

# **Dual Nutrition Burden in Urban Women from Low Middle Income Families**

# **INTRODUCTION**

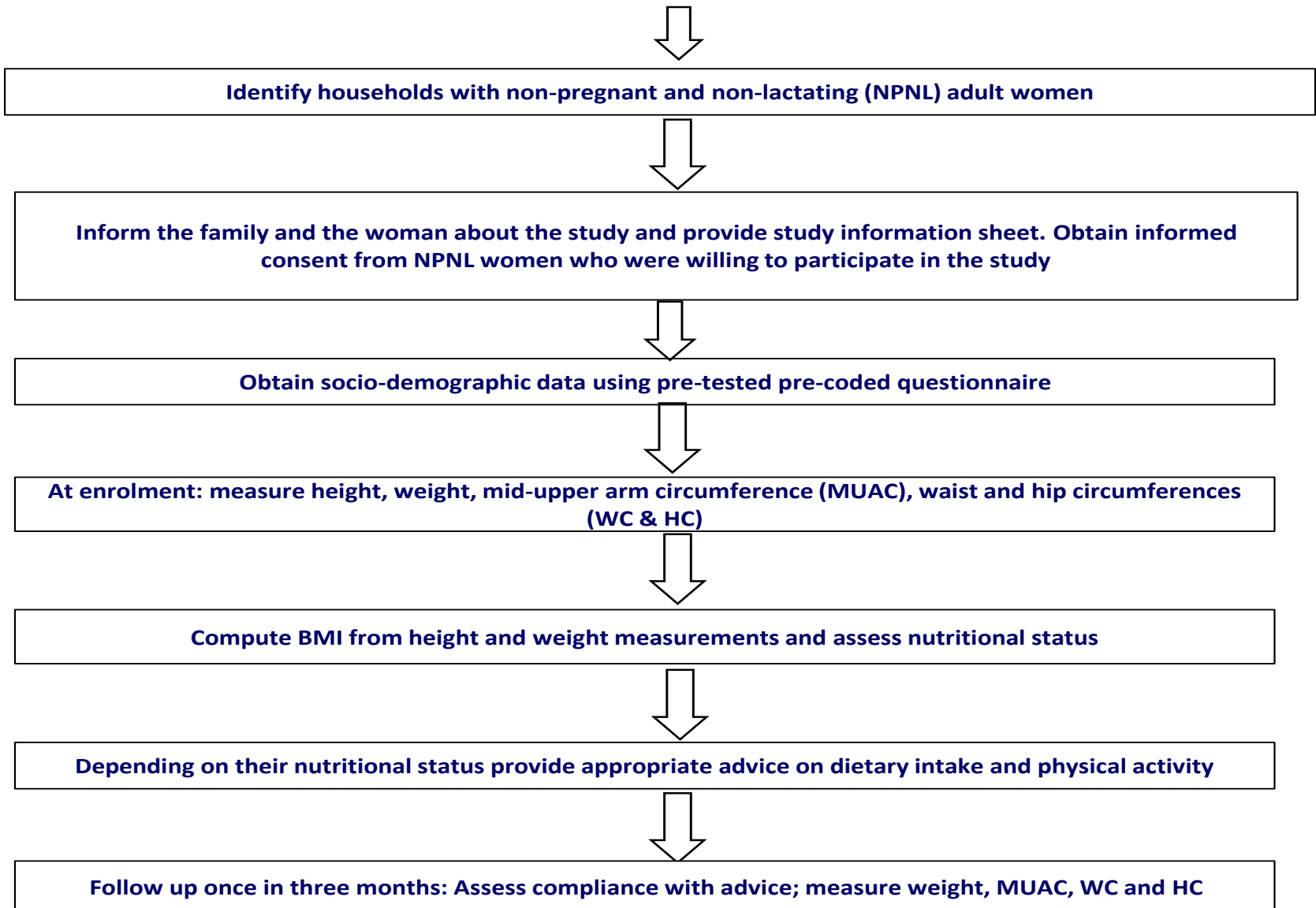
- **Developing countries like India are currently undergoing economic, social, demographic, health and nutrition transitions. India has been facing dual nutrition burden and consequent health problems in the last two decades.**
- **Data from all the surveys indicate that prevalence of both under and over-nutrition are higher in women as compared to men**
- **In the last two decades there has been a steady and progressive increase in over-nutrition and associated non-communicable diseases.**
- **Data from NFHS4 showed that in Delhi - a predominantly urban state - prevalence of over-nutrition is high especially in women.**

## **OBJECTIVE**

- To assess prevalence of under and over-nutrition in non- pregnant non-lactating women (NPNL) belonging to low middle income families in South Delhi

# **STUDY DESIGN AND METHODOLOGY**

**Fig 1 Study Design**



| <b>Year</b>  | <b>Number of women</b> | <b>Number of times anthropometric measurements carried out</b> |               |             |             |             |
|--------------|------------------------|--|---------------|-------------|-------------|-------------|
|              |                        | <b>Height</b>  | <b>Weight</b> | <b>MUAC</b> | <b>WC</b>   | <b>HC</b>   |
| <b>2015</b>  | <b>841</b>             | <b>841</b>   | <b>2689</b>   | <b>1689</b> | <b>2317</b> | <b>2317</b> |
| <b>2016</b>  | <b>784</b>             | <b>784</b>   | <b>2419</b>   | <b>1434</b> | <b>1983</b> | <b>1983</b> |
| <b>2017</b>  | <b>2530</b>            | <b>2530</b>  | <b>6107</b>   | <b>3617</b> | <b>3606</b> | <b>3606</b> |
| <b>Total</b> | <b>4155</b>            | <b>4155</b>  | <b>11215</b>  | <b>6740</b> | <b>7906</b> | <b>7906</b> |

In three years 4155 women were enrolled.

