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Kanika
Assistant Professor,
Shaheed Kartar Singh Sarabha college of Nursing, Sarabha, Ludhiana, Punjab, India

Jyotika Sharma
Assistant Professor,
Shaheed Kartar Singh Sarabha college of Nursing, Sarabha, Ludhiana, Punjab, India

Sukhpreet Kaur
Assistant Professor,
Shaheed Kartar Singh Sarabha college of Nursing, Sarabha, Ludhiana, Punjab, India

Jaspreet Kaur
Clinical Instructor,
Shaheed Kartar Singh Sarabha college of Nursing, Sarabha, Ludhiana, Punjab, India

Corresponding Author:
Kanika
Assistant Professor,
Shaheed Kartar Singh Sarabha college of Nursing, Sarabha, Ludhiana, Punjab, India

A study on prevalence of obesity and its determinants among women in selected areas of district Ludhiana, Punjab

Kanika, Jyotika Sharma, Sukhpreet Kaur and Jaspreet Kaur

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Abstract
Obesity and overweight are a complex multi -factorial disorder characterized by excessive amount of body fat. It is not just cosmetic concern but it also a medical problem that increases risk of other disease. A quantitative research approach of exploratory descriptive design was adopted for the study and purposive sampling technique was used to collect the data from 750 women of Sarabha, Ludhiana. Tool was divided into three parts as socio-demographical profile, anthropometry measurements to assess the prevalence of obesity and questionnaire related to determinants. The result of the study reveals that the prevalence of obesity was 29.46 in women in village Sarabha, Distt. Ludhiana and there were 221 women who were obese from total sample. The P value computed of the association of selected socio- demographic variables**,** where age, marital status, number of children, type of family, religion, dietary habits and lifestyle was non-significant. But occupation, are you on any medication and socio-economic class was significant and the significant value was ($p< 0.05$). The non-significant value was ($p> 0.05$). The average, mean, age & SD were 2.60 ± 1.12.

Keywords: Obesity, women, prevalence, determinants and BMI

Introduction
Obesity is increasing at an alarming rate throughout the world and has become a global problem. Obesity is now growing fast in many middle- and low-income countries. According to the World Health Organization 1998, it has declared overweight as one of the top 10 health risks in the world and one of the top five in developed nations. (WHO, 2002) [1].
According to estimates, there are more than one billion overweight people worldwide, and some 250 million of these are estimated to be clinically obese. (WHO, 1998) [1].

- Richard J. Codey

A famous ancient proverb states: eat breakfast like a king, lunch like an ordinary person, and dinner like a beggar. These words of wisdom have long been discarded. Modern life has brought with it more food with high caloric density and better taste. New technology has made life easier and less active and the result is a worldwide epidemic of obesity and its associated disorders. Obesity involves both increased fat cell size and occurs when energy intake is greater than energy expenditure. This balance between energy input and energy output can be affected by many factors including the quality and quantity of dietary intake, environmental and genetic inputs and physiological and psychological status [2].

Objectives
1. To assess the prevalence of obesity among women.
2. To explore the determinants of obesity among women.
3. To find out the association of prevalence of obesity with selected socio- demographic variables among women.
4. To prepare and disseminate information in the form of booklet with a view to provide information for healthy lifestyle among women.

Sample Criteria
Inclusion Criteria Women who will be
- in selected area of Ludhiana, Punjab
- in age group of 20 to 60
- present at time of data collection

Exclusion Criteria Women who will be

- bed ridden patient, pregnant and lactating women.
- who are not willing to participate

Methods and material

A descriptive study was conducted to prevalence of obesity and its determinants among women in selected areas of district Ludhiana, Punjab. The research design selected for the present study was non-experimental (exploratory descriptive). The research design is the master plan specify the methods and procedures and collecting and analyzing the needed information in research study. Population of the present study where women of age group 20-60 years of Sarabha village, Ludhiana. There were total 750 women of age group 20-60 years. The total sample size was 750 which were taken from Sarabha village, Ludhiana. Purposive sampling technique was used for the selection of sample. The data was collected using Interview and Biophysiological technique. Anthropometric details related to Height, Weight and Waist Circumference, Hip Circumference were taken. The measurements were taken as per the guidelines given with the WHO.

