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A Descriptive Study to Assess the Morbidity Pattern among Nurses with Special Reference to Obesity

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ABSTRACT

Background: The association between obesity and age, lifestyle choices, and adverse health outcomes are well documented. However, to date the association between these variables has not been studied either in female nurses in Indi. The study was conducted in zonal hospitals of Uttar Pradesh to examine the prevalence of obesity in relation with chronic diseases such as DM, Hypertension, etc. and examine association between obesity parameters, age, blood pressure, lifestyle, and chronic diseases.

Method: A total of 182 Nurses were surveyed from five (05) zonal hospitals in Uttar Pradesh who were on duty and not pregnant at the time of data collection.

Results: 20% of the subjects were overweight (body mass index 25-29.9kg/m2) and 5% were obese; 54% of the subjects had central obesity (waist circumference > 80cm). Obesity and central obesity were significantly associated with age, blood pressure, and chronic diseases. Data did not reveal an inverse relationship between lifestyle and World Health Organization (WHO) recommended body mass index (BMI) cutoff points; waist circumference (WC) cutoff points. However, when we adopted WC cutoff points advocated by Mishra et al., (2003, 2006, & 2010) for Asian Indians we found high prevalence of central obesity and inverse relationship with physical activity. A majority of Nurses reported irregular working hours and lack of time, lack of motivation, and lack of facilities to exercise as barriers to their health maintenance behavior.

Conclusion: Overweight and obesity according to WHO BMI cutoff points was moderately prevalent but, central obesity was highly prevalent in Nurses.

KEYWORDS: *Obesity, BMI, Waist Circumference, Central Obesity*

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INTRODUCTION

Obesity is clinically defined as a body mass index (BMI) of ≥ 30 kg/m^2 (a BMI of 30 represents overweight of approximately 30 lb (14 kg) for any given height). Central obesity level 1 and 2 are clinically defined as waist circumference (WC) for women ≥80cm and ≥ 88 cm respectively. The prevalence of overweight and obesity is increasing at an alarming rate in developed and developing countries (2,11). Several experts from all over the world and researchers from India are indicating that India is facing obesity epidemic (30). Epidemiologic studies indicate that overweight and obesity are important risk factors for Diabetes, Cardiovascular disease, Cancer, and premature death (11). Thus, it is a challenge for health care providers when they have to care and educate patients who are not only suffering from chronic diseases but also have obesity. Undoubtedly, bedside nurses, nursing administrators, and nursing academicians, play a key role in health promotion and disease prevention in our society. Nurses not only provide care to patients but also educate patients and their families. Anecdotal observations and some research conducted elsewhere (19,24) stated that nurses exhibit overweight and obesity. It is important for nurses not to be overweight or obese or have central obesity as it not

only has a negative impact on their own health outcomes but, also impacts their educating/counseling behaviour towards patients and their families. With an assumption that nursing officers (NOs) serving in Military Nursing Service (MNS) exhibit overweight, obesity, and central obesity we enlisted several underlying issues that may contribute to overweight and obesity in this population. There is very little literature on obesity in nurses around the world. This study will not only help in understanding the prevalence of obesity and central obesity in nurses but also enhance the world literature related to obesity and central obesity. Therefore, this study was conducted in Central Command to examine the prevalence of obesity in relation with chronic diseases such as Diabetes and Hypertension amongst MNS population & examine the association between obesity parameters, age, blood pressure, lifestyle choices, and chronic diseases, and provide recommendations based on the study findings.

Material and Methods: This study used a cross-sectional study design of purposive sample of nursing officers (NOs) to describe prevalence of obesity and central obesity. Out of 218 posted NOs at five zonal hospitals, a total of 182 NOs were surveyed from five (05) zonal hospitals in Uttar Pradesh who were on duty and not pregnant at the time of data collection.. Subject's height, weight, waist circumference measurements were taken by two individuals only. Laboratory investigations were also done from those subjects whose BMI was over 25 kg/m^2.

