive aged females was found to be 26%. Women who were working, married, and had family history of overweight and obesity and those who took fast foods moderately were found significantly more likely of becoming overweight or obese ($p \leq 0.05$). Moderate physical activity, daily breakfast intake, were found to be significantly less likely of becoming overweight or obese in reproductive aged women ($p \leq 0.05$).

Conclusions: Moderate physical activities as well as daily breakfast consumption is more likely to reduce overweight and obesity. The findings can be used as a guideline for overweight and obesity prevention in reproductive aged women. Some larger prospective studies are needed.

Key words: BMI; Nutrition, Overweight; Obesity; Reproductive age

INTRODUCTION

Overweight and Obesity, with increased morbidity and mortality, is a severe, complex, and highly prevalent global epidemic [1]. In 2014, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 600 million were obese. 39% of adults aged 18 years and over were overweight in 2014, and 13% were obese. Most of the world's population lives in countries where

overweight and obesity kills more people than underweight [2].

Obesogenic environment with increasingly accessible fatty foods and decrease of physical activity are the major contributing factors. Although South Asians have had low prevalence rates of obesity when compared with many Western countries, their vulnerability to obesity-related diseases with rising co morbidities is higher than in developed countries [3]. Cardio vascular deaths are found to be 46.7% in developing countries when compared with 26.5% in developed countries. Indo Asians are at greater risk of obesity related diseases [4]. 2.5 million Deaths are attributable to obesity globally of which 1/3 rd occurs in developing countries leading to increased health care costs in developing countries [5]. Nepal is one of the developing countries facing the consequences of potentially increasing obesity [6].

According to WHO , Nepal's national overweight rate was 8.8% and 8% for men and women respectively in 2005 , but it is predicted to increase to 13.7% for men, 12.3% for women by 2015 [7]. WHO diabetes country profile, 2016 of Nepal shows higher prevalence of overweight and obesity in females ie: is 19.6% and 4.1% respectively in comparison to males which is 13.6% and 1.7% [8]. As per NDHS, 2011 highest prevalence of overweight and obesity in females (15-49) is found in central hill sub region of Nepal (22.2%) [9]. Studies in different countries have shown that there is association between dietary, socio-demographic and other life style factors to overweight and obesity. Camoes M et al [10] have reported the relation between diet and exercise on obesity. In south Asian countries (Bangladesh, Nepal and India), the prevalence of overweight and obesity in women of reproductive age has increased substantially [11, 12]. Another significant finding from the WHO MONICA project is that women generally have higher rates of obesity than men. Many other studies have also shown that the prevalence of obesity among women was higher than men. The age range of 25–44 years is the time when women tend to gain the greatest amount of weight. Among women of childbearing age, one potential pathway for the development of obesity has been through the retention of gestational weight gain [11,12].

The sedentary lifestyle due to urbanization and modernization and its effect on dietary pattern are often blamed for increasing overweight and obesity. Women have more frequent opportunities to consume food and are more likely to have greater volumes of food available because they traditionally prepare meals for their families in country like Nepal. On the other hand, nowadays more women are eating outside their homes, as well as buying home food from restaurants, food-stalls and fast-food centers for their families [12]. However, no research to our knowledge has been published in Nepal regarding maternal overweight and obesity in relation to dietary and life style factors. To fulfill the gap the present study tries to focus on identifying mainly dietary and other life style related determinants of overweight and obesity in urban women of reproductive age (15-49) and examine their probable associations.

MATERIAL AND METHODS

An analytical cross sectional study was carried out among females of reproductive age 15-49 in even number of wards of Kathmandu metropolitan city who were continuously staying in the even number of

wards at least for six months and who were willing to be a part of the study by signing informed consent were considered under study. 189 females from 17 wards (even number of wards out of 35 wards of Kathmandu metropolitan city, Nepal) matching including criteria were selected using random sampling technique. Females other than reproductive age i.e. beyond 15 and 49, who were recently pregnant or who are in lactation period and, the respondents who were found fasting or feasting the day before of the interview were not included for the study (as questionnaire has 24 hrs meal details).

A structured questionnaire consisting of information about Socio-demographic and anthropometric information's of female population (15-49), and information's on life style factors was designed. Face to face interviews was conducted by researchers following cut-offs value was used in the study [table 1] and for the sake of analysis BMI category is made dichotomous as in table 2.