Result and discussion

Section-A

Description of socio-demographic variables

Table 1: Description of socio-demographic variables

S. No.	Socio-demographic variables	F (%)
1.	**Age in year**	
	21-30	157(20.9)
	31-40	214(28.5)
	41-50	149(19.9)
	51-60	230(30.7)
2.	**Marital status**	
	Unmarried	39(5.2)
	Married	702(93.6)
	divorced	3(0.4)
	Widow	6(0.8)
3.	**Number of children**	
	0	15(2.0)
	1	78(10.4)
	2	183(24.4)
	3	332(44.3)
	4	118(15.7)
	5	24(3.2)
4.	**Occupation**	
	Working	32(4.3)
	Not working	718(95.7)
5.	**Type of family**	
	Nuclear	353(47.1)
	Joint	388(51.7)
	Extended	9(1.2)
6.	**Religion**	
	Hindu	40(5.3)
	Christian	2(0.3)
	Sikh	701(93.5)
	Muslim	7(0.9)
7.	**Dietary habits**	
	Vegetarian	483(64.4)
	Non-vegetarian	264(35.2)
	Eggiterian	3(0.4)
8.	**Genetic history of obesity**	
	Yes	58(7.7)
	No	692(92.3)
9.	**Enrolled for any weight reduction program**	
	Yes	169(22.5)
	No	581(77.5)
	If yes specify	
	Diet management	5(.7)
	Exercise	76(10.1)
	Any alternative medicine	19(2.5)
	Yoga	21(2.8)
	Other	48(6.4)
10.	**Are you on any medication?**	
	Yes	1(0.1)
	No	749(99.9)
11.	**Lifestyle**	
	Sedentary lifestyle	30(4.0)

	Moderate lifestyle	578(77.1)
	Heavy lifestyle	142(18.9)
12.	**History of medical condition**	
	Yes	144(15.2)
	No	636(84.8)
	If yes specify	
	Diabetes mellitus	32(4.3)
	Hypertension	72(9.6)
	PCOD	6(0.8)
	Hypothyroidism	2(0.3)
	Cushing syndrome	00
13.	**Socioeconomic class**	
	Upper class	6(8)
	Upper middle class	59(7.9)
	Lower middle	210(28.0)
	Upper lower	302(40.3)
	Lower	173(23.1)

The data presented in table 1 depicts that Most of women were married 93.6% and majority of women were belonged to 51-60 and maximum were of 31-40 age group. Majority of women were belonged to category of not working. There were 22.5% of women who were enrolled for weight reduction program from which 10% were doing exercise. 40.3% of women were belonged to upper lower class of socio- economic class.

Section-2

Frequency and percentage distribution of bio physiological of women with obesity

This section describes the bio physiological measurements such as weight, height, BMI, waist circumference, hip circumference and waist and hip circumference. Frequency and distribution measurements were computed of women with obesity in Table 2.

Table 2: Frequency and percentage distribution measurements of women with obesity

S. No.	Sample characteristics	F (%)
1.	**Height**	
	141-150	27(3.6)
	151-160	**403(53.7)**
	161-170	301(40.1)
	171-180	19(2.5)
2.	**Weight**	
	31-50	190(25.3)
	51-70	**460(16.3)**
	71-90	95(12.7)
	91-110	4(0.5)
	111-130	1(0.1)
3.	**Body mass index**	
	Underweight	67(8.9)
	Normal	462(61.6)
	Obesity	164(21.9)
	Pre obese 1	50(6.7)
	Pre obese 2	6(0.8)
	Pre obese 3	1(0.1)
4.	**Waist circumference**	
	Very low	71(9.5)
	Low	377(50.3)
	High	283(37.7)
	Very high	19(2.5)
5.	**Hip circumference**	
	Very low	157(20.9)
	Low	328(43.7)
	High	244(32.5)
	Very high	21(2.8)
6.	**Waist and hip circumference**	
	Low	39(5.2)
	Moderate	255(34.0)
	High	456(60.8)

The data presented in table 2 depicts that from 151-160 women were more height that was 53.7% and minor was from 171-180 that was 2.5% and 61.6 women had normal BMI. More waist circumference was 50.3% and minor was 2.5. Hip circumference was more 60.8 that was high and less was 5.2 in category low.

