

## Nutritional status of aged rural women of North Karnataka

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**Abstract:** Nutritional anthropometry of rural women revealed that a majority of women were in normal nutritional status (50.83 %) with a BMI ranging from 18.50 to 22.99 kg/ m<sup>2</sup>, having no risk of metabolic complications based on both waist circumference (79.72 %) and WHR (85.56 %). Increased risk with respect to waist circumference was observed among 15.83 per cent of women. Substantially increased risk with respect to waist circumference and WHR was observed among 4.45 per cent and 14.44 per cent of women, respectively. Nutritional status of the rural women was dependent on the age and socio-economic status of the family.

**Key words:** Body mass index, Nutritional status, Rural women

### Introduction

Through the centuries, woman has been the heart of the family providing care for its members. In rural India women is often the last to be cared for and malnutrition is most apparent in women than children of the family. Women are responsible for family health, but are also victims of poor nutritional status. Women in poor health are more likely to give birth to low birth weight and preterm infants. Poor nutrition during reproductive ages can lead to reduced immunity and impaired physical and mental development of children. National Family Health Survey-IV indicated that 24.30 per cent of rural women (15- 49 years) in Karnataka recorded a BMI below normal and 46.10 per cent were anemic indicating a high prevalence of nutritional deficiency (Anon., 2016). The health status of women in reproductive stages of life is related to their food behaviour qualitatively and quantitatively (Kumari, 2013). This clearly suggests a condition of emergency for improving the nutritional status of women especially in rural areas (Rout, 2009). The present study was under taken to assess the nutritional status of rural women in reproductive age (15-35 years).

### Material and methods

Assessment of nutritional status of 360 rural women from 12 villages and six talukas of four agro-climatic zones of UAS, Dharwad i.e., zones 3, 8, 9 and 10 was carried out following standard procedures described by Jelliffe (1966). Waist and hip circumference (Anon., 2008) and body mass index were assessed as per methods of WHO (Anon., 1995).

Based on BMI, the rural women were classified into different categories of nutritional status as suggested for Asians by WHO (Anon., 2004). Ideal body weight was calculated by deducting 100 in height (cms). Per cent of ideal body weight was computed as follows

$$\text{Ideal body weight(\%)} = \frac{\text{Actual weight (kg)}}{\text{Ideal body weight (kg)}} \times 100$$

Predicted risks of metabolic complications in terms of waist to hip ratio was categorized as suggested by WHO (Anon., 2008).

Socio-economic status of rural families was assessed using the modified and pre-tested scale of Aggarwal *et al.* (2005).

### Results and discussion

Demography results indicated that majority of selected women were in the age range of 21-25 years (28.89 %), were married and living in joint families (49.72 %). Majority of respondents belonged to Hindu religion (91.11 %), matriculates (29.72 %), not engaged in gainful employment and belonged to lower middle socio-economic status (59.44 %).

Body mass indices of women of different agro-climatic zones are depicted in Fig. 1. It was observed that majority of rural women were in normal nutritional status (50.83 %) and results were in accordance with findings of Devi and Sindhuja (2015) in rural areas of Palakkad district, Tamil Nadu, Prakruthi and Prakash (2013) in rural Mandya, Karnataka and Dhobal and Raghuvanshi (2012) in rural Uttarkashi of Uttarakhand. This probably could be due to heavy working culture of rural women both at homestead and in farms. Jayamani *et al.* (2013) revealed a similar phenomenon wherein women engaged in heavy physical activity were reported to be either underweight or normal.

Maximum proportion of underweight women were recorded in zone 10 (35.00 %) it might be probably due to heavy work and lower middle socio-economic status (71.67 %) compared to other zones (Table 1). There was no significant association was noted between nutritional status and agro-climatic zones.