Table 1: BMI cut-offs used in the study

	BMI KG/M^2
Underweight	< 18.50
Normal range	18.50- 24.99
overweight/ Pre-obese	25-29.99
Obese	>30

Table 2: Dichotomized BMI cut-offs

	BMI KG/M^2
Normal	< 25
Overweight/ obese	≥25

Collected data was entered into IBM SPSS 21 statistic for statistical analysis. Ethical clearance was obtained from the ethical review board of CAFODAT College, Purbanchal University.

Data collection tool and basic interviewing techniques were strictly followed in addition to check the consistency and completeness of the tool. Data processing was done by creating variables, entering, coding and tabulation of the data and analysis was done using SPSS version 17 software and Ms Excel.

RESULTS

Socio-demographic characteristics of the participants are presented in Table 3. Out of 189 study participants, 41(21.7%) were of age group 15-19, 60 (31.7%) were of 20-29, 45(23.8%) were of 30-39 and 43 (22.8%) were of age group 40-49. Anthropometric Characteristics is shown in Table 4. Table 5 highlights the life style behaviors and health related aspects.

Table 3: Characteristics of Socio-demographic variables

Variables	Frequency n= 189	Percent %
Age groups		
15-19	41	21.7
20-29	60	31.7
30-39	45	23.8
40-49	43	22.8
Ethnicity		
Brahmin/Chhetri	118	62.4
Janajati	56	29.6
Others	15	7.9
Religion		
Hindu	155	82
Non- Hindus	34	18
Occupation		
Not working	78	41.3
Working	111	58.7
Education		
Secondary or less	34	18
More than secondary	155	82
Marital status		
Married	108	57.2
Unmarried	81	42.8
Family income		
Rs 30500 or less	35	18.5
More than 30500	154	81.5

Table 4. Anthropometric characteristics of females of reproductive age (15-49)

Variables	Mean	Std. Dev.
Height(cm)	156.23	5.4
Weight(kg)	55.91	8.19
Body mass Index	**Frequency**	**Percent**
Underweight (< 18.5)	16	8.5
Normal (18.5-24.99)	124	65.6
Overweight (24.99-29.99)	43	22.8
Obese (≥ 30)	6	3.2

Table 5: Characteristics of Lifestyle and health related variables of women of reproductive age:

Variables	Frequency n=189	Percent %
Alcohol consumption		
Yes(Sometimes)	103	54.5
No	86	45.5
Smoking Behavior		
Daily	5	2.6
Sometimes	11	5.8
None	173	91.5
TV hrs		
2 or less	131	69.3
2-5	46	24.3
>5	12	6.3
Menstruation	138	73
Regular	51	27
Irregular		
Family history of Overweight/obesity		
Yes	63	33.3
No	126	66.7
Daily Breakfast consumption		
Yes	107	56.6
No	82	43.4
Fasting Behaviour		
Fasting	41	21.7
Not fasting	148	78.3
Physical Activity		
low	79	41.8
moderate	99	52.4
High	11	5.8

Regarding bi-variate analysis of lifestyle related variables as shown in Table 6, alcohol consumption, occasional smoking behavior, TV hours more than 5, having family history of overweight/obesity, having fasting behavior at least one time weekly and having hypothyroid disorders were significantly associated with higher odds of overweight or obesity. Whereas moderate physical activity and daily breakfast eating behavior showed significantly lower odds of becoming overweight or obese. However, daily number of meals and regularity of menstrual periods did not show any significant association with overweight or obesity.

Table 6: Bivariate analysis of Life style and health related variables with overweight or obesity

Variables	Frequency	Crude odds ratio(95%CI)	p-value
Alcohol consumption			
Yes (Sometimes)	103	2.332 (1.168-4.659)	.016*
No	86	1	
Smoking Behaviour			
Daily	5	4.987 (0.805-30.89)	.084
Sometimes	11	3.990 (1.157-13.765)	.029*
none	173	1*(Ref)*	
TV hrs			
2 or less	131	1*(Ref)*	
2-5	46	1.954 (0.922-4.14)	.08
>5	12	8.077 (2.258-28.89)	.001*
Physical Activity			
low	79	1*(Ref)*	
moderate	99	0.255 (0.124-0.526)	.000*
High	11	0.885(0.239-3.275)	.855
Regularity of menstruation			
yes	138	.604(0.299-1.220)	0.160
no	51	1*(Ref)*	
Family history of Overwt/obesity			
Yes	63	3.147 (1.450-9.353)	.001*
no	126	1(Ref)	
Daily Breakfast consumption			
Yes	107	0.333 (0.169-0.654)	.001*
no	82	1*(Ref)*	
Fasting Behaviour			
Fasting	41	2.954 (1.419-6.147)	.004*
Not fasting	148	1*(Ref)*	

** denotes to significant variables P-value<0.05*
(Ref) denotes to reference category

Multivariate Analysis:

The variables which were found significant at the level of 0.2 in bivariate analysis were considered for multivariate analysis by using binary logistic regression categorical as shown in table 7.