To assess the prevalence of obesity among women
Sample size = 750 Obese = 221
221/750×100 = 29.46

The prevalence of obesity was 29.46 in women in village Sharabha, Distt. Ludhiana.

Section-3
This section describes five domains such as diet, physical activity, stress, sleep and hormonal. Frequency and percentage distribution were computed to describe the variables presented in Table 3.

Table 3: Frequency and percentage distribution of woman with obesity according to their variables Domain-1 (Diet) N = 221

S. No.	Variables	F (%)
1.	**How often do you eat meals in a day? (Including tea, coffee, fruits, salads, snacks)?**	
	a. Very often	6(2.7)
	b. 6 times	41(18.6)
	c. 5 times	59(26.7)
	d. 4 times	90(40.7)
	e. 3 times	25(11.3)
2.	**How often do you drink sweetened beverages, soft drinks, juices etc.?**	
	a. At least once daily	5(2.7)
	b. 3 to 6 times a week	49(22.2)
	c. 1 to 2 times a week	104(47.1)
	d. 2 to 3 times a month	46(20.8)
	e. Once a month or less	17(7.7)
3.	**How often do you eat sweets such as barfi, jalebi, kulfi, chocolate, halwa, rice, pudding?**	
	a. 3 to 6 times a week	61(27.6)
	b. 1 to 2 times a week	113(51.1)
	c. 2 to 3 times a month	12(5.4)
	d. Once a month or less	35(15.8)
4.	**How often do you eat fried foods such as puri, paranthas, kachori, bhature, pakoras, samosas etc.**	
	a. At least once daily	6(4.1)
	b. 3 to 6 times a week	39(17.6)
	c. 1 to 2 times a week	78(35.3)
	d. 2 to 3 times a month	53(24.0)
	e. Once a month or less	42(19.0)
5.	**How often do you eat high salty snacks such as bhujia, pickles, chutney, papad etc.?**	
	a. At least once daily	9(4.1)
	b. 3 to 6 times a week	52(23.5)
	c. 1 to 2 times a week	74(33.5)
	d. 2 to 3 times a month	67(30.5)
	e. Once a month or less	19(8.6)
6.	**How often do you consume sugar or honey in tea, coffee, curd, lassi, etc.?**	
	a. At least once daily	35(38.5)
	b. 3 to 6 times a week	38(17.5)
	c. 1 to 2 times a week	46(20.8)
	d. 2 to 3 times a month	47(21.3)
	e. Once a month or less	5(2.3)
7.	**How often do you eat calorie rich foods between meals while watching T.V.?**	
	a. Every time in main diet	98(49.3)
	b. At least once a day	11(5.0)
	c. 3 to 4 times a week	55(24.9)
	d. Once a week	46(20.8)
	e. Less than once a week	11(5.0)
8.	**How often do you eat sprouts and green vegetables?**	
	a. Every time in main diet	146(66.1)
	b. At least once a day	38(17.2)
	c. 3 to 4 times a week	22(10.0)
	d. Once a week	15(6.8)
9.	**How often do you eat non-vegetarian foods such as egg yolk, mutton, pork etc.?**	
	a. 3 to 6 times a week	4(9.1)
	b. 1 to 2 times a week	20(9.0)
	c. 2 to 3 times a month	17(7.7)
	d. Once a month or less	**175(79.2)**
10.	**How often do you eat refined food item like burgers, pizza, etc.?**	
	a. At least once daily	12(5.4)
	b. 3 to 6 times a week	4(1.8)
	c. 1 to 2 times a week	86(38.9)
	d. 2 to 3 times a month	**119(53.8)**