A large portion of women (42.27 %) in younger age (15-20 years) group were underweight (Fig. 2), this may be because of young age and poor feeding practices followed for girl children in rural families. McArdle *et al.* (1991) indicated that BMI increased with increased age. It was observed that majority of normal (66.67 %) and obese class women (33.33 %) belonged to high socio-economic status (Fig. 3). Women in underweight (50.00 %) category were belonging to very poor socio-economic status. Rout (2009) and Nagamani (2014) suggested that socioeconomic status was an important determinant of nutritional status. However, it was observed that there was a

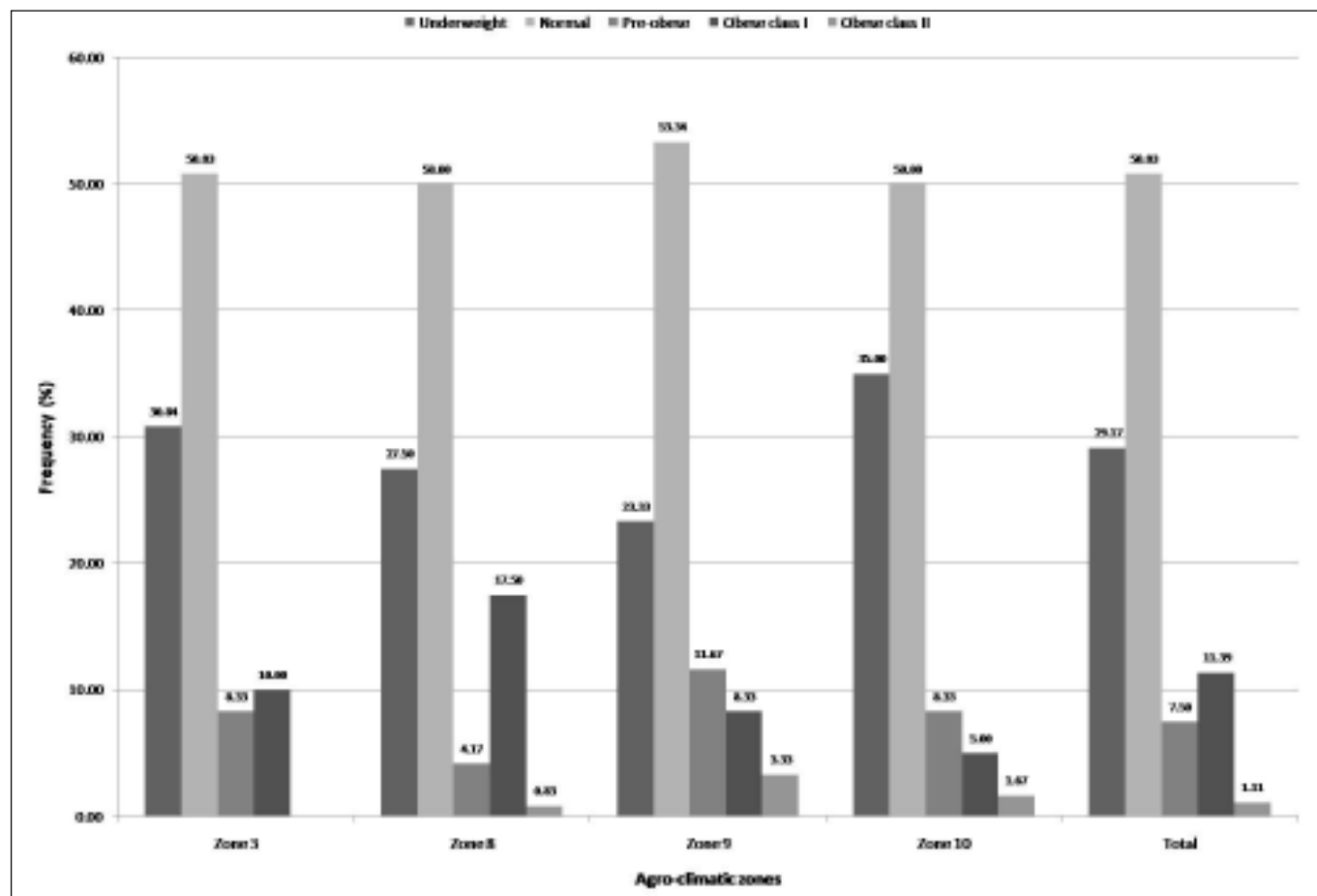


Fig. 1. Classification of nutritional status of rural women from different agro - climatic zones