Table 7: Multivariate Analysis of the variables with overweight or obesity that have p-value less than 0.2

Variables	Frequency	odds ratio (95%CI)	p-value
Age groups			
15-19	41	1(Ref)	
20-29	60	3.632 (0.035 - 372.487)	.585
30-39	45	11.990 (.072 - 1992.038.0)	.341
40-49	43	76.269 (.464 - 12547.170)	.096
Ethnicity			
Bhramin/ Chhetri	118	0.188 (0.005 - 5.235)	.324
Janajati	56	0.453 (0.013-15.877)	.662
Others	15	1 (Ref)	
Occupation			
Not working	78	1 (Ref)	
Working	111	0.026 (0.001-.520)	0.017*
Marital status:			
Unmarried	81	1(Ref)	
Married	108	601.97(9.76-37134.2)	0.002*
Alcohol consumption			
Yes(Sometimes)	103	6.656 (0.608-72.8)	0.120
No	86	1(Ref)	
Smoking Behaviour			
Daily	5	3.2(0.007-1415.1)	.706
Sometimes	11	15.3(0.21-1110.76)	.212
none	173	1(Ref)	
TV hours			
less than 2	131	1(Ref)	
2-5	46	3.36(0.14-79.1)	0.452
>5	12	2.4 (0.012-520.8)	0.742
Physical Activity			
low	79	1(Ref)	
moderate	99	0.078(0.006-0.943)	0.045*
High	11	0.225(0.005-10.31)	0.444
Menstruation			
Regular	138	0.274(0.021-3.63)	0.326
Irregular	51	1*(Ref)*	
Family history of Overweight/ obesity			
Yes	63	15.575(1.225-198.1)	0.034*
No	126	1*(Ref)*	
Daily Breakfast consumption			
Yes	107	0.038 (0.002-0.604)	0.021*
no	82	1*(Ref)*	
Fasting Behaviour			
yes	41	3.426(0.10-117.2)	0.495
No	148	1*(Ref)*	

** denotes to significant variables P-value<0.05; (Ref) denotes to reference category*
Food groups intake based on percent contribution to daily calorie intake. Low, medium, and high denotes to first, second, and third tertiles, respectively.

DISCUSSION

This study tries to provide glimpse of overweight and obesity prevalence in females of reproductive age examining socio-demographic, lifestyle and dietary factors to the likelihood of becoming overweight and obese in the age group. As most of studies in Nepal are focused on under-nutrition, the findings of this study may provide evidence to recognize overweight and obesity as one of the alarming public health issue and could necessitate the need of larger studies. Beside, this study could help in formulating appropriate prevention strategies and policies regarding overweight and obesity in females of reproductive age.

The total overweight or obesity (BMI ≥25) prevalence in females of reproductive age in Kathmandu metropolitan city was found to be 26% which is nearly double than that in NDHS 2011(13.6%) and exceed by 3.9% than that in STEPS survey, 2013 (21.1%) performed in the females of age group 15-69 [13]. When compared with data from other developing countries, a previous study in South Asian countries has showed the rising trend of overweight and obesity among reproductive-age women between 1996 and 2006, from 2.7% to 8.9% in Bangladesh and 10.6% to 14.8% in India [14].

In our study, regarding associations of various factors with overweight or obesity, bivariate analysis showed that age groups 30-39 and 40-49 are significantly associated with increased odds of overweight or obesity which was supported by the study performed among adults of north east India [15]. Likewise, a study carried out among women in north India [16] found age as the important covariate of overweight and obesity. This suggests that the amount of muscle-mass begins to decrease and the proportion of adiposity continuously increases as the age increases [17]. The increase in the odds of overweight and obesity could be thus related to age-affected body adiposity [18]. Therefore, individuals belonging to the higher age groups have greater adiposity that leads to a higher prevalence of overweight-obesity [18]. However, in our study, independent effects of the age groups were not seen.

Regarding occupational status, compared with not working, females who were working showed significantly independent association with lower odds of overweight and obesity in multivariate analysis($P<0.05$) which is in agreement with the study as per Musaiger AO, [19] in Eastern Mediterranean region. Working women were less likely to be overweight than nonworking women. For example, in Saudi Arabia, Musaiger and AlAhdal found that 55.9% of nonworking women were obese, and the rest (44.1%) were non-obese.