Height was measured at the time of enrollment in all .

Weight was measured in 11215 visits (2.7 measurements/year); Circumference measurements could not be taken in winter and hence the number of times circumferential measurement were taken was lower; mid-upper arm circumference was measured 1.6 times in a year.

| <b>Table 2 Number of weight measurements in age/BMI groups</b> |                 |                  |             |              |
|--|-----------------|------------------|-------------|--------------|
| <b>Age/BMI</b>   | <b>&lt;18.5</b> | <b>18.5-24.9</b> | <b>≥25</b>  | <b>Total</b> |
| <b>18-29 yrs</b>   | <b>663</b>      | <b>2959</b>      | <b>1858</b> | <b>5480</b>  |
| <b>30-49 yrs</b>   | <b>156</b>      | <b>1517</b>      | <b>2332</b> | <b>4005</b>  |
| <b>≥50 yrs</b>   | <b>56</b>       | <b>457</b>       | <b>1109</b> | <b>1622</b>  |
| <b>Total</b>   | <b>875</b>      | <b>4933</b>      | <b>5299</b> | <b>11107</b> |

- Information on age, weight and BMI was available in 11107.
- These data were analysed for assessing the effect of age on nutritional status of women.

## **SOCIO-DEMOGRAPHIC PROFILE OF WOMEN**

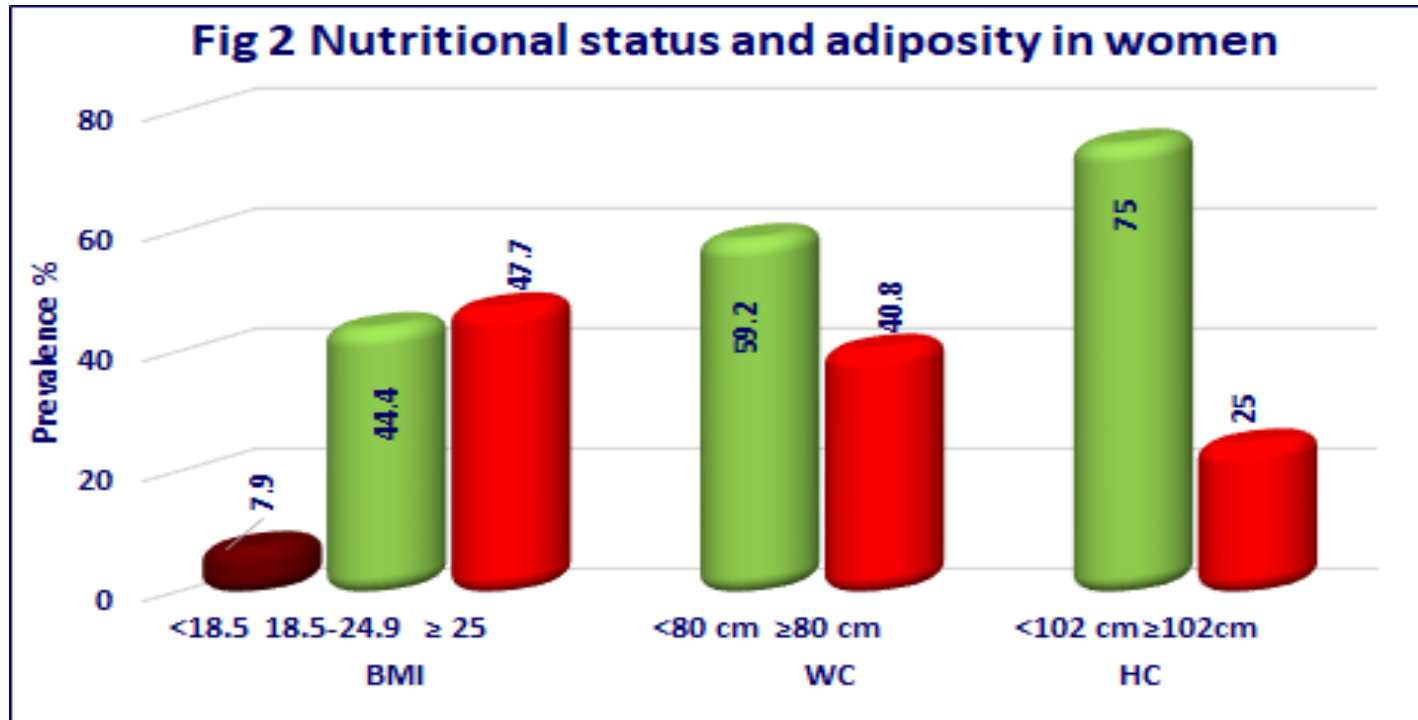
- Majority were nuclear families (75.8%) with five or less members (72.3 %).
- Majority of Men (68.5 %) and Women (50.2 %) had secondary school education
- Majority of the men (70.6%) worked in white collar jobs; 22% were semi-skilled workers. Over 90% of women were home makers
- Over 95% of households lived in brick and mortar buildings; 29.5% owned their houses; the rest, mostly migrants, lived as tenants.
- Over 95% had access to piped water supply at home or in the vicinity and access to flush toilets either in their own home or shared with other households.
- For cooking almost all households used Liquefied Petroleum Gas (LPG) and stainless steel utensils.
- Over 98% owned colour TV, which was their main source of entertainment.
- If the household possessions are considered, these households belong to low middle income group. Because of urban housing constraints, these families lived in one or two room tenements in over-crowded unhygienic localities
- These families stated that they were food secure; if needed they accessed subsidised food grains from Public Distribution System and availed ICDS supplementary feeding programmes.