Statistical Plan: Paper based data was first entered into Microsoft excel spread sheet and then converted into SPSS spread sheet. Descriptive statistics were calculated, where appropriate, for continuous and categorical variables and were summarized with minimum, maximum, mean, frequency count and percentages. Pearson correlation tests were performed between BMI and WC, and BMI and WHR. Pearson Chi-Square tests were performed among categorical variables namely: BMI and age, BMI and type of diet, BMI and meal timings, BMI and exercise, BMI and chronic disease, BMI and family history of chronic disease, WC and exercise, WC and chronic disease, marital status and BMI, marital status and WC. To ensure the robustness of our results we conducted MANOVA and independent t tests. Overall, all the data analysis were conducted using statistical software SPSS version 17.00.

Results: A total of 182 subjects (all females) responded to the study questions. Descriptive statistics of variables such as age, age at the time of commission, years in service, height, weight, body mass index (BMI), waist circumference (WC), hip circumference (HC), Waist hip ratio (WHR) and skin fold thickness (SFT) are shown in Table 1. 31% (57 out of 182) subjects fell in pre-hypertension category and 14 (8%) in stage 1 hypertension category and remaining 111 were normal. In total 71 (39%) of them did not have normal blood pressure (systolic <120mmHg and/or diastolic <80mmHg) (Table 2).

Table 1 Descriptive statistics of subjects

Continuous Measures	Min	Max	Mean	Standard Deviation
Age (yrs)	22	59	38	9.78
Age at the time of joining	20	30	23	1.96
Years in service (yrs)	0.5	34	15.5	9.67
Height (cm)	143	172	157	5.9
Weight (kg)	40	111	57	8.9
BMI (kg/m^2)	15.5	41.3	23.2	3.3
W.C (cm)	60	114	79.4	9
H.C (cm)	75	130	96	9
Waist/Hip ratio	0.65	1.16	0.82	0.07
S.F.T (mm)	10	40	20	7

Table 2 Distribution according to blood pressure

MNS Age Distribution	BP Classification			Total
	Normal	Pre-Hypertension	Stage 1 Hypertension	
21-30 years	42	8	0	50
31-40 years	25	10	3	38
41-50 years	37	37	6	80
51 – 60 years	7	2	5	14
Total	111	57	14	182

OVERWEIGHT AND OBESITY

Body Mass Index (BMI) & Waist Circumference (WC)

According to the nursing officers' (NOs) survey, based on BMI categorization, 75% of the subjects have BMI within normal limits (18.5-24.99), while 20% were overweight and 5% were obese (Table3). However, using WC cut off points, 46% of the subjects were normal and 54% of them had central obesity (LI & LII) . 75% (137) of the subjects whose BMI was within normal limits were analyzed to see if they had any central obesity. We found that 36% of them had level 1 central obesity and 7% had level 2 central obesity. Having central obesity and normal BMI is worrisome because research is indicating that individuals having central obesity may have metabolic disorders which may result in co-morbid conditions.

Table 3 Association with BMI

Age	BMI			Total
	Normal 18.5-24.99kg/m^2	Grade 1 Overweight 25-29.9kg/m^2	Grade 2 Overweight >30kg/m^2	
21-30 years	50	0	0	50
31-40 years	24	11	3	38
41-50 years	53	22	5	80
51 – 60 years	10	3	1	14
Total	137 (75%)	36 (20%)	9 (5%)	182

Association with Age: When subjects were analyzed according to the age categories, it appeared that, subjects in 21-30 years category were neither overweight nor obese when compared to age categories 31-40, 41-50, & 51-60). Further, when Chi- square tests was performed, to test age vs. BMI; age Vs. WC the level of significance of 0.001< 0.05 and 0.000<.05 respectively with 95% level of confidence it can be concluded that the age and BMI; age and WC are not independent. That is, there appears to be an association between subject's age and obesity and central obesity. To be noted that this is not normal because the standard figures take into account age related variation (14).

Association with Lifestyle

Eating Habits: Overweight and obesity were to a large extent equally distributed among vegetarians and non vegetarian. When Chi-Square test was conducted it appeared that there is no association between type of diet subjects take and obesity: yes or no (p=.611>0.1). However, we found an association between subjects meal times (regular/irregular) and obesity: yes or no (p=0.078<0.1).