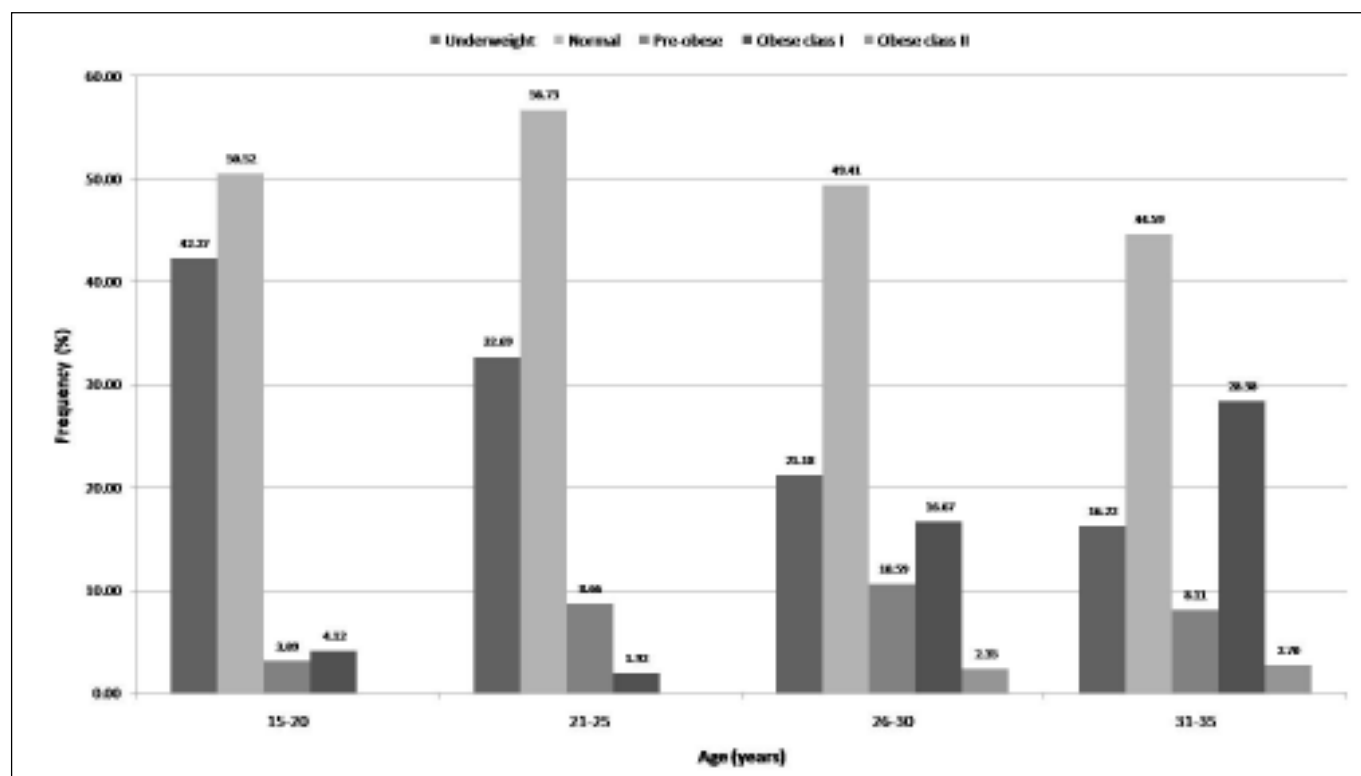


Fig. 2. Nutritional status of women as per age

# Nutritional status of aged rural women .....

Table 1. Demographic profile of rural women selected from different agro-climatic zones