11.	**How often do you eat saturated fat such as Ghee, butter, cream, palm oil, etc.?**	
	a. At least once daily	79(35.7)
	b. 3 to 6 times a week	34(15.4)
	c. 1 to 2 times a week	34(15.4)
	d. 2 to 3 times a month	40(18.1)
	e. Once a month or less	34(15.4)
12.	**How often do you eat street food?**	
	a. More than 3 times a week	42(19.0)
	b. More than once a week	16(7.2)
	c. 2 times in a month	59(26.7)
	d. 1 time in a month	53(24.0)
	e. Less than 1 time in a month	5(2.3)

The data presented in Domain-1(Diet) depicted that most of women were taking meals including tea, coffee, fruit, salad and snack four times a day which is 40.7%. Majority of women were eaten sprouts or green vegetables in their main diet which is 66.1% and maximum women were eat street food 2 times in a month which was 26.7% of obese women. The study revealed that majority of women were eaten fried foods such as puri, paranthas, kachori, bhature, pakoras, samosas etc. 1 to 2 times, a week which is 35.3% of total population. There was maximum of the obese women who eat saturated fats such as Ghee, butter, cream, palm oil, etc. at least once in a day which 35.7%. There were 51.1% obese women who eat sweets such as barfi, jalebi, kulfi, chocolate, halwa, rice, pudding etc. 1 to 2 times in a week.

DOMAIN-2 (Physical Activity)

S. No.	Variables	F (%)
1.	**Do you perform regular physical activity?**	
	a. Yes	48(21.7)
	b. No	173(78.3)
	If yes: 1.1 How many days do you exercise in a week?	
	1. Daily	34(4.5)
	2. 5-6 times a week	1(0.4)
	3. 3-4 times a week	2(0.9)
	4. 1-2 times a week	9(4.0)
	5. Never+	2(0.9)
	1.2 Which type of exercise do you perform?	
	1. Yoga	31(14.0)
	2. Cycling	----
	3. Running	17(7.69)
	4. Lifting weight	----
	1.3 How much time do you spend for exercise for each session?	
	1. >Above 40 minutes	2(0.9)
	2. 30-40 minutes	9(4.0)
	3. 20-30 minutes	25(11.3)
	4. <10 minutes	12(5.4)
2.	**How often do you perform household activity (mopping floor, sweeping, washing clothes etc.) without helper/family member?**	
	a. Regular	70(31.7)
	b. Sometimes	121(54.8)
	c. Never	30(13.6)
3.	**How often do you walk in a day? (Gurudwara, dairy, ground etc.)**	
	a. 15 min	131(59.3)
	b. 30 min	54(24.4)
	c. More than 30 min	36(16.3)
4.	**How often do you climb stairs?**	
	a. Yes, limited a lot	13(5.9)
	b. Yes, limited a little	135(61.1)
	c. No, not limited at all	73(33.0)
5.	How often do you carry groceries by walking?	
	a. Daily	7(3.2)
	b. 5 to 6 times in a week	58(26.2)
	c. 3 to 4 times in a week	31(14.0)
	d. Never	125(56.6)

The data presented in Domain-2 (Physical Activity) depicted that most of the women were (78.3%) not performed any physical activity, women who were doing on daily basis were 11.3% and most of were spends 20 to 30 min. for exercise. The study revealed that most of obese women taking help sometime to performed their household activities which were 54.8%. There was majority of women who limited climb stairs which was 61.1%. Majority of subject was those who never carry groceries by walking which was 56.6%.

DOMAIN-3 (Sleep)