Physical Activity: 30 out of 182 (16%) subjects stated that they do not exercise, 55% are irregular in exercising and the remaining 29% informed that they exercise regularly. Majority of the subjects surveyed exercised irregularly and exercised for 15 minutes 4 days per week (56%) followed by 30 minutes (19%) and more than 45 minutes (9%). Among the subjects who exercised, 63% reported to be doing brisk walking followed 21% doing yoga. Chi-Square test was performed to assess the association between exercise behaviour and BMI cutoff points. No significant association was found (p<0.82). To confirm our result, we undertook the independent t-test which is to compare two sample means when the two samples are independent of one another. Rationale for dividing subjects into two groups was that there were several who never exercised and several who reported to exercise 15 minutes only which is very minimum .On the other hand, there were some who exercised 30 minutes or more. We compared the BMI means, WC means, and hip circumference means of a group that exercises more than or equal to 30 minutes per session with the group that does less than 30 minutes or no exercise (Table 4). It appeared that exercise duration and BMI were independent in this sample but exercise duration and WC were not independent (p=0.070<0.1). Therefore, there appears to be some association between exercise duration and waist circumference.

Table 4 Association between exercise, WC, HC, & BMI Independent t-test

Group 1 (<30 mins exercise) Group 2((>=30 mins exercise)		N	Mean	Std. Dev	P value
Waist Circumference	1	134	79.7015	10.13149	.070
	2	48	76.2708	13.76820	
Hip circumference	1	134	96.6791	9.57801	.244
	2	48	94.7708	10.07259	
BMI	1	134	23.2170	3.66116	.828
	2	48	23.3231	2.55837	

Adapting Mishra et al. 2010 (20) WC cutoff points in women (Central obesity level 1: >80cm and Central obesity level 2: >88cm), Chi-Square test was conducted. We found significant association between central obesity and exercise duration (p=0.029<0.05). It appeared that majority of subjects who performed less than 30 minutes of exercise 4 days/week had central obesity.

Association with Marital Status : Out of 182 subjects 49 (27%) were unmarried, 127 (70%) were married and 6 (3%) were widowed, separated, or divorced. Comparative bar graph (Figure 1& 2) and Chi-Square test was conducted to assess if there is any association between marital status and BMI); marital status and WC (Figure 3); marital status and exercise behaviour. There appeared to be a significant association between marital status and BMI, WC, and exercise behaviour (all p values <0.05). This means that after marriage females tend to gain weight and exercise less. As a result, their BMI and WC increase.

