Nutritional Status of Rural Women in Bengaluru Rural District

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ABSTRACT

The study was undertaken on the nutritional status of rural women in Heggadehalli of Doddaballapur taluk and Venkathalli of Devanahalli taluk in Bengaluru rural district with the sample size of 200 respondents. Mean anthropometric measurement of rural women was 153.8 cm of height, 46.8 kg of weight. In comparison with the mean BMI standards, it was observed that 20 percent of women were undernourished, 64 percent of women were normal, and 16 percent of women were obese. In comparison with the mean waist/hip ratio with standards, it was observed that 84 percent were in normal category and 16 percent were obese. Education, land holding, income, and age had a significant positive association with anthropometric measurements of rural women. The deficient level of hemoglobin existed in 53 percent of rural women, low in 20 percent and only 27 percent had an acceptable level. The occurrences of morbidity symptoms were higher in rural women.

Keywords: Anthropometry, Body index, Hemoglobin, Nutrient deficiency, Rural women.

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INTRODUCTION

The nutritional status reflects the health of a person and is influenced by the quality of foods eaten, and the ability of the body to utilize these foods to meet its needs is affected by various socio-economic factors including income, family size, occupation and educational status of the people. Musbe and Kumar, 2002 said that the prevalence of symptoms of malnutrition in a community is, in turn, a reflection of dietary consumption of its members. Majority of the population in developing and underdeveloped countries suffer from malnutrition and mostly the axe falls on the women and children. Populations like rural agricultural laborers and tribal community are more vulnerable than the rest of the population in India. According to the 2011 census, the population of women in Karnataka 38 million and out of these 28 million women belongs to a rural area. Women’s contribution in Agricultural production process is about 50–60%.

Keeping these facts in view, the study was conducted with the following objectives:

• To assess anthropometric measurements of rural women.
• To assess the hemoglobin, morbidity, and nutrition deficiency symptoms of rural women.

MATERIAL AND METHODS

The nutritional status of subjects was assessed by nutritional anthropometry, diet survey, and hemoglobin level. The anthropometric measurements viz., height in cm, weight in kg, waist, and hip circumference of the respondents were recorded. The nutritional status was assessed by calculating body mass index (BMI) and waist to hip ratio (WH ratio).

Height was measured accurately to the nearest 0.1 cm using a vertical rod. The subject was made to remove the shoes and stand on the height rod platform by the scale with foot parallel with heals, shoulders and back of the head in an upright posture. Weight of the selected subject’s was measured to the nearest point of 0.1 kg using a standard weighing balance (Jelliffe, 1966). The accuracy of the weight was ascertained by using standard weight. The zero adjustments of the scale were checked before each measurement. Height and weight of the subjects were used to calculate the body mass index. Subjects were classified based on standard BMI (NIN, 1999). The waist was measured with the subject standing erect. The circumference was measured at an anatomical reference point such as 12 cm below the xiphisternum. The hip was also measured with the subject standing erect, taking in the maximal gluteal circumference. Waists circumference and hip circumference were used to calculate the waist to hip ratio. Abdominal obesity was judged by using the reference ratio given by (Lean et al., 1995). Clinical status was assessed by the investigator by visual method (presence of any deficiency symptoms at the time of the survey). Modified ICMR
proforma was used for the same. Morbidity status of the subjects was assessed by orally enquiring from the subjects whether they suffered from past six months any of the disorders mention in the questionnaire. Hemoglobin status is an indicator of iron status in an individual. The occurrence of iron as a component of the hemoglobin molecule has led to the use of hemoglobin determination to assess the adequacy of iron allowance.

**Results and Discussion**

Table 1 depicts the body mass index and the waist-hip ratio of rural women. According to body mass index, women were categorized into normal, underweight, and overweight. Sixty-four percent of respondents were normal, and 20 percent of them were underweight, and 16 percent of respondents were overweight. Similar findings have been observed by Venkatalakshmi and Peramma (2000) who reported that body mass index of agricultural farm women showed lower weight normal grade between 18.5–20.0 BMI and concluded that agriculture workers main pillars of country’s economy have lower body weight which could contribute to powered productivity.

