



Prevalence and factors associated with obesity among adult women of Nepal

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ABSTRACT

Introduction The objective of the study was to explore the prevalence and factors associated with obesity among adult women of Ramkot VDC (Village Development Committee), Kathmandu district of Nepal.

Materials and Methods A cross-sectional descriptive study was used to explore the prevalence and factors associated with obesity among adult women of age group between 20 to 59 years old. Five wards were selected randomly on the lottery drawn and quota sampling basis. 22 samples were drawn from each selected wards. There were 110 sample sizes. A questionnaire guided interview method. BMI was calculated by following formula: weight in kg/height in m².

Findings The prevalence of obesity and overweight is 24.5 and 1.8% respectively and there is no association between BMI with caste, education and age. 81.7% of respondents, who consumed fruits more than five times a week had low BMI, whereas 44% of respondents, who consumed fruits less than once a week in their diet had high BMI indicating overweight and obesity. The significance difference of taking fruits daily or not, was showed by the chi square (p value) i.e. 0.013.

Conclusion The finding of this study shows that the prevalence of overweight among women was 24.5% and prevalence of obesity was 1.8%. Overweight and obesity of women was not associated with physical activities, whether women were vegetarian or non-vegetarian and frequency of food they usually took. But the women who took fruits frequently in their diet had low body mass index than women who took fruits less frequently. In other word, overweight and obesity among women was associated with fruits intake less frequently.

Keywords: Obesity, Overweight, BMI (Body Mass Index)

INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. BMI is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m²). The WHO definition is: (1) a BMI greater than or equal to 25 is overweight and (2) a BMI greater than or equal to 30 is obesity.

Overweight and obesity are the fifth leading risk for global deaths. At least 2.8 million adults die each year as a result of being overweight or obese. In addition, 44% of the diabetes burden, 23% of the ischemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity. Some WHO global estimates from 2008 follow: (1) More than 1.4 billion adults, 20 and older, were overweight, (2) Of these overweight adults, over 200 million men and

GJMEDPH 2013; VOL. 2, ISSUE 4

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CONFLICT OF INTEREST—NONE

FUNDING—UGC, NEPAL

nearly 300 million women were obese and (3) Overall, more than one in ten of the world's adult population was obese. The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended. Raised BMI is a major risk factor for non-communicable diseases such as; (1) cardiovascular diseases (mainly heart disease and stroke), which were the leading cause of death in 2008 ;(2) diabetes ;(3) musculoskeletal disorders (especially osteoarthritis - a highly disabling degenerative disease of the joints; and (4) Some cancers (endometrial, breast, and colon). Many low- and middle-income countries are now facing a "double burden" of disease.¹

In Europe, the prevalence of obesity (body mass index ≥ 30 kg/m²) in men ranged from 4.0% to 28.3% and in women from 6.2% to 36.5%.² Obesity is a major public health problem in developed countries especially in the United States, with one-third to one-half of adults affected. Nowadays, it also occurs in the developing countries. Obesity is associated with five out of ten leading causes of death and disability such as heart disease, diabetes, cancer, hypertension and stroke. An estimated 300,000 people die each year of illnesses related to obesity, more than the number killed by pneumonia, motor vehicle accidents and airlines crashes combined. Since 1991, the percentage of obese Americans has increased by 74%. More than 21 million US men and over 23 million women are obese. The most comprehensive data on the prevalence of obesity worldwide are those of the WHO MONICA project. The main conclusion drawn from the project was that obesity prevalence is increasing worldwide at an alarming rate in both developed and developing countries. In many developing countries, obesity coexists with under nutrition. Although still relatively uncommon in African and Asian countries, obesity is more prevalent in urban than rural populations. In economically advanced regions, prevalence rates may be as high as in developed countries. 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. For the past two decades, rapid and marked socioeconomic advancement in Malaysia has brought about significant changes in the lifestyles of communities. These include significant changes in the dietary patterns of Malaysians. Changes in meal patterns are also evident where more families eat out, busy executives skip meals, and the younger generations miss breakfast and rely too much on fast food. In addition, communities have become generally more sedentary. 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. However, more women are eating outside their homes nowadays, as well as buying home food from restaurants, food-stalls and fast-food centers for their families. Many Malaysians are at huge health risk because they are overweight or obese. The National Health and Morbidity Survey 2, conducted by the Ministry of Health in 1996 and 1997, found that 4.4 per cent and 16.6 per cent of the population were obese and overweight respectively. Based on adult population between the ages of 20 and 59 years old, that translates to about 450,000 obese and 1.72 million overweight adult Malaysians. Using the World Health Organization (WHO) guidelines of Body Mass Index (BMI) ≥ 25.0 for overweight and BMI ≥ 30.0 for obesity, it was reported that in Malaysian adult males, 15.1% were overweight and 2.9% obese while in adult females, 17.9% were overweight and 5.7% obese.³ The finding show that obesity and overweight problems are higher in the 30-60 age group while 50 percent of those in the age group 40-59 are either overweight or obese.⁴ A study of 14,425 subjects in Nepal found that 32% were obese, 28% were overweight, 6.3% were diabetic and 34% had hypertension. Prevalence was higher in the less educated, those working at home and women.⁵