Figure 1 BMI Vs Marital Status

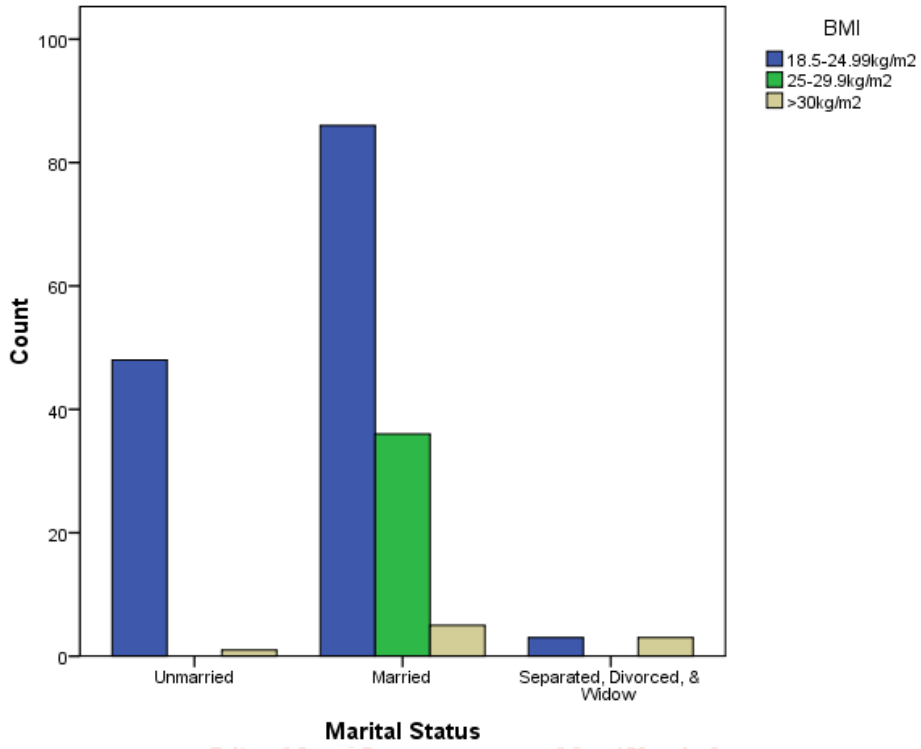
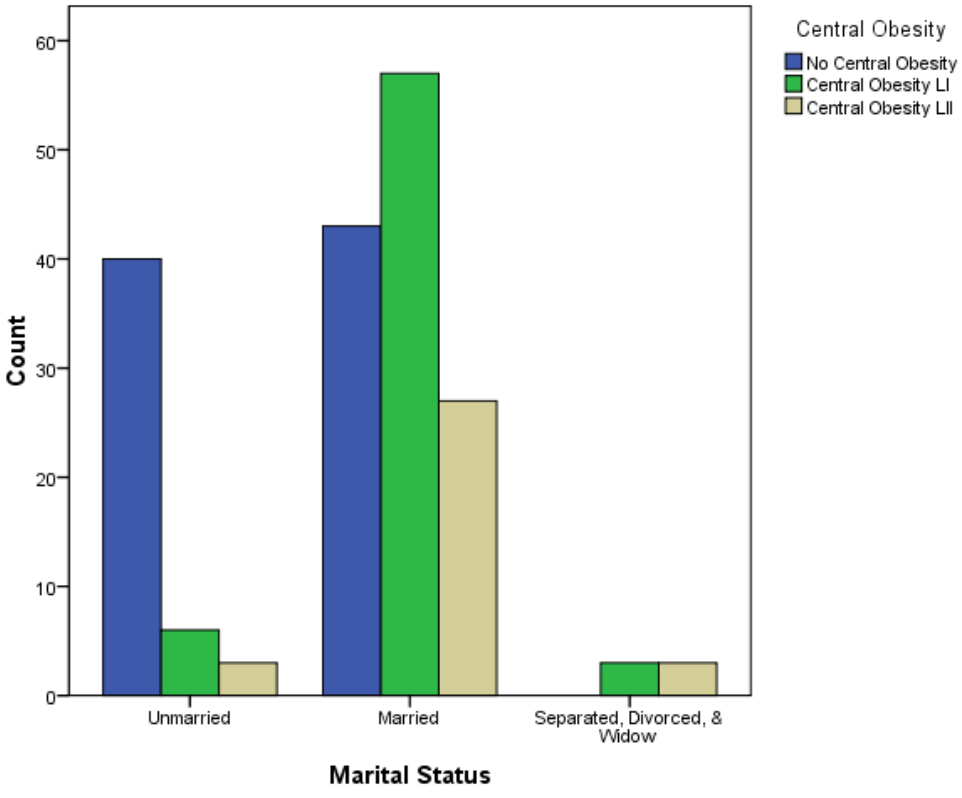


Figure 2 Central Obesity Vs. Marital Status



Anecdotal reports state that usually waist circumference of married women who have had children is more than what it used be before bearing children or compared to those who are married but do not have children. To test this anecdotal observation, we conducted comparative bar graph (Figure 3 & 4) and Chi-Square test to see if there was any association between number of children and obesity: yes or no & Central obesity: yes or no. Significant association was noted ($p<.05$) and it also appeared that majority of subjects who had BMI and WC with normal limits did not have children.