## **ANTHROPOMETRIC PARAMETERS**

| <b>Table 3 Anthropometric profile of women</b>   |                           |
|--|---------------------------|
| <b>Parameter</b>   | <b>Mean±SD</b>            |
| <b>Height*</b>   | <b>151.7±5.88 (4155)*</b> |
| <b>Weight</b>  | <b>57.5±12.71 (11141)</b> |
| <b>BMI</b>   | <b>25.1±5.20 (11133)</b>  |
| <b>MUAC</b>  | <b>26.5±4.06 (6718)</b>   |
| <b>WC</b>  | <b>78.1±11.85 (7835)</b>  |
| <b>HC</b>  | <b>96.1±10.13 (7835)</b>  |
| <b>*height does not change in adult women; hence taken only at the time of enrolment</b> |                           |

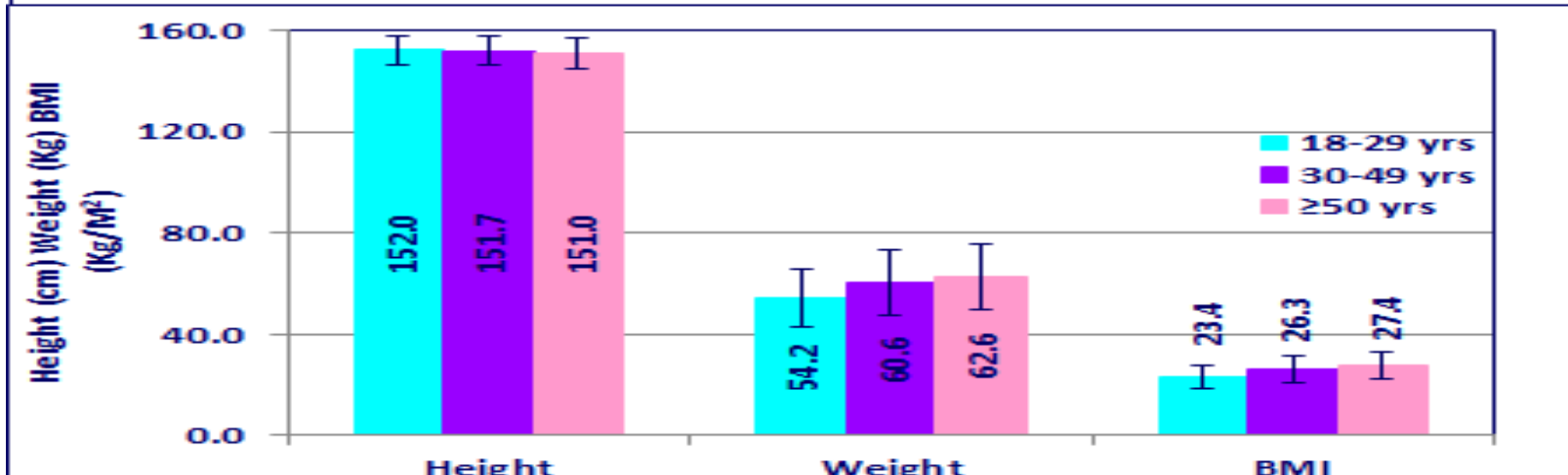
- These women were relatively short (mean height was only 151.7 cm).
- Mean weight was 57.5 Kg.
- These women had relatively high mean BMI, MUAC, WC and HC.





- Prevalence of under-nutrition was relatively low (7.9%)
- 44.7% were normally nourished.
- Nearly half of these women (47.7%) were over-nourished
- About 40% had high WC, and 25% had high HC.