Since the rural women belong to a low socioeconomic group in general, the reasons for the prevalence of undernutrition could be because women are over exhausted by the combination of reproductive demands and long term intake of lower amounts of food.

The waist/hip ratio of rural women is depicted in Table 2. Among respondents, 84 percent of them were normal, and 16 percent of them were overweight. Estimates of waist/hip ratio provide a useful indication of nutritional status in undeveloped countries, where the population is often malnourished with little fat reserves, a change in this measurement reflects the total body stress. It is observed that measurement of waist/hip ratio has been used as a measure of total body subcutaneous fat. This observation was in concurrence with the findings of Menon et al. (2011) who reported that body weight was highest in older individuals, whereas no marked difference was observed in other variables like height. The possible factors of variation are in waist/hip ratio, height and significant linear correlation with weight. Approximately, 50 percent of the women were undernourished due to low intake of food during early childhood and socioeconomic status.

The correlation coefficient of selected socio-economic factors on anthropometric measurements of women is depicted in Table 3. It is indicated that, except age with height and waist/hip ratio, family type with weight, height, and BMI, remaining independent variables had a positive relationship with anthropometric measurement. Education, landholding, and income had a completely positive influence on anthropometric measurements and the same results were observed with respect to dietary intake also. From the present study, it was observed that socioeconomic

![Table 1: Mean Anthropometric measurements of the rural women](image)

| Attributes        | Mean | SD  |
|-------------------|------|-----|
| Height (cm)       | 153.8| 4.9 |
| Weight (kg)       | 46.8 | 5.0 |
| Body mass index   | 22.49| 10.19|
| Waist hip ratio   | 0.80 | 0.268|

![Table 2: Body mass index and waist hip ratio of rural women](image)

| Classification | No. | Per cent |
|----------------|-----|----------|
| Body Mass Index|     |          |
| Under weight (<18.5) | 40  | 20       |
| Normal (18.5 – 22.99) | 128 | 64       |
| Over weight (23 – 27) | 32  | 16       |
| Waist/hip ratio |     |          |
| Normal (0.80) | 168 | 84       |
| Obese (>0.80) | 32  | 16       |
| Total | 200 | 100      |

![Table 3: Correlation co-efficient of Independent variables on Anthropometric measurements](image)

| Independent variables | Weight (kg) | Height (cm) | BMI | Waist | Hip | Waist/hip ratio |
|-----------------------|-------------|-------------|-----|-------|-----|-----------------|
| Age                   | 0.00569NS   | -0.21068*   | 0.00578 NS | 0.04548 NS | 0.01115 NS | -0.014 NS         |
| Family type           | -0.031213 NS | -0.02684 NS | -0.1079 NS | 0.2206* | 0.21784* | 0.0194 NS         |
| Family size           | 0.016824    | -0.11652 NS | -0.0097 NS | 0.30921** | 0.27853** | 0.04869 NS         |
| Education             | 0.0153642   | 0.23298*    | 0.13003 NS | 0.1206 NS | 0.1346 NS | 0.11343 NS         |
| Land holding          | 0.1976*     | 0.17289 NS  | 0.18321 NS | 0.19609* | 0.20659* | 0.11967 NS         |
| Income                | 0.426136*   | 0.39847**   | 0.38279** | 0.3903** | 0.40509** | 0.35767**          |

* Significant at 5%
** Significant at 1%
NS: Non significant
factors viz. age and family income had a positive influence on anthropometric measurements. These observations are in line with the findings of Shwetha et al. (2011).

**Hemoglobin status of rural women**

Table 4 shows the classification of rural women by hemoglobin range. The deficient level of hemoglobin existed in 53 percent of women, low in 20 percent and 27 percent of women had an acceptable level. This may be due to the inadequacy of iron through dietary intake, which in turn affects the women as undernourished. Poor nutrition also affects her activity level, and overall physical performance, which reduces work capacity increases fatigue and causes nutritional anemia. These findings are in line with the findings of Shobha et al. (2011), who reported that mean hemoglobin levels of women were 10.44 g/dL. Majority of women (59.21%) were mildly anemic, 23.3 percent were moderately anemic, and only 14.5 percent were found to have normal hemoglobin level.