N=360

Parameters	Criteria	Zone 3 (n=120)	Zone 8 (n=120)	Zone 9 (n=60)	Zone 10 (n=60)	Total
Age(years)	15-20	30 (25.00)#	37 (30.84)	19 (31.67)	11 (18.33)	97 (26.94)
	21-25	43 (35.83)	27 (22.50)	18 (30.00)	16 (26.67)	104 (28.89)
	26-30	29 (24.17)	31 (25.83)	13 (21.67)	12 (20.00)	85 (23.61)
	31-35	18 (15.00)	25 (20.83)	10 (16.66)	21 (35.00)	74 (20.56)
Marital status	Married	98 (81.67)	82 (68.33)	44 (73.33)	40 (66.67)	264 (73.33)
	Unmarried	22 (18.33)	38 (31.67)	16 (26.67)	20 (33.33)	96 (26.67)
Type of family	Nuclear	46 (38.33)	55 (45.83)	29 (48.33)	33 (55.00)	163 (45.28)
	Joint	64 (53.34)	58 (48.33)	31 (51.67)	26 (43.33)	179 (49.72)
	Extended	10 (8.33)	7 (5.84)	-	1 (1.67)	18 (5.00)
Family size	Small (1-4)	39 (32.50)	36 (30.00)	24(40.00)	31(51.67)	130(36.11)
	Medium(5-7)	69 (57.50)	64 (53.33)	27 (45.00)	26 (43.33)	186 (51.67)
	Big (>7)	12 (10.00)	20 (16.67)	9 (15.00)	3 (5.00)	44 (12.22)
Religion	Hindus	105 (87.50)	112 (93.33)	55 (91.67)	56 (93.33)	328 (91.11)
	Muslims	11 (9.17)	8 (6.67)	2 (3.33)	1 (1.67)	22 (6.11)
	Christians	3 (2.50)	-	2 (3.33)	3 (5.00)	8 (2.22)
	Jains	1 (0.83)	-	1 (1.67)	-	2 (0.56)
Educationlevel	No schooling	18 (15.00)	20 (16.67)	8 (13.33)	6 (10.00)	52 (14.44)
	Primary	16 (13.33)	12 (10.00)	6 (10.00)	9 (15.00)	43 (11.95)
	Higher primary	30 (25.00)	17 (14.17)	10 (16.67)	15 (25.00)	72 (20.00)
	SSLC	40 (33.33)	38 (31.67)	19 (31.67)	10 (16.67)	107 (29.72)
	PUC / diploma	9 (7.50)	23 (19.17)	12 (20.00)	13 (21.66)	57 (15.83)
	Graduate	7 (5.84)	9 (7.50)	5 (8.33)	6 (10.00)	27 (7.50)
Occupationalstatus	Post graduate	-	1 (0.83)	-	1 (1.67)	2 (0.56)
	Not engaged in gainful employment	56 (46.67)	73 (60.83)	46 (76.67)	32 (53.33)	207 (57.50)
	Agriculture	15 (12.50)	5 (4.17)	1 (1.67)	4 (6.67)	25 (6.94)
	Agricultural labourer	36 (30.00)	19 (15.83)	8 (13.33)	6 (10.00)	68 (18.89)
	Other labourer	3 (2.50)	8 (6.67)	2 (3.33)	5 (8.33)	22 (6.11)
	Business	8 (6.67)	12 (10.00)	2 (3.33)	7 (11.67)	28 (7.78)
Socio-Economic Status	White collar / Govt. / private job	2 (1.67)	3 (2.50)	1 (1.67)	6 (10.00)	10 (2.78)
	High	3 (2.50)	1 (0.83)	2 (3.33)	-	6 (1.67)
	Upper middle	28 (23.33)	38 (31.67)	13 (21.67)	10 (16.67)	89 (24.72)
	Lower middle	68 (56.67)	64 (53.33)	39 (65.00)	43 (71.67)	214 (59.44)
	Poor	20 (16.67)	17 (14.17)	5 (8.33)	7 (11.66)	49 (13.61)
	Very poor	1 (0.83)	-	1 (1.67)	-	2 (0.56)

# Figures in parentheses indicate per cent values

Table 2. Nutritional status (mean  $\pm$  SD) of rural women from different agro-climatic zones