**Fig 3 Anthropometric measurements in relation to age (mean & SD)**

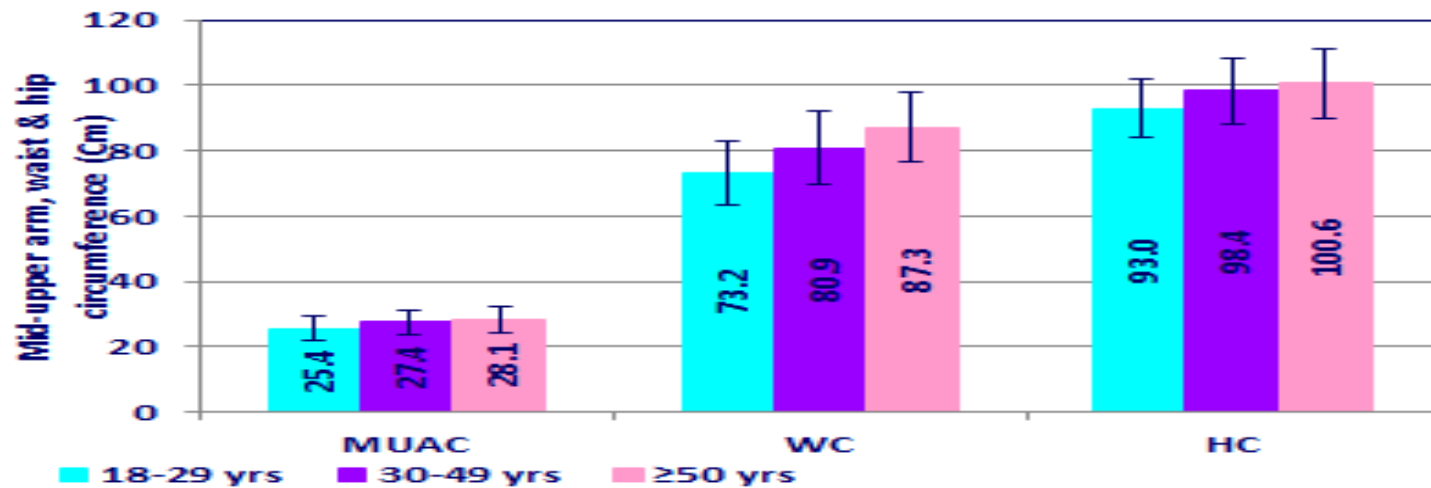


**T-test of anthropometric parameters agewise**

|        | 18-29 vs 30-49 | 30-49 vs ≥50 | 18-29 vs ≥50 |
|--------|----------------|--------------|--------------|
| Height | 0.0137 (ss)    | <0.0001      | <0.0001      |
| Weight | <0.0001        | <0.0001      | <0.0001      |
| BMI    | <0.0001        | <0.0001      | <0.0001      |

- The differences in the mean height between the three groups were very small (152 cm, 151.7 and 151cm).
- With increasing age there was a progressive increase in mean body weight (54.2, 60.6 and 62.6 Kg); these differences were statistically significant
- There was a progressive increase in mean BMI (23.4, 26.3 and 27.4). These differences were statistically significant

**Fig 4 Circumferential measurements in relation to age (mean & SD)**

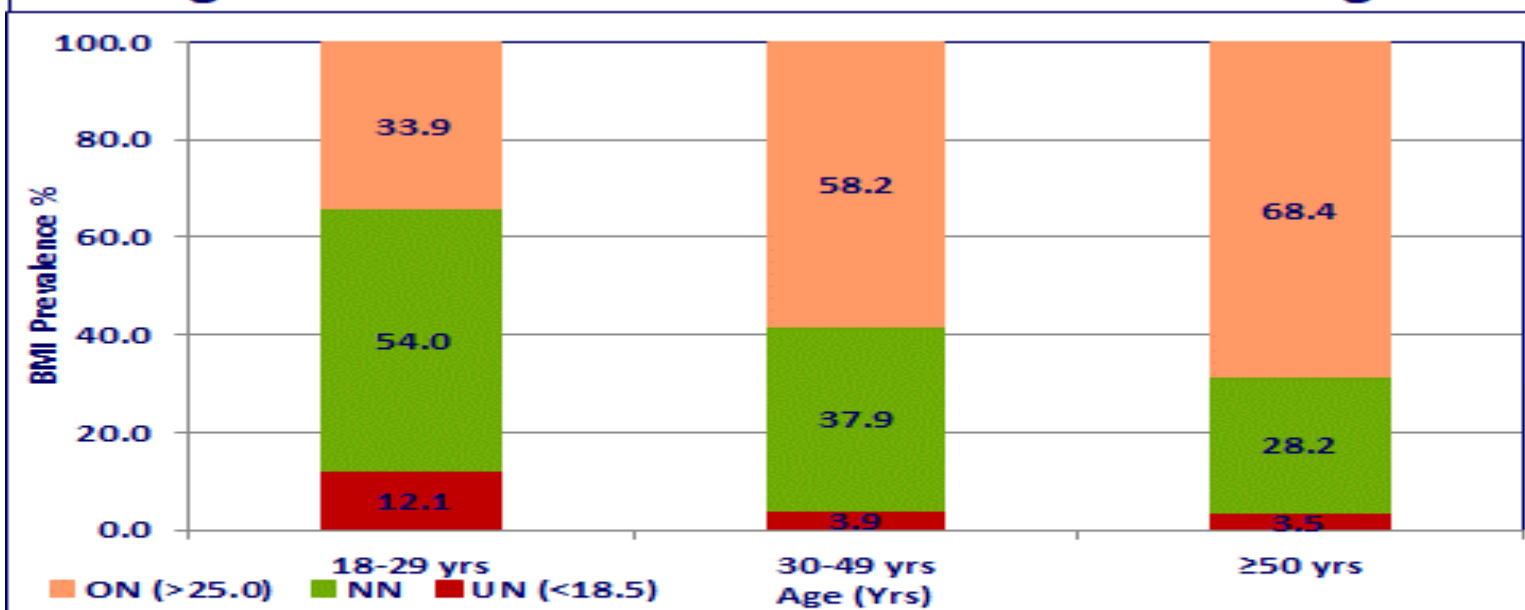


**T-test of circumferential measurements agewise**

|      | 18-29 yrs vs 30-49 yrs | 30-49 vs ≥50 | 18-29 vs ≥50 |
|------|------------------------|--------------|--------------|
| MUAC | <0.0001                | <0.0001      | <0.0001      |
| WC   | <0.0001                | <0.0001      | <0.0001      |
| HC   | <0.0001                | <0.0001      | <0.0001      |

- There was a progressive increase in mean WC with age
- There was also an increase in MUAC and HC with age but these were of a lower magnitude as compared to WC.