The above mentioned evidence shows that the obesity is high in women and it is becoming a serious health problem to women and this is the reason behind doing the study for being familiar about prevalence and factors of obesity among women. The general objective of the study was to explore the prevalence and factors associated with

obesity among adult women of Ramkot VDC, Kathmandu district of Nepal.

METHODS

A cross-sectional descriptive explorative research design was adopted to explore the prevalence and factors associated with obesity among adult women of Nepal. Nepal is a cultural mosaic state comprising different caste and ethnic groups belonging to mainly the Tibeto-Burman and Indo-Aryan linguistic families, which is indicative of the waves of migrations that have occurred for over 2000 years from the north and south, respectively. The Tibeto-Burman or Mongoloid groups have arrived from the north and east and by Indo-Aryan (Caucasoid) group that migrated from the south and west. It has been said that Nepal is a nation forged in migration.⁶ Among the Indo-Aryan castes include the Bahun (Brahmins), Chhetri, Thakuri, Kami, Pariyar (Damai), Sarki, Thapa etc., and among the Mongoloid/hybrid group is a heterogeneous mixture of various clans and ethnic groups, including Gurung, Magar, Newar, Tamang, Lama/Ghale, Thami, Bhujel (Khawas), Rai (Khambu), Limbu (Subba), Sunuwar (Mukhia), Yakkha (Dewan), Sherpa, Yolmo, etc.⁷ Kathmandu, the capital of Nepal, lies in the central region of the country, where Ramkot VDC is one of the VDC of Kathmandu Valley. The population of this VDC was made up of mixed ethnic group. The total population of Ramkot was 10781, and there were 1239 households according to the 2001 census VDC record. This study was conducted on 17th October, 2011-15th February, 2012.

To investigate the prevalence of obesity and its association, female, age equals to or greater than 20 years and had residence in Ramkot VDC of Kathmandu were the population of the study. From 9 wards of Ramkot VDC, five wards were selected randomly on the base of lottery draw. The wards which were selected from the lottery draw were ward number 9, 5, 3, 2 and 6. On the quota sampling basis, 22 samples were drawn from each selected wards. In total, sample size was 110.

First of all, an interviewed schedule questionnaire which consist the demographic variables, personal habits, the socioeconomic profile, dietary profile, physical activities, stress history, tobacco and alcohol taking habits of the participants was developed

After development of the interview questionnaire, it was pre- tested by interviewing 12 women of Manamaiju VDC of Kathmandu District. There were 28 questions in total, and question number 22 was modified before final use by adding options as Ayurvedic and Allopathic instead of open-ended question; name the medication if you are in use.

After pre-testing and revision of questionnaire, some Proficiency Certificate Level (PCL) Nursing first year students of Nursing Campus Maharajgunj were selected as enumerators. After selection, they were instructed by demonstrating about the way of taking interview from the participants, technique of taking weight of the participants, and techniques of measuring height of the participants.

Body mass index was calculated by using following formula that is weight in kg/height in m². This is categorized by BMI for Asian index.⁸

- Standing height was measured with the respondents in bare feet, back square against the wall and eyes looking straight ahead. It was measured to the nearest 0.5 cm.
- Weight was measured in light indoor clothing without shoes using a platform weighing scale, to the nearest 0.2 kg. The scale was standardized to 0 before each use.
- Before survey way of taking weight and height was taught, demonstrated and returned demonstration was taken from the enumerators to maintain reliability of the measurements.
- On the quota sampling basis, 22 house hold of each wards were surveyed.
- On the base of survey, BMI was calculated, and on the base of BMI, overweight and normal weights of women were calculated.

