

Double burden of malnutrition among women residing in tenements in a resettlement area, Kancheepuram district

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ABSTRACT

Introduction: The double burden of malnutrition is the co-existence of undernutrition along with overweight/obesity. The underweight can cause cognitive impairment, increase mortality, and over nutrition increases the chance of noncommunicable diseases like type 2 diabetes and hypertension. Women are vulnerable for early marriages, early conception, and so forth, which have an impact on their nutritional status. **Objective:** To estimate the prevalence of double burden of malnutrition among women residing in tenements in a resettlement area, Kancheepuram district. **Materials and Methods:** This is a cross-sectional study conducted among women aged above 18 years residing in a tenement in a resettlement area, Kancheepuram district using a semi-structured questionnaire. The sample size was 211. **Results:** The median age of the participants was 44.78; 2% were married; 30.8% belong to class III. Based on BMI 1.4% were underweight, 17.1% had normal BMI, 48.8% were pre-obese, and 19.9% were under obese stage 1. Based on the waist circumference, 23.7% were under high risk and according to the waist-hip ratio, 69.7% were under high risk. The prevalence of diabetes among the high-risk category for waist-hip ratio was higher (80.3%) with statistical significance. **Conclusion:** The national programs are concentrating more on the undernutrition. The importance of obesity as a risk factor for many noncommunicable diseases should be stressed in the nutritional programs thereby providing proper interventions to prevent them, which could be done by interlinking with NPCDCS.

Keywords: Double burden of malnutrition, obesity, over nutrition, undernutrition, women

Introduction

The malnutrition is the major public health problem in many low- and middle-income countries. The double burden of malnutrition is the co-existence of undernutrition along with

overweight/obesity. The changes in the dietary intake patterns and leisure time activities associated with industrialization, urbanization is known to increase obesity.^[1] The underweight can cause cognitive impairment, increase mortality, and over nutrition increases the chance of noncommunicable diseases like type 2 diabetes and hypertension.^[2] Malnutrition is prevalent among all segments of the population, poor nutrition among women begins at infancy and continues throughout their lifetime. Women are vulnerable for early marriages, early conception, domestic violence, and so on, which has an impact on their nutritional status.^[3] The dimension of malnutrition problem in India is presented

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with reference to its implications on birth outcome and undernutrition in children.

According to WHO, in 2014, more than 1.9 billion adults worldwide were overweight and around 462 million people were underweight. More than 600 million were obese.^[4] According to NFHS-4 data, women with Body Mass Index (BMI) <18.5 indicating underweight/chronic energy deficiency were 22.9% for India^[5] and 14.6% for Tamilnadu.^[6] Similarly, women with BMI of more than or equal to 25 indicating overweight/obese for India and Tamil Nadu were 20.7% and 30.9% respectively. The NFHS 4 data highlights about the double burden of malnutrition among women especially in Tamil Nadu.

The burden of overweight is steadily increasing among the women surpassing the rates of underweight in accordance with the NFHS-4 data. This shift could be attributed to development in economics, urbanization, changes in lifestyle. Studies have shown that the obesity and the underweight are one of the top ten risk factors for the worldwide burden of diseases.^[7] The recent World Health Organization data has also shown that the underweight is responsible for 6 percent of the global disability-adjusted life years.^[8]

Abdominal obesity also known as central obesity is the excessive accumulation of fat around the stomach. These can be measured by anthropometric measures like waist circumference and waist-hip ratio. Central obesity is linked to multimorbidity like type 2 diabetes, stroke, and cardiovascular diseases.

Both the obesity and underweight are easily preventable by simple lifestyle modification. Many evidences have shown that simple primary care practices such as eating healthy diet, practicing physical activity, and avoiding sedentary practices can have a spectacular effect on maintaining a healthy body weight. On screening for double burden of malnutrition in a community, it helps to take an integrated action on all forms of malnutrition.

Objectives

- To estimate the prevalence of double burden of malnutrition among women residing in tenements in a resettlement area, Kancheepuram district
- To assess the association of waist-hip ratio as a risk factor for noncommunicable diseases.

Material and Methods

Study type

The study was a cross-sectional study conducted in tenements in a resettlement area.

Study duration

The duration of the study was 6 months.