**Fig 5 Nutritional status of women in relation to age**

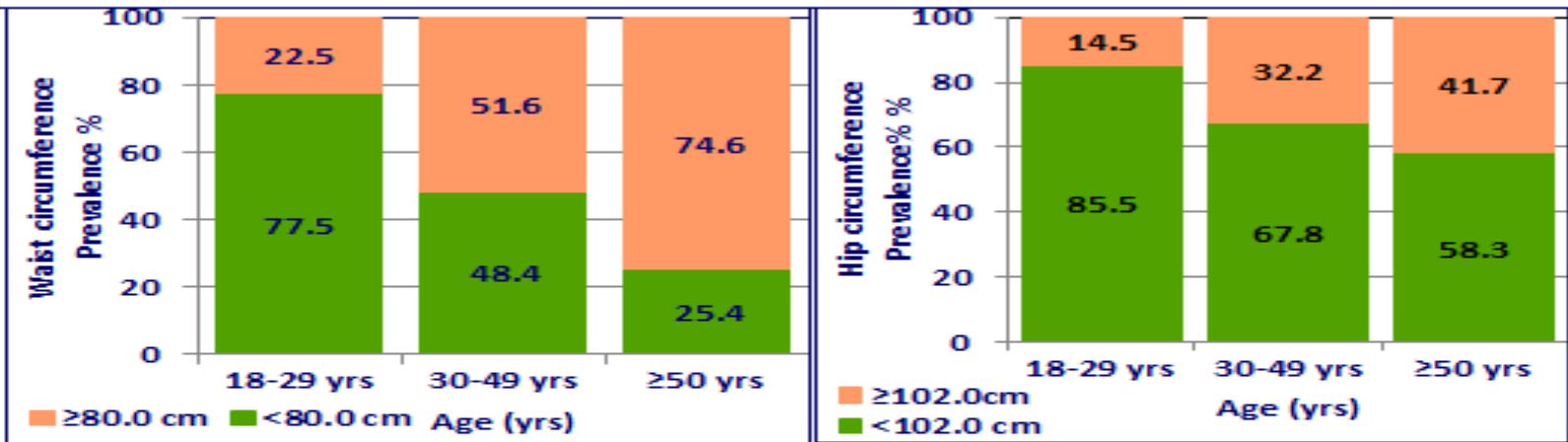


**Chi square test of anthropometric parameters agewise**

|                     | UN vs others | ON vs others | UN vs ON |
|---------------------|--------------|--------------|----------|
| 18-29 & 30-49 yrs   | <0.0001      | <0.0001      | <0.0001  |
| 30-49 yrs & ≥50 yrs | 0.43 NS      | <0.0001      | 0.078 NS |
| 18-29 yrs & ≥50 yrs | <0.0001      | <0.0001      | <0.0001  |

- Even in the 18-29 year age group prevalence of under-nutrition was low (12.1%); There was a further fall in under-nutrition rate with increase in age.
- Prevalence of over-nutrition even in the under-30 year age group was high (33.9 %).
- There was a steep increase in prevalence of over-nutrition with increase in age
- In the over ≥50 age group 68.4% of women were over-nourished.

**Fig 6 Prevalence of adiposity in relation to age**



|                     | WC N vs ON | HC N vs ON |
|---------------------|------------|------------|
| 18-29 & 30-49 yrs   | <0.0001    | <0.0001    |
| 30-49 yrs & ≥50 yrs | <0.0001    | <0.0001    |
| 18-29 yrs & ≥50 yrs | <0.0001    | <0.0001    |

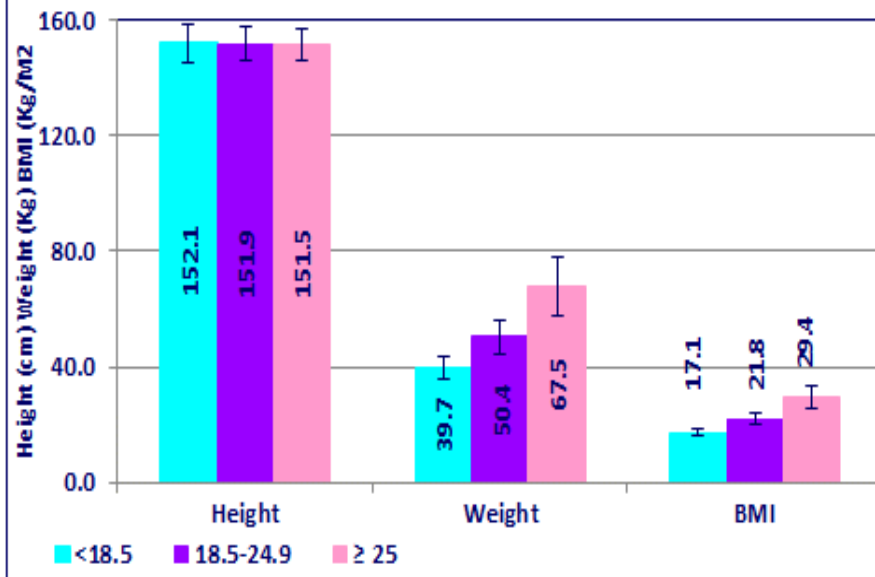
Prevalence of adiposity as assessed by high WC and HC were seen right from 18-29 age group

Adiposity increased with increasing age.