In our study both bivariate and multivariate analysis showed significant association of married women with higher odds of overweight or obesity. This is in agreement with many other studies performed in Nepal and other different countries [6, 20,21, and 22].

Regarding alcohol consumption and smoking behaviour, bivariate analysis showed significant association with higher odds of overweight or obesity among those who consumed sometimes compared with the non-consumers. However, in multivariate analysis significant association was not found. It may be due to the adjustment of confounding of other factors. Regarding alcohol consumption, this is in agreement with the study performed among female civil servants in Nepal [6]. The finding somehow corresponds with the results of the study

conducted among 826 Rengma-Naga individuals which have shown that alcohol consumption had significantly 1.44 fold greater odds to being overweight ($p<0.05$). Likewise smoking showed greater association with the increased adiposity in the same study [15]. An inverse relationship between smoking and adiposity has been documented, but effects of smoking on obesity remain inconclusive [23] but a significantly greater risks (1.50 times) for overweight observed in tobacco use ($p<0.05$)

Moderate Physical activity was significantly associated with lower odds of overweight and obesity ($P = 0.045$) compared with low physical activity in multivariate analysis. In our study no independent significant association was seen between high physical activity and overweight and obesity. our finding somehow correspond with most epidemiological studies showing smaller risk of weight gain, overweight and obesity among persons who currently engage regularly in moderate to large amounts of physical activity [24]. Likewise a cross sectional study performed in south India among adults [1] supports our study which found each hour of moderate physical activity associated with a 0.085 kg/m2 decrease in BMI, in adjusted model. Several researchers suggest that modernization has contributed to declining physical activity in many ways. As mentioned by Mishra P et al, an influx of vehicles has reduced the need for active transportation [25].

Family history of overweight and obesity is associated with significantly higher odds of overweight or obesity in both bivariate and multivariate analysis ($p<0.05$). Our findings correspond with the findings among private medical students of Bangladesh which reported the association between the positive family history of overweight/obesity and being overweight. Similar finding was seen in previous studies as well [26, 27]. Likewise, a community-based study done in Chennai, South India, showed a high rate of heritability for abdominal obesity [28]. Daily breakfast consumption is significantly associated with lower odds of overweight and obesity in both bivariate and multivariate analysis ($P<0.05$). This is in agreement with many other studies. Analyses of data from the National Health and Nutrition Examination Survey, 1999–2000 in US adults , the odds ratios for BMI ≥25 were lower for breakfast consumers (odds ratio=0.76) for women[29]. A meta-analysis in Asian and pacific regions regarding skipping breakfast and prevalence of overweight and obesity suggested that a positive association between skipping breakfast and overweight and obesity was globally observed regardless of cultural diversity among countries. It concluded that promoting eating breakfast may be beneficial in all population [30]. Among adults, it was reported that 68.7% of Saudi women who skipped breakfast were obese, and the rest (31.3%) were no obese ($P < 0.007$) [31]. As per Deshmukh Taskar PR et al [32], even though mechanisms linking breakfast consumption to lower body weight are unclear, several possible explanations may exist [32]. According to him skipping breakfast may lead to excess hunger and rebound overeating. Regarding fasting behaviour our study did not show independent association with overweight and obesity however in bivariate analysis significant associations was observed showing higher odds of overweight and obesity. Unlike our finding as per Longo VD et al concluded based on existing evidence from animal and human studies that periodic fasting during adult life promotes optimal health and reduce the risk of many chronic

diseases, particularly for those who are overweight and sedentary [33].

CONCLUSION

This study is one of the first conducted in Nepal in females of reproductive age investigating associations of lifestyle factors with overweight or obesity. The study provides the snapshot of prevalence of overweight and obesity as well as lifestyle characteristics of females of reproductive age. This study has presented high prevalence of overweight and obesity in females of reproductive age of Kathmandu metropolitan city. More importantly , findings of the study has pinpointed towards specific socio-demographic, lifestyle factors that may increase the risk of overweight or obesity in females of reproductive age. The documented high prevalence of maternal overweight or obesity raises questions about its implications on maternal and child health, given that maternal overweight and obesity is associated with adverse reproductive outcome which effects for both mother and child. In the present study overweight and obesity was positively associated with being married, having family history of overweight or obesity while working occupational status, moderate physical activity, daily breakfast consumption were associated with lowered risk.

Finally, as the current study is cross-sectional and has small sample size, it should be carefully interpreted and some larger prospective studies are recommended to verify its findings.

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