S. No.	Variables	F (%)
1.	**How much sleep do you get?**	
	6 hours	65(29.4)
	7 hours	94(42.5)
	8 hours	55(24.9)
	More than 8 hours	7(3.2)
2.	**When you go to bed for sleep?**	
	9-10 pm	80(36.2)
	10-11 pm	101(45.7)
	After 11 pm	40(18.1)
3.	**When you get up in the morning?**	
	5 to 6 am	93(42.1)
	6 to 7 am	93(42.1)
	7 to 8 am	22(10.0)
	After 8 am	13(5.9)
4.	**How often do you have trouble getting off to sleep?**	
	Never	162(73.3)
	Less than once a month	14(6.3)
	About once a month	29(13.1)
	Many times, in a week	16(7.2)
5.	**What helps you to falling asleep?**	
	Relaxation exercise	6(2.7)
	Counting	7(3.2)
	Lying still	207(93.7)
	Watching T.V.	01(.5)
6.	**How often do you wake up in the night?**	
	Never	128(57.9)
	Less than once a month	25(11.3)
	About once a month	6(2.7)
	2-4 times a week	23(10.4)
	Many times, a week	26(11.8)
	Daily	13(5.9)
7.	**How long does it usually take to fall asleep again?**	
	Few minutes	143(64.7)
	Up to half an hour	47(21.3)
	Up to one hour	8(3.6)
	01-2 hours	10(4.5)
	More than 2 hours	13(5.9)
8.	**Do you sleep during your leisure time?**	
	Regular	21(9.5)
	Sometimes	161(72.9)
	Never	39(17.6)

The data presented in Domain-3(Sleep) depicted that majority of women were like to sleep for 7 hours and minority was more than 8 hours that was 3.2%, study shows that maximum of women was get up in morning in between 5 to 7 am which was 42.1% Most of women was not wake up in night which was 57.9% of total obese women. There were lots of obese women who sleep during their leisure time which was 72.9%.

DOMAIN-4 (Hormone)

S. No.	Variables	F (%)
1.	**Do you have any hormonal abnormality?**	
	Yes	7(3
	No	214(96.8)
2.	**Have you taken any hormonal medication?**	
	Yes	7(3.2)
	No	214(96.8)
3.	**Do you take contraceptives?**	
	Yes	46(20.8)
	No	175(79.2)
Specify		
	Pills	
	Condom	

The data presented in Domain-4 depicted that majority of obese women were not having hormonal abnormality which is 96.8% and 20.8% of women who were using contraceptives from which most of were using contraceptive pills.

DOMAIN-5 (Stress)

S. No.	Variables	F (%)
1.	**Do you have any kind of stress?**	
	Yes	160(72.4)
	No	61(27.6)
2.	**Do you feel with loaded with responsibilities?**	
	Yes	106(48)
	No	115(52.0)
3.	**Do you feel mentally exhausted?**	
	Yes	153(69.2)
	No	68(30.8)
4.	**Do you have enough time for you?**	
	Yes	127(57.5)
	No	94(42.5)
5.	**Do you think your problems seem to be piling up?**	
	Yes	126(57.0)
	No	95(43.0)

The data presented in Domain 5(Stress) depicted that most of women had stress in their life that was 72.4%. Majority of women were mentally exhausted that was 69.2%. There were 48% of women who feels loaded with responsibilities. Maximum obese women think that they have enough time for their self and 42.5% of subjects think that they have no time. The study revealed that majority of women think that their problems seem to be piling up.

Table 4: Association of selected socio-demographic variables range of score, mean, P value, DF, F/t among women with obesity

S. No.	Socio-demographic variables	Mean	DF	F/t	P value
1.	**Age in years**				
	20-30	2.24			
	31-40	2.47			
	41-50	2.15	749	1.73	0.12^{NS}
	51-60	2.52			
2.	**Marital status**				
	Unmarried	2.23			
	Married	2.30			
	Widow	1.67	749	0.71	0.61^{NS}
	Divorced	2.00			
3.	**Number of children**				
	0	2.07			
	1	2.27			
	2	2.35			
	3	2.27	749	0.86	0.50^{NS}
	4	2.32			
	5	2.21			
4.	**Occupation**				
	Working	2.17			
	Not working	2.30	748	1.26	0.00*
5.	**Type of family**				
	Nuclear	2.25			
	Joint	2.35	749	0.97	0.43^{NS}
	Extended	1.78			
6.	**Religion**				
	Hindu	2.20			
	Christian	3.00			
	Sikh	2.30	749	0.50	0.77^{NS}
	Muslim	1.71			
7.	**Dietary habits**				
	Vegetarian	2.27			
	Non vegetarian	2.34			
	Vegan	---	749	2.10	0.06^{NS}
	Eggiterian	2.00			
8.	**Are you on any medication?**				
	Yes	2.00			