Validity of the instrument was established by reviewing related literature by consulting with the research expert, discussing with research team and use of standard formula for calculation of BMI. Similarly, to avoid questionnaire information bias, questionnaires were pre-tested in similar setting and feedback from the pre-test was incorporated into the final questionnaire design to improve

validity and reliability. Likewise, to avoid interviewer information and skill/procedure bias, interviewers who were PCL 1st year students were trained on data collection tools and methods to take weight and to measure height. Regular supervision visits were carried out with appropriate feedback ensured from the research team.

Before preceding data collection an official letter was obtained from Nursing Campus, Maharajgunj asking for permission to carry out this study in Ramkot VDC. Similarly, permission and consent was taken from the Ramkot VDC before conducting research. Participants were informed about the nature of the study and the extent of their involvement. Verbal consent was taken from each of the respondents before data collection. Respondents were assured that the information

provided will be used for this research study only. Likewise, anonymity of the subject was maintained.

The collected data were analyzed by using simple descriptive statistics such as frequency, percentage, mean, Chi square, P value and standard deviation. The findings of the study were interpreted using table, bar graph and Pie-chart.

RESULTS

After collecting the data, BMI of each respondent was calculated manually by applying formula of weight in kg/height in m². After calculation of BMI, data was coded and organised manually for completeness and accuracy. After coding it was entered in SPSS version 12 for further calculation and findings are interpreted following the result section.

Table 1 Demographic variables of the Respondents, n = 110

Demographic Profile	Frequency	Percent
Caste		
Brahmin (IA)	66	60
Chhetri (IA)	15	13.6
Pariyar (IA)	3	2.7
Lama/Ghale (TB)	16	14.5
Gurung (TB)	8	7.3
Newar (TB)	2	1.8
Age		
<31 yrs.	17	15.5
31-40 yrs.	28	25.5
41-50 yrs.	25	22.7
51-60 yrs.	32	29.1
>61 yrs.	8	7.3
Family Type		
Single	56	50.9
Joint	54	49.1
Diet		
Vegetarian	16	14.5
Non-Vegetarian	94	85.5

Note: Indo-Aryan (IA), Tibeto-Burman (TB)

Table 1 shows that out of 110 respondents, majority of the respondents (60%) were Brahmin whereas 1.8% was Newar. Similarly, majority of the respondents (29.1%) were of age group between 51 to 60 years. More than half of the respondents (50.9%) lived in a single family followed and 49.1% lived in a joint family. Minority of the respondents that is 14.5% were vegetarian and rest of other respondents that is 85.5% were non-vegetarian.

Among 94 non-vegetarian respondents, 50% of the respondents ate non-vegetable diet such as meat, egg and fish once a week, likewise 30.9% ate twice a week and very few respondents 6.4% ate non-vegetable diet 4/5 times a week. Similarly, among 16 vegetarian respondents, 68.8% of respondents ate fruits, milk and milk products in their diet as extra food. Similarly, among 96 respondents,

majority of the respondents (53.1%) ate fruits once a week whereas very few respondents 8.3% ate fruits daily.

Among 110 respondents, more than 56.4% of respondents ate in 6 to 7 hours interval whereas very minimal 3.6% of respondents ate in 2 hours interval. Similarly, 12.7% respondents were active, 78.1% respondents were moderately active and 9.09% respondents had sedentary lifestyle. About 40.9% of respondents had never done 30 minutes of physical activities, whereas 28.2% respondents did physical activities 2/4 times a week. Likewise,

majority of the respondents (84%) heard about obesity followed by 16% of respondents did not hear about obesity.

Similarly, out of 84% of the respondents who heard about obesity, 7.4% had no any idea about disease associated with obesity, whereas 8.5% had knowledge about hypertension, diabetes mellitus, and heart disease which are associated with obesity. Likewise 34% and 27.7% respondents had knowledge about diabetes mellitus and heart diseases associated with obesity respectively.