In each age group prevalence of high WC was higher as compared to high HC.

Three fourth of women aged 50 years and above, had high WC and 41.7% of them had high HC.

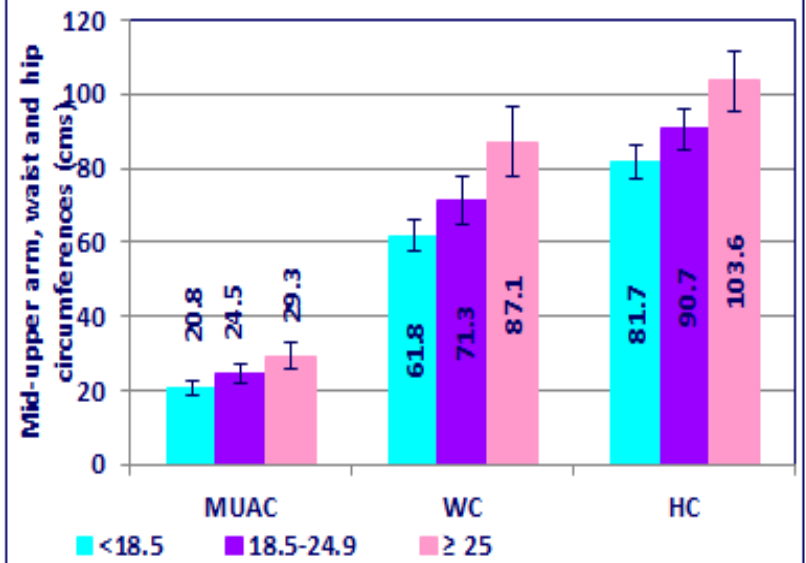
**Fig 7 Anthropometric measurements in relation to nutritional status (BMI)**



**T-test of anthropometric parameters according to nutritional status (BMI)**

|        | <18.5 vs 18.5-24.9 | 18.5-24.9 vs ≥ 25 | <18.5 vs ≥ 25 |
|--------|--------------------|-------------------|---------------|
| Height | 0.3665 (ns)        | 0.0005            | 0.0042        |
| Weight | <0.0001            | <0.0001           | <0.0001       |
| BMI    | <0.0001            | <0.0001           | <0.0001       |

**Fig 8 Circumferential measurements in relation to nutritional status (BMI)**

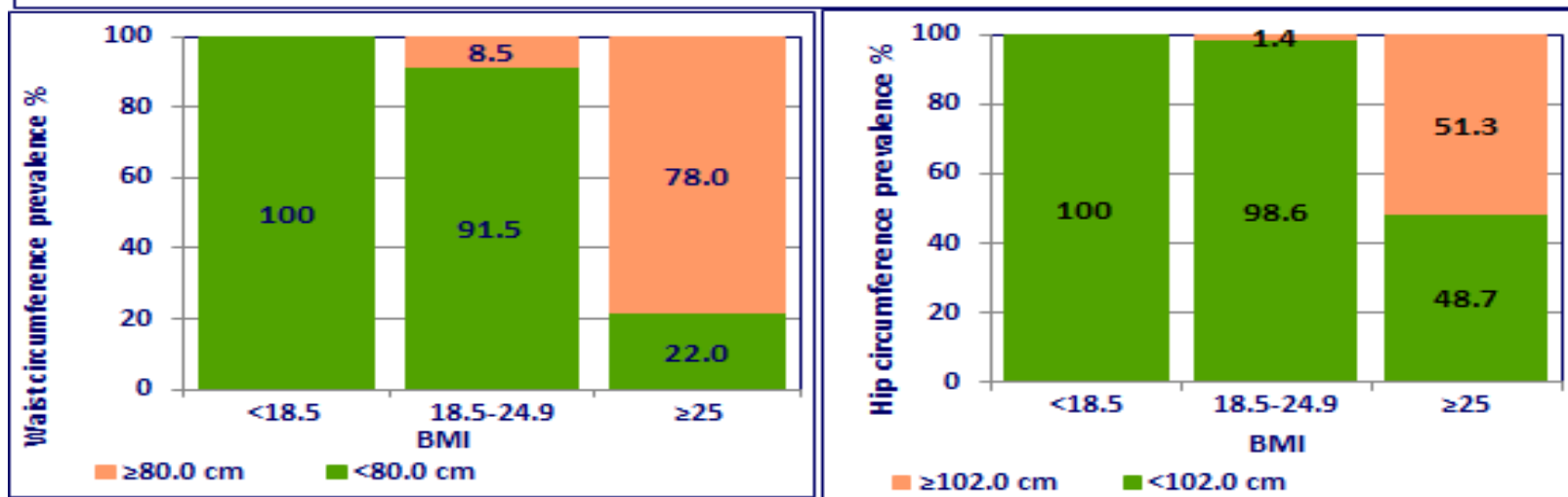


**T-test of circumferential measurements by nutritional status (BMI)**

|      | <18.5 vs 18.5-24.9 | 18.5-24.9 vs ≥ 25 | <18.5 vs ≥ 25 |
|------|--------------------|-------------------|---------------|
| MUAC | <0.0001            | <0.0001           | <0.0001       |
| WC   | <0.0001            | <0.0001           | <0.0001       |
| HC   | <0.0001            | <0.0001           | <0.0001       |

- Mean height, weight, BMI, MUAC, WC, and HC in under-nourished, normally nourished and over-nourished women were computed.
- The differences in the mean height in under-nourished, normally nourished and over-nourished women was small and were not of any physiological significance.
- There was a progressive increase in the mean weight, BMI, MUAC, WC and HC with increasing BMI. All these differences were substantial and were statistically significant.