N=360

Parameters	Zone 3(n=120)	Zone8(n=120)	Zone 9(n=60)	Zone 10(n=60)	Mean
Height (cm)	154.72 $\pm$ 3.32	156.42 $\pm$ 3.91	155.74 $\pm$ 4.52	155.41 $\pm$ 5.08	155.24 $\pm$ 4.06
Weight (kg)	48.08 $\pm$ 7.44	50.22 $\pm$ 8.91	50.74 $\pm$ 7.57	49.55 $\pm$ 7.41	49.82 $\pm$ 7.97
Body mass index	19.51 $\pm$ 3.10	20.77 $\pm$ 3.60	20.95 $\pm$ 3.23	20.56 $\pm$ 3.21	20.68 $\pm$ 3.31
Ideal body weight	54.72 $\pm$ 3.32	56.42 $\pm$ 3.91	55.74 $\pm$ 4.52	55.41 $\pm$ 5.07	55.24 $\pm$ 4.06
Ideal body weight (%)	88.89 $\pm$ 13.89	90.72 $\pm$ 15.91	91.48 $\pm$ 14.79	89.43 $\pm$ 14.35	90.35 $\pm$ 14.77
Waist circumference (cm)	75.98 $\pm$ 4.78	76.02 $\pm$ 6.37	76.00 $\pm$ 6.07	74.47 $\pm$ 4.29	75.75 $\pm$ 5.52
Hip circumference (cm)	91.83 $\pm$ 4.50	91.15 $\pm$ 5.05	93.41 $\pm$ 5.66	90.75 $\pm$ 4.27	91.76 $\pm$ 4.83
Waist to hip ratio	0.83 $\pm$ 0.03	0.83 $\pm$ 0.04	0.82 $\pm$ 0.04	0.82 $\pm$ 0.02	0.83 $\pm$ 0.04

Table 3. Risk of metabolic complications among rural women of different zones

N=360

Risk of metabolic complications	Zone 3(n=120)	Zone 8 (n=120)	Zone 9(n=60)	Zone 10(n=60)	Total	$\chi^2$
Based on waist circumference (cm)						
No risk ( $\leq$ 80)	96(80.00)#	89(74.17)	47(78.33)	55(91.67)	287 (79.72)	14.94 <sup>NS</sup>
Increased risk (80-88)	19(15.83)	21(17.50)	12(20.00)	5 (8.33)	57 (15.83)	
Substantially increased risk (>88)	5(4.17)	10(8.33)	1(1.67)	-	16(4.45)	
Based on waist to hip ratio (WHR)						
No risk (<0.85)	103(85.83)	96(80.00)	52(86.67)	57(95.00)	308 (85.56)	8.19 <sup>NS</sup>
Substantially increased risk ( $\geq$ 0.85)	17(14.17)	24(20.00)	8(13.33)	3(5.00)	52(14.44)	