Figure 3 No. of Children Vs. BMI

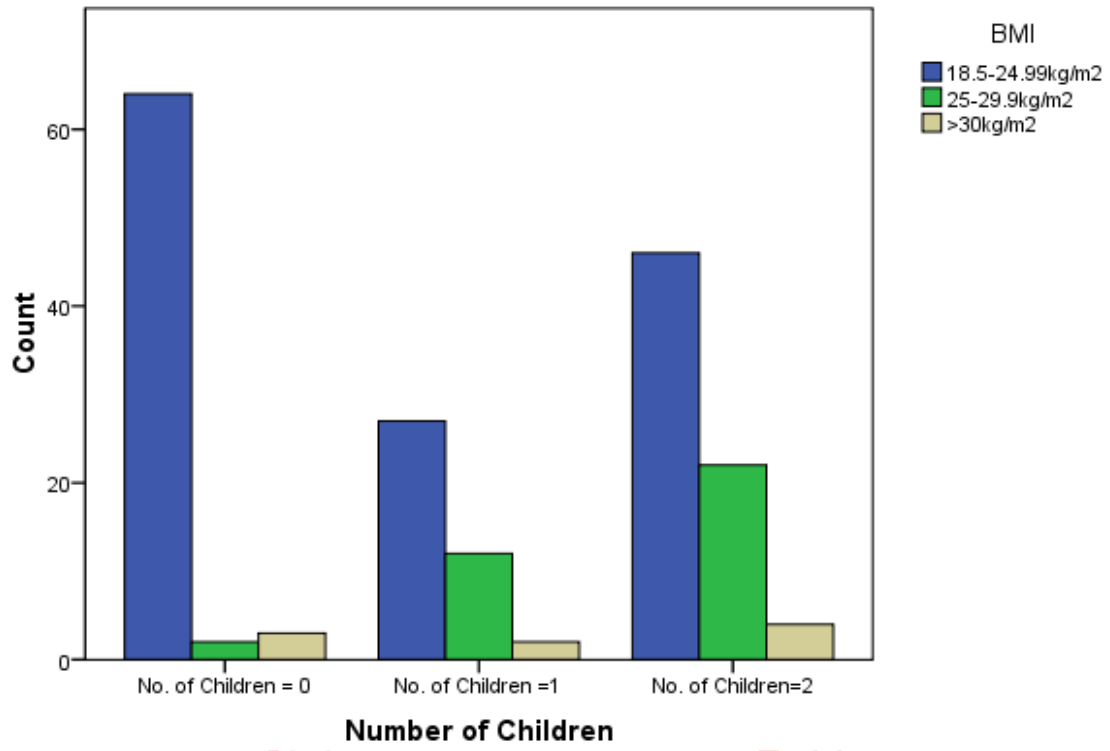
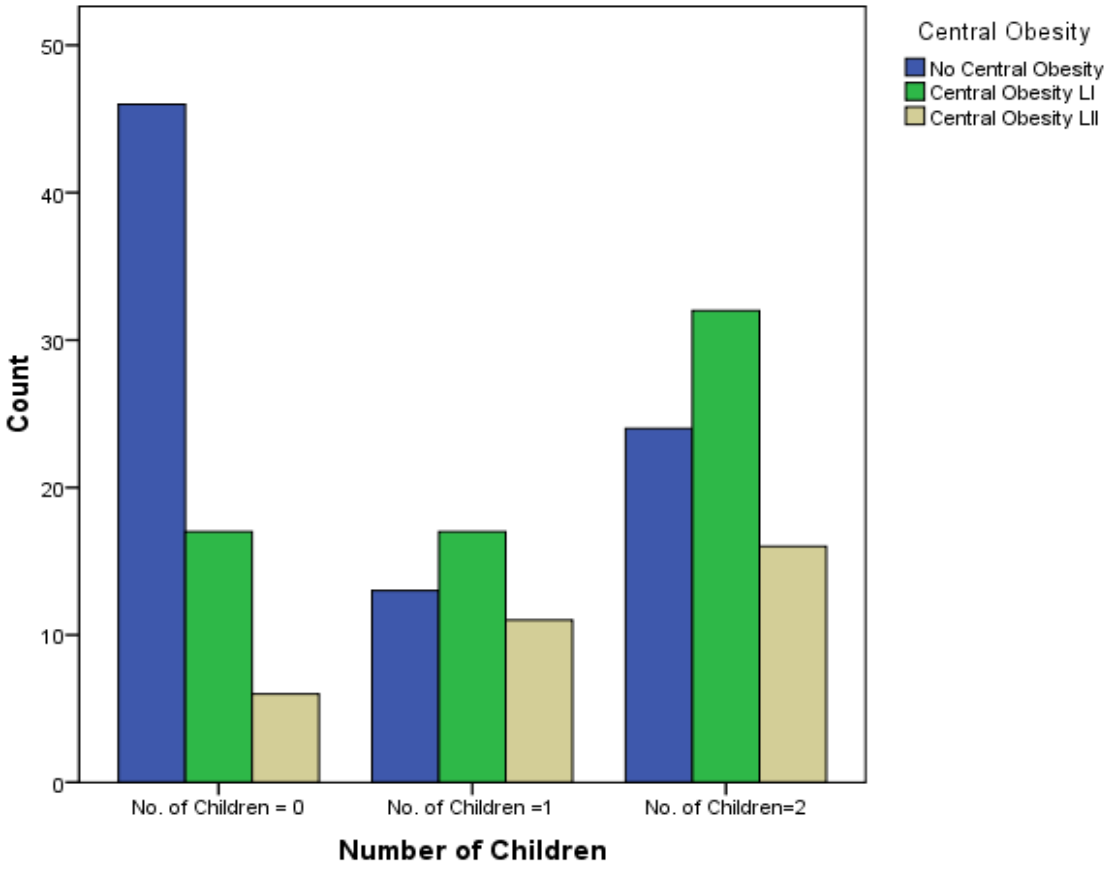