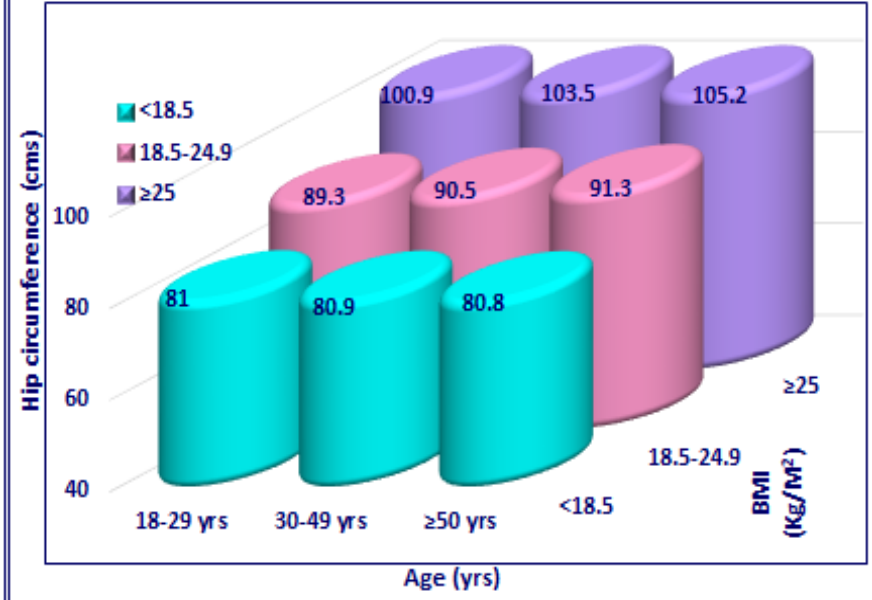
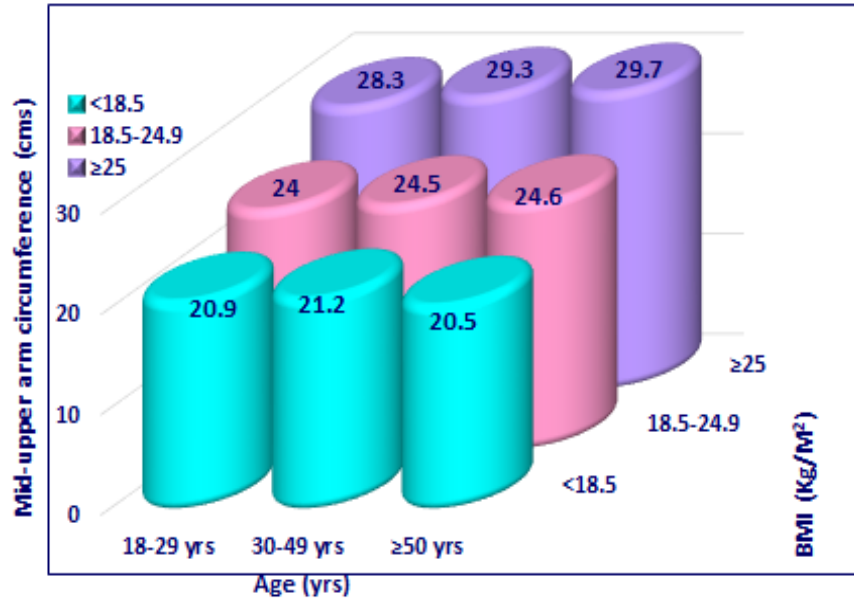
**Fig 9 Prevalence of adiposity in relation to nutritional status (BMI)**



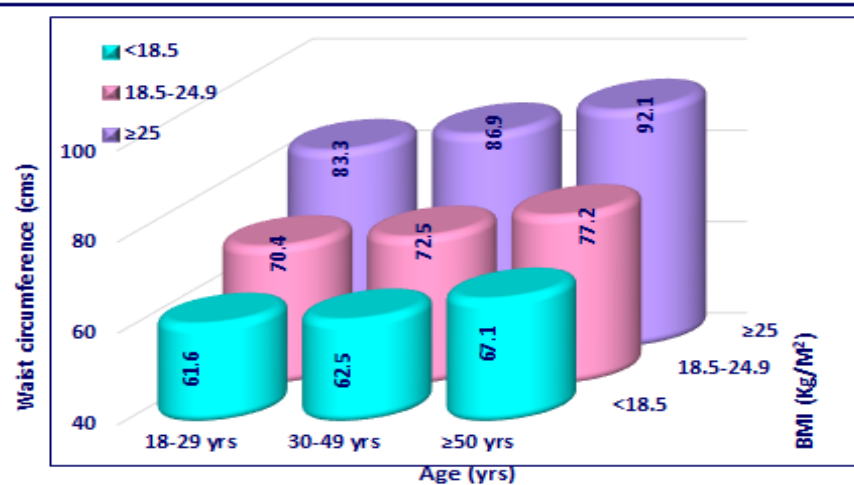
| Chi square test of circumferential measurements by nutritional status (BMI) |            |            |
|---|------------|------------|
|   | WC N vs ON | HC N vs ON |
| <18.5 vs others   | <0.0001    | <0.0001    |
| ≥ 25 vs others  | <0.0001    | <0.0001    |
| <18.5 vs ≥ 25   | <0.0001    | <0.0001    |