Sample size determination

Taking prevalence as 14.6 (underweight prevalence)^[6] and allowable error of 5%, the estimated sample size was 192. To account for the non-response, 10% of subjects are being added to the sample size. Thus, total of 211 subjects were included in the study.

Sampling and study population

Sampling method

The sampling method used to derive the sample was Simple Random Sampling.

Study population

Inclusion criteria

Women aged above 18 years residing in the study area for more than 1 year.

Exclusion criteria

Pregnant women and mentally challenged women.

Study instrument

A standardized pretested semi-structured questionnaire was used as the study instrument. The questionnaire had 2 sections. Section 1 consists of sociodemographic profile of the participants and section 2 had anthropometric measurements.

Anthropometric measures

Asian criteria cut off for Body mass Index

According to the Asian Body Mass Index classification, BMI of less than 18.5 is considered to be underweight. BMI between 18.5 and 22.9 is considered as normal nutritional status. Overweight is considered as BMI between 23 and 24.9. Preobese is when BMI is between 25 and 29.9. BMI of more than or equal to 30 is considered as obesity, in which BMI of 30 to 40 is type 1 obesity, 40 to 50 is type 2 obesity, and more than 50 is considered as type 3 obesity.

Waist circumference

Waist circumference of more than 88 cm in females is considered as higher risk for morbidity.

Waist-hip ratio

Waist-hip ratio is calculated by dividing waist circumference with the hip circumference. Normal waist-hip ratio for females is less than 0.80.

Data collection procedure

After obtaining written informed consent, the participants were interviewed using pretested, prevalidated semi-structured questionnaire.

Statistical analysis

Data was entered in Microsoft Excel spread sheet and after checking the normality of the study it was analyzed in Statistical

Table 1: Distribution of study participants according to the sociodemographic profile (n=211)

Profile	Frequency	Percentage
Age		
21-30	42	20
31-40	55	26.1
41-50	29	13.7
52-60	29	13.7
>60	56	26.5
Education		
Graduate/diploma	12	5.7
Higher secondary	19	9
High school	52	24.6
Middle school	45	21.3
Primary	45	21.3
Illiterate	38	18
Family		
Joint	40	19
Nuclear	118	55.9
Three generation	53	25.1
Religion		
Hindu	154	73
Christian	47	22.3
Muslim	10	4.7
Marital Status		
Married	165	78.2
Widow/Separated	40	19
Unmarried	6	2.8
Financial Dependency		
Independent	67	31.8
Totally dependent	83	39.3
Partially dependent	61	28.9
Socioeconomic status*		
Class I	10	4.7
Class II	42	19.9
Class III	65	30.8
Class IV	55	26.1
Class V	39	18.5

*. According to BG Prasad classification

Table 2: Distribution of the study participants according to the BMI classification (n=211)

BMI Classification	Frequency	Percentage
Underweight	3	1.4
Normal	36	17.1
Overweight	27	12.8
Preobese	103	48.8
Obese type 1	42	19.9

Package for Social Sciences (SPSS-IBM) software version 21. Frequency for each variable, BMI and WHR will be calculated. Bivariate analysis is done by the application of Pearson chi square test and the *P* value of less than 0.05 was considered significant.

Ethical consideration and confidentiality

All participants were informed regarding the purpose of study, benefits, procedure, and confidentiality of the research study in

Table 3: Distribution of the study participants according to waist circumference and waist-hip ratio (n=211)

Variable	Frequency	Percentage
Waist Circumference		
Low risk	161	76.3
High risk	50	23.7
Waist-Hip Ratio		
Low risk	64	30.3
High risk	147	69.7

Table 4: Distribution of study participant's prevalence of non-communicable disease according to Waist-hip ratio

Variable	Waist-Hip Ratio		<i>P</i>	Odds ratio (95% CI)
	High risk	Low risk		
Diabetes				
Yes	49 (80.3)	12 (19.7)	0.032	2.167 (1.06-4.43)
No	98 (65.3)	52 (34.7)		
Hypertension				
Yes	30 (62.5)	18 (37.5)	0.219	0.655 (0.33-1.28)
No	117 (71.8)	46 (28.2)		
Cardiovascular disease				
Yes	4 (30.8)	9 (69.2)	0.002	0.171 (0.05-0.57)
No	143 (72.2)	55 (27.8)		
Chronic Kidney Disease				
Yes	5 (71.4)	2 (28.6)	0.918	1.092 (0.2-5.7)
No	142 (69.6)	62 (30.4)		
Asthma				
Yes	3 (42.9)	4 (57.1)	0.117	0.313 (0.6-1.4)
No	144 (70.6)	60 (29.4)		

local language. The study was undertaken after getting informed consent from the participants using the pretested, prevalidated semi-structured questionnaire.