Table 2 Distribution of Respondents according to Body Mass Index, n=110

BMI	Number	Percent
BMI<18.4	30	27.3
BMI 18.5-24.9	51	46.4
BMI 25-29.9	27	24.5
BMI>30	2	1.8
Total	110	100
Mean: 21.3		
Standard deviation: 4.1		
Range: 14-34		

Table 2 shows that 46.4% of respondents having BMI within normal range (18.5 to 24.9), whereas 24.5% respondents have BMI < 25 to 29.9, indicating overweight and only 1.8% respondents have obesity (BMI greater than 30). This table shows that the prevalence of over weight is 24.5% and prevalence of obesity is 1.8%. The respondents' body mass index range was ranged from 14 to 35 with 21.3 mean BMI and 4.1 standard deviation.

Table 3 shows that among 66 Brahmin, 40% of respondents have BMI indicating normal weight, 24.2% of respondents have overweight and only 1.5% of respondents have BMI more than 30 indicating obesity. Among Chhetri, 33.3% of respondents have BMI indicating overweight. Here the chi square p value indicates that there is no difference between BMI and the caste of the respondents. Likewise, greater percentage of respondents (32.1%) with age between 30 – 39, have BMI indicating overweight whereas 28% of the respondents, age range from 40 – 49 also have BMI indicating overweight (25 - 29.9). Here the chi square P value indicates there is no difference between BMI and age of the respondents. Similarly, among 110 respondents, majority of the

respondents are illiterate and among them, 27.5% have BMI < 18.4, indicating underweight, whereas 21.6% illiterate respondents' BMI having overweight (BMI 25 – 29.9). But the chi square P value indicates no significant difference between education qualification and BMI of the respondents.

Among 110 respondents, 23.4% of non-vegetarian respondents have BMI 25 – 29.9, indicating overweight, and 31.2% vegetarian respondents BMI 25 – 29.9, indicating overweight, but the p value shows that there is no significant difference between BMI and vegetarian and non-vegetarian diet of the respondents. Similarly, among 94 non-vegetarian respondents, the respondents (33.3%) who consume non- vegetarian diet three times or four to five times a week, have BMI 25-29.9, indicating overweight. Only 21.3% of the respondents who consume non-vegetarian food once a week have BMI more than 30, indicate overweight. But chi square (P value) indicates there is no difference between BMI and frequency of non-vegetarian diet taken by the respondents. Similarly, among 16 vegetarian respondents, 36.4% are overweight and 9.1% of them are obese who

consume almost all dairy products (fruits, milk and curd).

Table 3 BMI and its relationship with caste, age, education level, frequency of non-veg. diet and veg. diet