Figure 4 No. of children vs. Central Obesity



Association with Blood Pressure (BP)

BMI and BP variables were tested for association using Chi-Square test. There was a significant association between obesity and hypertension ($p=0.003<0.05$). Similarly, there was a significant association between hypertension and central obesity ($p=.00<.05$). This means that majority of subjects who had obesity and central obesity were hypertensive.

Association with Metabolic Variables

Metabolic variables such as, blood sugar F/PP, TSH, lipid profile were taken for those subjects who were found to have overweight/obesity to rule out the causes related to endocrine/metabolic disorders. However, it was difficult to test for variation and associations with BMI and WC as the sample size of overweight and obesity was very small in this population.

Association with Shift Work

Nurses while on day duty alternate between short duty (0730am to 1 pm) and long duty (0730 am to 0730 pm with a 2 hr break in between). After every one month of day duty or whenever there is shortage of staff, nursing officers are expected to work night shifts (7.30 pm to 8 am). Overall, majority of the nursing officers' shifts are not fixed to morning only, evening only, and night only, except the nursing officers who work in administration in day shift. Even these administrators have to take up evening rounds once a week or whenever necessary. Further, majority of their working wards such as ICU, labour room, general ward are not fixed through out the year. Therefore, it is not reasonable to test the association between obesity and rotating shift work. A comparative data of 'only day workers' and 'only rotating shift workers' needs to be collected to conduct meaningful analysis. Therefore, it is not possible at this time to make a statement on this association. However, based on the moderately significant association of irregular meal timings and obesity ($p<0.1$), it is possible that obesity and shift work might be associated.

Association with Chronic Diseases

43 out of 182 (24%) subjects reported to be having some form of chronic disease and the remaining 139 (76%) did not report any chronic disease. Among the 43 who had chronic disease, 81% of them had only one chronic disease, 17% had two chronic diseases, and 2% had more than three chronic disease.

Table 5 shows the classification of chronic disease, counts, and percentages and obesity status (Yes/No) of the subjects. It appeared that more number of subjects had a combination of obesity and hypertension, followed by other chronic diseases, diabetes, and hypothyroidism. A Chi-Square test was performed to see if there was an association between chronic disease and obesity parameters (BMI and WC). There is a significant association between subjects having chronic disease and obesity ($p<0.05$) and central obesity ($p<.05$). It also appeared that proportion of subjects having hypertension and diabetes was more in the age category of 41-60 years.