	No	2.29	748	1.50	0.05*
9.	**Lifestyle pattern**				
	Sedentary lifestyle	2.23			
	Moderate lifestyle	2.31	749	0.36	0.87^{NS}
	Heavy lifestyle	2.25			
10.	**Socioeconomic class**				
	Upper class	1.83			
	Upper middle class	2.03			
	Lower middle	2.17			
	Upper lower	2.36	749	5.33	0.00*
	Lower	2.42			

NS = Not significant ($p > 0.05$)
*Significant ($p < 0.05$)

The data on table 4 shows that the p value computed of the association of selected socio-demographic variables**,** where age, marital status, number of children, type of family, religion, dietary habits and lifestyle was non-significant. But occupation, are you on any medication and socio-economic class was significant and the significant value was ($p < 0.05$). The non-significant value was ($p > 0.05$).

Discussion

The chapter deals with the discussion of the finding of the present study in according with the objectives of present research study and they were discussed with reference of result by another investigator, trend and theoretical constructs. Obesity involves both increased both cell size and occurs when energy intake is greater than energy expenditure. This balance between energy input and output can be affected by many factors including the quality and quantity of dietary intake. Environmental and genetic input and physiological and psychological status.

Major finding of the present study discusses them in relation to similar studies conducted by other researcher. The present study intends to explain the factors contributes to obesity among women.

The first objective was to assess the prevalence of overweight among rural women (20-years in Ludhiana, Punjab

The sample of the study was 750 whereas 221 women were obese. The prevalence of obesity in the study is 29.46% in a woman of Sarabha.

The presented study was supported by MS. Binny Paul (2017) An exploratory study on factor contributing to obesity among women in selected setting at Mangaluru. The sample consisted of 383 women. The data revealed that 81% women were obese and 13% of women were overweight.

The second objective was to explore the determinants of obesity of women

Most of women were taking meals including tea, coffee, fruit, salad and snack four times a day which is 40.7%. Majority of women were eaten sprouts or green vegetables in their main diet which is 66.1% and maximum women were taking saturated fat at least once daily which is 35.7%. Most of the women were (78.3%) not performed any physical activity, women who were doing on daily basis were 11.3% and most of were spends 20 to 30 min. for exercise. Majority of obese women were not having hormonal abnormality which is 96.8% and 20.8% of women who were using contraceptives from which most of were using contraceptive pills. There were obese women most of them think that they have stress which is 72.4%.

The finding was supported by DR. Ceyhun Varim (2019) A descriptive study was conducted on the prevalence of obesity and the factors affecting obesity in the students of secondary education in Turkey. The research was conducted on 750 students attending secondary education schools. Students‟ data were collected between January 2017 and June 2017. About 41.7% of the 750 children incorporated into the study were female, whereas 58.2% of them were male Ages ranged from 14 to 18. According to BMI values 12.3% (n=92) of all the children were overweigh whereas 4% (n=30) of them were obese.

The third objective was to find out the associated of prevalence of obesity with selected socio-demographic variables among women

The association of prevalence of obesity with age, Marital status, number of children, type of family, religion, dietary habits and lifestyle was non-significant. But occupation, are you on any medication and socio-economic class was significant and the significant value was ($p < 0.05$). The non-significant value was ($p > 0.05$).

The present study was supported by Jose Maria Huerta (2018) this study aims to explore the social and economic factors associated with overweight and obesity among women of childbearing age residing in the urban area of Morocco. This is a descriptive and analytic study conducted among women aged between 15 to 49 years. The results indicate that the prevalence of overweight and obesity among women is higher in women aged over 30. A significant association was shown between education level and both BMI and WHR ($r_1 = -0.23$, $r_2 = -0.17$, $p < 0.05$), respectively, and there is also a significant correlation between household size and WHR abdominal obesity ($r = 0.21$, $p = 0.05$).

Conclusion

The main purpose of this study was to find out the prevalence of obesity among women (20 to 60 years) and the determinants of the obesity among women. This study reveals that women who are pre obese consider themselves as healthy. These perceptions related to obesity among women have to change considerably. Effective use of media like newspaper, television can be used for educating women about adverse health effects of obesity.

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