	BMI<18.4	BMI 18.5-24.9	BMI 25-29.9	BMI>30	Total
Caste (n = 110)					
Brahmin (A)	22 (33.3%)	27 (40.9%)	16 (24.2%)	1 (1.5%)	66 (100%)
Chhetri (IA)	2 (13.3%)	8 (53.3%)	5 (33.3%)	0 (0%)	15 (100%)
Newar (TB)	0 (0%)	0 (0%)	2 (100%)	0 (0%)	02 (100%)
Ghale/Lama (TB)	3 (18.8%)	10 (62.5%)	2 (12.5%)	1(6.2%)	16 (100%)
Gurung (TB)	2 (25%)	4 (50%)	2 (25%)	0 (0%)	08 (100%)
Pariyar (IA)	1 (33.3%)	2 (66.7%)	0 (0%)	0 (0%)	03 (100%)
Total	30 (27.3%)	52 (46.4%)	27 (24.5%)	2 (1.8%)	110 (100%)
p = 0.470					
Age (n = 110)					
Less than 30 yrs.	3 (17.6%)	8 (14.1%)	5 (29.4%)	1 (5.9%)	17 (100%)
30-39	7 (25%)	12 (42.9%)	9 (32.1%)	0 (0%)	28 (100%)
40-49	8 (32%)	10 (40%)	7 (28%)	0 (0%)	25 (100%)
50-59	9 (28.1%)	16 (50%)	6 (18.8%)	1 (3.1%)	32 (100%)
60 and above	3 (37.5%)	5 (62.5%)	0 (0%)	0 (0%)	8 (100%)
Total	30 (27.3%)	51 (46.4%)	27 (24.5%)	2 (1.8%)	110 (100%)
p = 0.762					
Education Level (n = 110)					
Illiterate	14 (27.5%)	26 (50%)	11 (21.6%)	0 (0%)	51 (100%)
Under 6 grade	7 (25%)	9 (32.1%)	11 (39.3%)	1 (3.6%)	28 (100%)
Grade 6 to under SLC	3 (18.8%)	9 (56.2%)	4 (25%)	0 (0%)	16 (100%)
SLC pass	3 (30%)	5 (50%)	1 (10%)	1 (10%)	10 (100%)
+2 and above	3 (60%)	2 (40%)	0 (0%)	0 (0%)	5 (100%)
Total	30 (27.3%)	51 (46.4%)	27 (24.5%)	2 (1.8%)	110 (100%)
p = 0.267					
Non-veg. diet (n = 94)					
4/5 times a week	1 (16.7%)	3 (50%)	2 (33.3%)	0 (0%)	6 (100%)
3 times a week	5 (41.7%)	3 (25%)	4 (33.3%)	0 (0%)	12 (100%)
Twice a week	13 (44.8%)	10 (34.5%)	6 (20.7%)	0 (0%)	29 (100%)
Once a week	9 (19.1%)	27 (57.4%)	10 (21.3%)	1 (2.1%)	47 (100%)
Total	28 (29.8%)	43 (45.7%)	22 (23.4%)	1 (1.1%)	94 (100%)
p = 0.334					
Type of Veg. diet (n = 16)					
Fruits	0 (0%)	1 (100%)	0 (0%)	0 (0%)	2 (100%)
Milk and curd	0 (0%)	3 (75%)	1 (25%)	0 (0%)	4 (100%)
Fruits, milk and curd	2 (18.2%)	4 (36.4%)	4 (36.4%)	1 (9.1%)	11 (100%)
Total	2 (12.5%)	8 (50%)	5 (31.2%)	1 (6.2%)	16 (100%)
p = 0.780					

Note: Indo-Aryan (IA), Tibeto-Burman (TB)

Table 4 Distribution of Respondents' BMI and their Relationships with Fruits Intake, n=96

Frequency of Fruits Intake	BMI		Total
	<25	>25	
Less than once a week	14(56%)	11(44%)	25(100%)
More than 5 times a week	58(81.7%)	13(18.3%)	71(100%)
Total	72(75%)	24(25%)	96(100%)

$p = 0.013$

Table 4 shows that 81.7% of respondents who consume fruits more than five times a week have low BMI, whereas 44% of them who consume fruits less than once a week in their diet have high BMI that indicating overweight. The significance difference is showed by the chi square (p value) that is 0.013.

Among 110 respondents, 26% respondents who are physically active have BMI >25 and 30% respondents who are physically inactive have BMI > 25. But chi square (p value) shows that there is no association between physical activities and BMI of the respondents. Likewise, 37.5% vegetarian respondents have BMI >25 and 24.5% non-vegetarian have BMI >25. But the chi square (p value) shows that there is no association between BMI whether the respondents were vegetarian or non-vegetarian.

DISCUSSION

The study revealed that 12.7% respondents were physically active, 78.1% respondents were moderately active and 9.09% respondents had sedentary lifestyle. The study also showed that majority of the respondents 40.9% had never done 30 minutes of physical activities whereas 28.2% respondents did physical activities 2/4 times a week. Most of the respondents didn't do physical exercise whereas a survey done by the WHO in 2003 found that 91% of women in Kathmandu were physically inactive and 42% of women were overweight.⁹

In the study, respondents' BMI range was 14 to 35 with 21.3 mean and 4.1 standard deviations. In the study respondents' BMI range was 14 to 35 with 21.3 mean with 4.1 standard deviations. Study revealed that there were 46.4 % respondents having BMI within normal range (18.5 to 24.9), whereas 24.5% respondents had BMI <25 to 29.9,

indicating overweight and only 1.8% respondents had obesity (BMI greater than 30). In this study, it was revealed that the prevalence of over weight is 24.5% and prevalence of obesity is 1.8%.