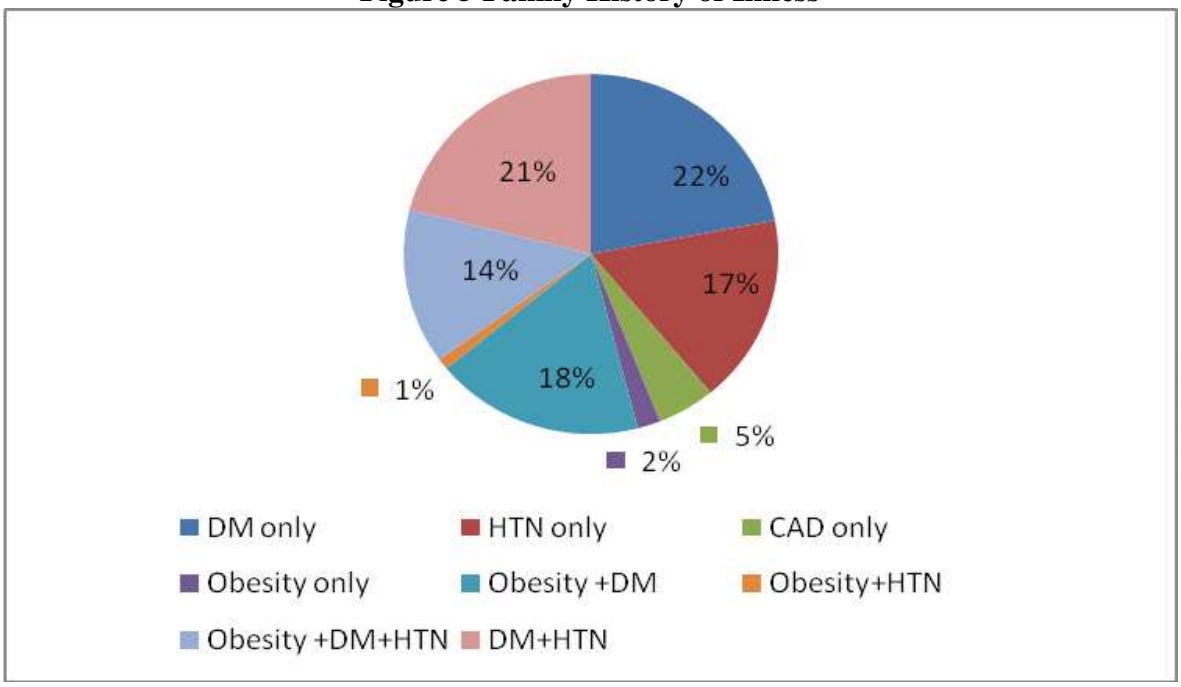
Table 5 Chronic Diseases

Name Of Chronic Diseases	Count	Percent	Obesity Yes	Obesity No
Hypertension	13	25.0%	7	6
Diabetes	6	11.5%	4	2
Hypothyroidism	7	13.5%	4	3
Rheumatoid Arthritis	4	7.7%	1	3
Bronchial Asthma	3	5.8%	1	2
Any other Chronic illness	19	36.5%	6	13

Family History of Illness

74 out of 182 (41%) subjects did not report any kind of illness in family. 52 (29%) of them reported as having one illness, 30 (16%) reported two illness, and 26 (14%) informed that there were either three or four types of illness in family. Subjects reported 36% diabetes, 32% hypertension, 12% obesity, 12% CAD, 5% thyroid disorder, and 3% rheumatoid arthritis. Further, exploration revealed that several subjects reported obesity, hypertension and diabetes in various combinations (Figure 5). That is, (obesity + diabetes) = 18%, (obesity + diabetes + hypertension) = 14% and (diabetes + hypertension) = 21%. Based on the frequencies and percentages it appears that obesity, diabetes and hypertension are interlinked in these subjects' families.

Figure 5 Family History of Illness



Self Reported Stress Management

66 out of 182 subjects did not specify how they manage their day to day stress. It is not clear whether they were experiencing stress or not. Also, it is difficult to determine whether they were interested in sharing their stress management strategy. However, the collected data revealed that 13% tended to shout at others, 16% tended to keep brooding, 6% tended to eat more, 9% do not eat properly, 15% tended to go out for shopping and 6% tended to become overactive.

Barriers to Exercise

45% of the participants indicated irregular working hours as one of the important barrier to exercise, 22% reported lack of time and lack of motivation. 16% reported combination of irregular working hours, lack of time, lack of motivation, and lack of facilities as barriers to exercise. Only, 17% did not mention any reason.