# Figures in parentheses indicate per cent values

NS- Non significant

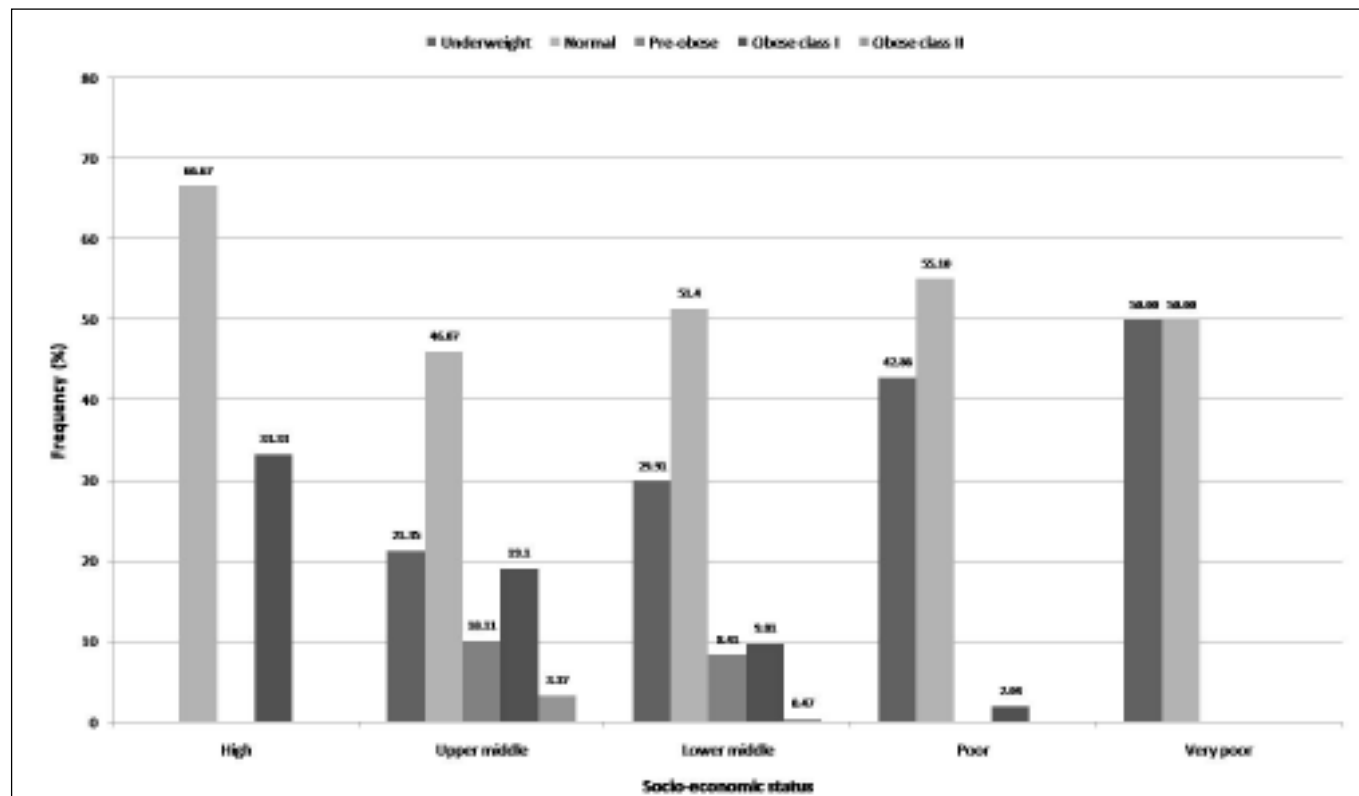


Fig. 3. Nutritional status of women as per socio-economic status

Table 4. Predicted risk of metabolic complications by age of rural women in different zones

N=360

Risk of metabolic complications	Age (years)				Total	$\chi^2$
	15-20	21-25	26-30	31-35		
Based on waist circumference (cm)						
No risk ( $\leq 80$ )	90 (92.78)	91 (87.50)	58 (68.24)	48 (64.86)	287 (79.72)	33.20**
Increased risk (80-88)	6 (6.19)	11 (10.58)	19 (22.35)	21 (28.38)	57 (15.83)	
Substantially increased risk ( $>88$ )	1 (1.03)	2 (1.92)	8 (9.41)	5 (6.76)	16 (4.45)	
Total	97 (26.94)	104 (28.89)	85 (23.61)	74 (20.56)	360 (100.00)	
Based on waist to hip ratio (WHR)						
No risk ( $<0.85$ )	91 (93.81)	95 (91.35)	68 (80.00)	54 (72.97)	308 (85.56)	19.22**
Substantially increased risk ( $\geq 0.85$ )	6 (6.19)	9 (8.65)	17 (20.00)	20 (27.03)	52 (14.44)	
Total	97 (26.94)	104 (28.89)	85 (23.61)	74 (20.56)	360 (100.00)	

# Figures in parentheses indicate per cent values

\*\*Significant at  $p \leq 0.01$ 

significant association ( $p \leq 0.05$ ) between body mass indices and socio-economic status of women. Further, education did not influence nutritional status in rural setting which was in contradiction to Rout (2009) study.

There was no significant association of agro-climatic zones with respect to risk of metabolic complications. The risk was independent of the zones (Table 3). Lower risk of metabolic complications was observed among majority of rural women (Table 3). Similar results were also reported by Devi and Sindhuja (2015) in rural areas of Palakkad district, Tamil Nadu.

The study revealed that no risk of metabolic complications among women of younger age group (15-20 years) as per waist

circumference or waist to hip ratio (Table 4), because majority of them were underweight (Fig.2). However, with increased age (31-35 years) the BMI increased and risk increased and such phenomenon was also reported by McArdle *et al.* (1991).

### Conclusion

Based on the results obtained it was concluded that majority of rural women were in normal nutritional status, but at least 29.17 per cent were underweight. More than 75.00 per cent of selected rural women were not associated with the risk of metabolic complications. The study indicated that the age and socio-economic status had a significant association with the nutritional status of rural women.

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