None of the under-nourished women had waist or hip circumference above the cut off levels. Among normally nourished women only 8% had high WC and 1.4% had high HC. Among the over-nourished women 78% had high WC and 51.3% had high HC

**Fig 10 Mean mid-upper arm and hip circumferences in relation to age & nutritional status (BMI)**



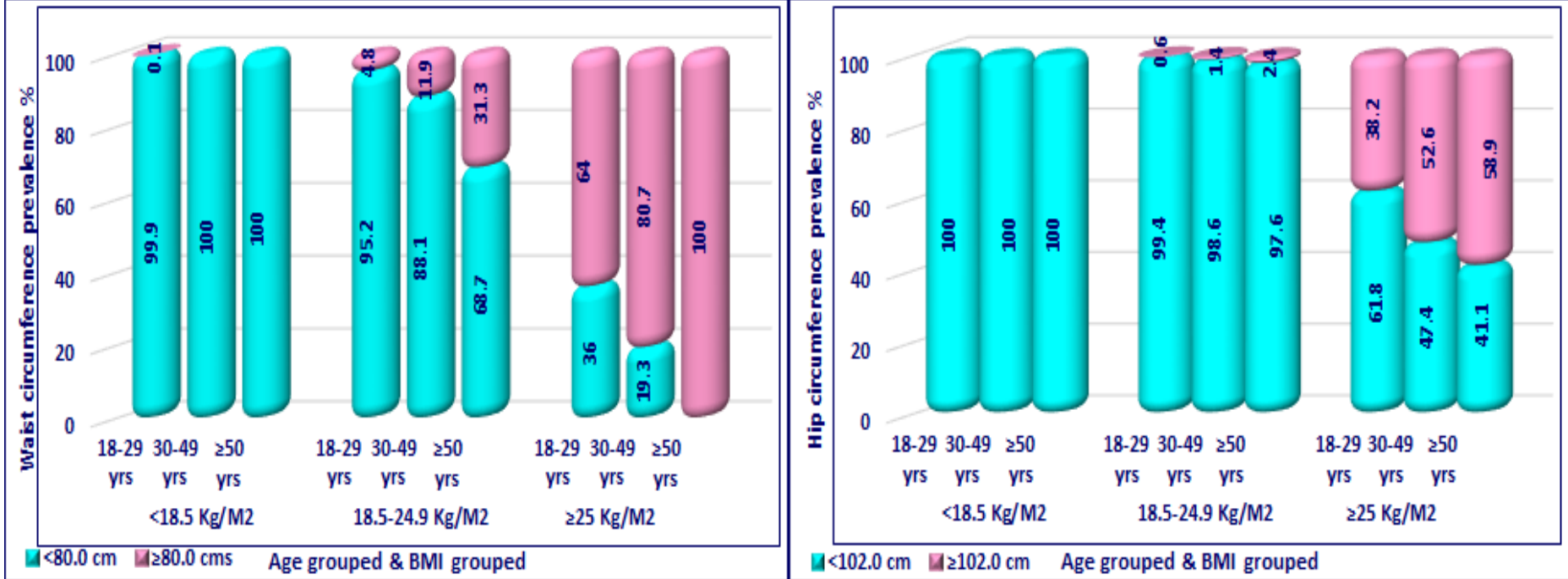
**Fig 11 Mean waist circumference in relation to age & nutritional status (BMI)**



Mean MUAC and HC increase with increase in BMI, but are similar across all age groups. In contrast mean WC increases both with increasing age and with increasing BMI. These data indicate older women are prone for abdominal adiposity (as assessed by WC) not only when they are over-nourished but also when they are normally nourished



**Fig 12 Prevalence of adiposity in relation to age and nutritional status (BMI)**



- For any given age and BMI, prevalence of high WC was higher as compared to high HC.
- High HC was seen in women with high BMI across all age groups.
- High WC was seen even in normally nourished women in 30-49 & 50 and above age.
- With increase in age and BMI prevalence of high WC increased.
- All women in any age group who were over-nourished had high WC, HC.

## **SUMMARY & CONCLUSION**

- **Data from the present study indicate that among the urban women from low middle income families, prevalence of under-nutrition was low.**
- **Over 40% of these women were normally nourished. Efforts should be directed to ensure that these women continue their current dietary intake and lifestyle, remain normally nourished and healthy.**
- **Nearly half the women were over-nourished and over 40% have abdominal adiposity.**
- **In these women rise in over-nutrition was not due to increase in energy intake but mainly due to steep reduction in physical activity.**
- **Focussed attention on improving physical activity can help them to halt rise in over-nutrition and related increase in NCD rates.**
- **It is imperative that over-nourished women are advised to seek nutrition and health care for effective management of over-nutrition and early detection and management of non-communicable diseases.**

**THANK YOU**