**Morbidity and Nutritional Deficiency Symptoms**

The occurrence of the illness among women is presented in Table 5. The illness reported among women in the study were a pain in hands and legs, backache, headache, pain in abdomen, fever, weakness, cold and cough, and acidity. This may be due to a considerable amount of workload on women who spend 8 to 9 hours at work and after returning continue their day’s work at home also. This was in conformity with findings of Jain and Singh (2013) who reported that more than three fourths of the farm women were frequently victimized for the health hazards namely skin irritation (88%), headache (80%), hardness of hand and feet (76%), back/body ache (74%) and whooping cough (60%) as a result of their involvement in agricultural occupations.

The prevalence of various nutritional deficiencies among rural women in the study group is presented in Table 6. The table reveals that the incidence of anemia, dental caries, and gums-spongy bleeding was present in rural women. These results indicate that rural women consumed inadequate iron and B-complex vitamins. Similar results were reported by Jain and Singh (2013) who reported that the women laborers suffered from B-complex deficiency followed by dental caries, bleeding gums and rough skin which may be due to the type of work and climate.

**Table 4:** Classifications of women by hemoglobin range

| Hemoglobin classification (WHO standard) | Respondents | Per cent | SD  |
|----------------------------------------|-------------|----------|-----|
| Deficient (<10 g/dL)                   | 106         | 53       | 1.680 |
| Low (10-11.9 g/dL)                     | 40          | 20       | 1.560 |
| Acceptable (>12 g/dL)                  | 54          | 27       | 1.580 |
| Total                                  | 200         | 100      |     |

**Table 5:** Morbidity status of rural women

| Sl. No. | Symptoms                           | Respondents (n=200) @No. | Per cent |
|---------|------------------------------------|---------------------------|----------|
| 1.      | Pain in hands and legs             | 67                        | 33.50    |
| 2.      | Giddiness and darkness in front of eyes | 48                  | 24.00    |
| 3.      | Back ache                          | 40                        | 20.00    |
| 4.      | Head ache                          | 120                       | 60.00    |
| 5.      | Fatigue                            | 40                        | 20.00    |
| 6.      | Body ache                          | 46                        | 23.00    |
| 7.      | Fever                              | 48                        | 24.00    |
| 8.      | Breathlessness                      | 12                        | 6.00     |
| 9.      | Weakness                           | 19                        | 9.50     |
| 10.     | Eye strain                         | 45                        | 22.50    |
| 11.     | Cold                               | 67                        | 33.50    |
| 12.     | Cough                              | 12                        | 6.0      |
| 13.     | Acidity                            | 47                        | 23.50    |
| 14.     | Tooth pain                         | 12                        | 6.0      |

@ Multiple response

**Table 6:** Nutrient deficiency signs prevalent in rural women

| Clinical symptoms               | Respondents (n=200) @No. | Percent |
|---------------------------------|---------------------------|---------|
| Anaemia                         | 124                       | 62      |
| Dental caries                   | 31                        | 15.5    |
| Mottled enamel                  | 12                        | 6       |
| Gum spongy bleeding             | 6                         | 3       |
| Normal                          | 17                        | 8.5     |

@ Multiple response

**Conclusion**

Since the rural women belong to a low socioeconomic group in general, the reasons for the prevalence of undernutrition could be because women are over exhausted by the combination of reproductive demands and long term intake of lower amounts of food. Education, land holding, income, and age had a significant positive association with anthropometric measurements of rural women. The deficient level of hemoglobin existed in 53 percent of rural women, low in 20 percent, and only 27 percent had an acceptable level. The occurrence of morbidity symptoms was higher in rural women. Majority of the rural women were anemic, but some of the nutritional deficiency symptoms like dental carries and gums-spongy bleeding.

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