The study revealed that among 24.5% prevalence of overweight, all Newar (100%) were overweight, 24.2% Brahmin had BMI in range of 25 – 29.9, indicating overweight, but chi square p value showed that there was no significant difference in BMI with cast, here it may be the reason that majority of the respondents were Brahmin. This finding is supported by (Straube, 2007). According to him, overweight and obesity in the U.S. occur at higher rates in racial / ethnic minority populations. Women and persons of low socioeconomic status within minority populations appear to particularly be affected by overweight and obesity.¹⁰

In this study, the prevalence of underweight, normal weight, over weight and obesity was 27.3%, 46.4% 24.5%, and 1.8% respectively, whereas (Vaidya et al., 2006), revealed that the prevalence of overweight and obesity was 32.9 percent and 7.2 percent respectively.¹¹ National overweight prevalence of Nepalese people was 8.8 percent and 8.0 percent for male and female respectively in 2005 and the predicted prevalence rate for 2015 is 12.3 percent for female and 13.7 percent for male. The overweight prevalence is higher in the urban areas of Nepal than the prevalence rate for general population.¹²

This study revealed that among 24.5% overweight prevalence, 21.6% illiterate women have overweight and also 27.5% of illiterate women have BMI <18.4 indicating underweight. This finding may relate in this study, because majority of the respondents were illiterate. But chi square p value (0.267) showed that there is no significant difference in BMI with educational level. The study

resulted that there is no association between BMI with age of the respondents, which was showed by chi square p value > 0.05 level of significant whereas study by (Vaidya et al., 2006), showed that physical inactivity is more importantly associated with obesity in the older population. Similarly, those into the business, vocational and clerical work, those who were more literate and those in the higher socio-economic status were significantly associated with obesity.¹¹

Finding of the study suggested that though there were higher number of physically active respondents have BMI < 25, indicating less weight but the chi square test revealed that there is no association between physical activity and BMI of the respondents, whereas (Vaidya et. al., 2006), said that physical inactivity is more importantly associated with obesity in the older population,¹¹ but in the study it is identified that there is no association between higher BMI and the age of the respondents. The study identified that 26.4% respondents had BMI greater than 25, and among vegetarian respondents 37.5% and among non-vegetarian respondents 24.5% had BMI>25, and also chi square p value showed that there is no association between BMI with vegetarian and non-vegetarian diet of the respondents. But study showed the association between BMI with frequency of fish and meat taken by the respondents. Respondents who consumed non-vegetarian items more frequently had higher BMI than the respondents who consumed less frequently the non-vegetable diet. This finding is supported by (HealthStartIQ, 2010), identified that cultural factors that influence dietary and exercise behaviors were reported to play a major role in the development of excess weight in minority groups.¹³

Finding of the study revealed that there is higher chance of increasing BMI with the respondents who consumed fruits less than two times a week. Significant difference in BMI between p value of respondents having food consumption almost daily and the respondents consumed fruits less than two times a week was <0.033. The chi square P value

(0.035) showed that there is association between family history of obesity and BMI.

CONCLUSION

In this study, the prevalence of underweight, normal weight, over weight and obesity among women is 27.3%, 46.4% 24.5%, and 1.8%, respectively and is not associated with physical activity, vegetarian and frequency of food taken. Moreover, there is a higher chance for increasing BMI with people who consume fish and meat too frequently. Similarly, it can be concluded that there is higher chance of increasing BMI of people who consume fruits less frequently than people who consume fruits more frequently.

It is recommended that the prevalence of obesity and associated risk factors among male and female in Nepal, need to be identified, its impact on health of an individual need to be explored, educate the people through mass media about maintenance of weight and healthy habits that maintain weight.

LIMITATION

The study was only limited to exploring prevalence and factors associated with obesity among women of Ramkot VDC, Kathmandu, therefore the findings of this study could not be generalized.

ACKNOWLEDGEMENT

First of all, we would like to thanks University Grant Commission for providing great opportunity and fund for research. We would also like to thanks The Campus Chief, Assoc. Prof., Tara Pokharel of Nursing Campus Maharajgunj for her support in the study. We are grateful to Secretary of Ramkot Village Development Committee (VDC), Mr. Bal Krishna Acharya, for granting permission to collect data in the VDC, as well as our heartfelt thanks goes to all staffs of PHC of Ramkot VDC and PCL 1st Year Nursing students, who were studying in Nursing Campus Maharajgunj for helping in data collection. Finally, we would like to express our gratitude to all research participants as well as their family members for involving in this research study.

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