Blood investigations

As the subjects falling in overweight and obese category were very small thus blood specimen collected and their results are not significant to our study.

Discussion

The mean BMI of this female population study was 23.2kg/m^2. However, the prevalence of overweight is 20% which is higher than the prevalence of overweight in general population, 11.4% in females in India (14). The prevalence of obesity in this population is 5% which is somewhat same (4.4%) as the prevalence of obesity in Indian females.

On the other hand, the prevalence of central obesity level 1 is 36% and central obesity level 2 is 18% in this population. We do not have any published data to compare these results. Abdominal adiposity more strongly predicts chronic disease, specifically diabetes and cardiovascular diseases than does BMI (6,34) and to acute myocardial infarction in urban Asian Indians than does BMI (25). Gopalan (9) reported that almost 20% of adults who were not overweight or obese but had central obesity, putting them at a greater risk of developing chronic diseases. We found that 36% of the nursing officers who were not overweight exhibited 'level 1 central obesity' and 18% of the nursing officers exhibited 'level 2 central obesity'. Therefore, our findings are consistent with Gopalan's (9) findings.

Evidence suggests that there is a positive association between age and BMI (29). Dhurandhar and Kulkarni (5) reported that the prevalence of the BMI was highest for the age group 31-50 years. We found similar results with respect to BMI and WC in our study ($p<0.05$). Some literature (23) indicates that vegetarians have a lower risk of overweight and obesity than non-vegetarians. We did not find any association between diet type and obesity. Therefore, it is possible that the subjects who reported to be non-vegetarians may actually be semi-vegetarian and consuming minimum amount of animal products periodically. Eating out and BMI/WC association was also not significant. It is possible that due to shift work schedules and living within cantonment area, nursing officers have less opportunity and few places to eat out. Meal timings and BMI/ WC were associated ($p<0.1$) indicating that irregular meal timings has negative impact on BMI/WC.

Several researchers have reported sedentary lifestyle leads to obesity and that there is an inverse

relationship between physical activity and BMI. However, nursing profession gives less scope to lead a sedentary lifestyle. Nurses work in shift system and are mobile while on duty as patient care is demanding. In our study we did not find an inverse relationship between subjects' physical activity and BMI cutoff points. However, we found that waist circumference and exercise duration were associated. Majority of subjects who had central obesity were exercising less than 30 minutes in 4 days a week.

Significant ($p<0.05$) association between obesity measures and blood pressure indicate increased cardiovascular risk to the subjects. It is noteworthy to mention that several subjects also had increased abdominal adiposity which further contributes to cardiovascular risk. Our study findings are consistent with published research. Similarly, chronic disease and obesity (BMI and WC) were significantly associated ($p<0.05$). Our findings are consistent with the vast published literature (8,29)

We found significant association ($p<0.05$) between marital status and BMI, WC, and exercise behavior. Literature suggests that there is significant association between obesity and marital status (16,17). Our findings are consistent with the literature. We also found that there is significant association in having delivered children and waist circumference and it also appeared that waist circumference continued to increase after marriage, after having one child, and after two children. Further research is needed to attest these associations.

Conclusion

Overweight, obesity, and/or central obesity are clinical and health burdens not only to general public but, more so to health care professionals such as nurses. Overweight and obesity according to WHO BMI cutoff points was moderately prevalent but, central obesity was highly prevalent in nurses of uttar pradesh Growing literature indicates that waist circumference also needs to be taken into account when assessing for overweight, obesity, and chronic diseases/ co morbidities. Nurses provide care and weight related health information and counseling to patients and their families. Thus, it is important for nurses to:

- Maintain healthy weight
- Maintain healthy lifestyle
- Manage their stress in a scientific manner, and
- prevent or minimize chronic illness as they age

It is also important for higher authority to facilitate health maintenance behavior in nurses and minimize or assist in their stress management. On the whole, ultimate aim of patient care, patient/family education will be more effective in obesity and central obesity prevention among patients and their families if nurses are healthy.

Conflict Of Interest

None Identified

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