Results

The median age of the participants was 44 years. 55.9% of the total participants belong to nuclear family. Only 18% were illiterates [Table 1]. The study also showed that 68.2% of the study participants were financially dependent either totally or partially. 4.7% belonged to the upper class and 18.5% belonged to the lower class and maximum of the study participants (30.8%) belong to the middle class according to modified BG Prasad classification.

Out of the 211 study participants, only 17.1% had normal BMI. Around 48.8% are preobese [Table 2]. The prevalence of overweight and preobesity in the present study was 12.8% and 48.8% respectively and the prevalence of obesity I was 19.9%. (According to WHO Asian BMI classification^[9]).

Though only 23.7% are under the high risk based on the waist circumference [Table 3], nearly 69.7% are under high risk according to the waist-hip ratio. (According to WHO classification of Waist Hip ratio^[10]).

Among those who had diabetes, 80.3% had higher waist–hip ratio (statistically significant) [Table 4]. The present study showed a higher prevalence of cardiovascular disease (69.2%) among the higher WHR than those with lower WHR.

Discussion

The present study was conducted among the women residing in the tenements in a resettlement area of Kancheepuram district, Tamil Nadu. The study has shown that the median age of the study participants was 44. Similarly, in a study done by Palo SK *et al.*,^[11] it was shown that the mean age of the study participants was 45.7%, almost similar to the present study.

The present study has shown that the prevalence of overweight and preobesity was 12.8% and 48.8% respectively. In a study conducted by Anuradha *et al.*,^[12] the results stated that the prevalence of overweight and obesity was 27.7% and 19.8% respectively. Similarly, in a study done by Sidhu S *et al.*,^[13] the prevalence was 20% and 25.3% respectively. Likewise, in a study done by Rao BB *et al.*^[14] the results showed that the prevalence of overweight among women was 28.2%. The prevalence of obese I in the present study was 19.9% and this data almost corresponds with the National Family Health survey (NFHS-4) data.^[6]

The present study showed that nearly 69.7% are under higher risk for waist–hip ratio. The present study also showed higher prevalence of waist–hip ratio (central obesity) than the general obesity. Similar result is shown in a study done by Ramachandran A *et al.*,^[15] which showed higher prevalence of waist–hip ratio (50.3%) than general obesity (30.8%) similar to the present study. Similarly, in a study done by Palo SK *et al.*,^[11] it was shown that around 51.9% had higher waist–hip ratio, which is higher than the general obesity.

Among those who had diabetes, 80.3% had higher waist–hip ratio (statistically significant). In a study done by Mohan V *et al.*,^[16] the prevalence of diabetes among those who had higher (62.6%) waist–hip ratio was higher than those with lower WHR, which supports the present study. Likewise, in a study done by Joshi B *et al.*^[17] the results stated that there is higher prevalence of diabetes among those who had higher waist–hip ratio. Similar report was shown in a study done by Fallahzadeh H *et al.*^[18] and Sun Y *et al.*^[19] Both the studies report that higher waist–hip ratio (central obesity) is associated with morbidities like diabetes.

In a study done by Patel SA *et al.*,^[20] the results showed that the waist–hip ratio was significantly associated with unhealthy cardiovascular profile, in a similar way, the present study showed a higher prevalence of cardiovascular disease (69.2%) among the higher waist–hip ratio than those with lower waist–hip ratio. Similar report was shown by the study done by Sun Y *et al.*^[19] It was reported that the central obesity, which means higher abdominal fat distribution is associated with higher mortality risk independent of BMI.

Conclusion

The rates of overweight are steadily increasing among the women surpassing the rates of underweight. In the context of nutrition, the national programs are concentrating more on the undernutrition. The importance of obesity as a risk factor for many noncommunicable diseases should be stressed in the nutritional programs, thereby providing proper interventions to prevent them, which could be done by interlinking with National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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