

To Assess the Nutritional Status and Morbidity Patterns Among Non-Pregnant Non-Lactating Rural Women of Reproductive Age Group (18-40 Years)

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Abstract: The study was undertaken to assess the nutritional status, dietary intake and morbidity patterns among 100 non-pregnant non-lactating rural women of reproductive age group (18-40 years) in the village Bashahpur, Gurgaon. A cross-sectional survey was conducted using both qualitative and quantitative data-collection methods. The study involved interviews using a questionnaire, measurement of food/nutrient intake, anthropometry, observations of clinical signs of morbidities and assessment of their general knowledge and awareness about health, nutrition and sanitation. The mean BMI of the women was found to be 21.12 (± 3.7) kg/m² with 25% of them being underweight and 16% being overweight or obese. The overall quality of food and nutrient intake was poor as the intake of all the food groups (except fats, sugars and milk and milk products) was found to be much lower than their RDAs. The mean energy and protein intake was found to be 983.60 (± 309.6) kcal and 27.33 (± 8.2) g, respectively which met only 50% of the nutrient requirements. Similarly, the intake of micronutrients was also found to be inadequate particularly of iron and folic acid which met only 37.8% and 11% of the RDAs, respectively. Dietary deficiencies were also present in NPNL women of Badshahpur reflecting their effects in the clinical signs like pale conjunctiva, menstrual problems and pregnancy complications, etc. The mean general knowledge score was found to be 12 (± 3.2) out of 24 which reflected that subjects possessed average knowledge about health, nutrition and hygiene. Efforts are needed to improve diet quality and education for rural women so that they rise in economic status and are better nourished.

Index Terms: Nutritional status, Rural women, Non-pregnant non-lactating, Morbidity pattern, General practices

INTRODUCTION

India has 17.5% of the world's population (UN World Population Prospects, 2008) but only 2.4% of its landmass, resulting in great pressures for resources. As per 2012 census, the total population of India is 1.2 billion out of which 655.8 million are males and 614.4 millions are females. It is a country where 70% of the population resides in a rural area and males significantly outnumber females, an imbalance that has increased over time. The typical female advantage in life expectancy is not seen in India and this suggests there are systematic problems in women's health care.

Indian women have high mortality rates, particularly during childhood and in their reproductive years. India's maternal mortality rates in rural areas are among the world's highest. From a global perspective, India accounts for 19% of all live births and 27% of all maternal deaths (NFHS-3 data). The health of Indian women is intrinsically linked to their status in society, especially for those living in a rural area. Research into women's status in society has found that the contributions Indian women make to families are often overlooked. Instead they are often regarded as economic burdens and this view is common in rural areas of the northern belt. There is a strong preference for sons in India because they are expected to care for ageing parents. This son preference and high dowry costs for daughter results in the mistreatment of daughters. Indeed, Indian women have low levels of both education and formal labour-force participation. They typically have little autonomy, living first under the control of their fathers, then their husbands, and finally their sons. These factors have a negative impact on the health status of Indian women. Poor health has repercussions not only for women, but also their families. Women in poor health are more likely to give birth to low weight infants. They are less likely to be able to provide food and adequate care for their children. Finally, a woman's health affects the household's economic wellbeing because a woman in poor health will be less productive in the labour force. In rural areas where women are less educated and economically deprived, their health condition is worse. In the context of health as defined by WHO - 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' - one must ask how can this be achieved for Indian women.

Health status is an outcome of a large number of factors:

- Poverty, food security, food pricing and malnutrition
- Environmental pollution and degradation
- Occupational health problems
- Reproductive health problems
- Household economy and wages
- Economic development; represented by per capita income, urbanization and industrialization
- Social development; especially literacy rates
- Prices of private health care system
- Public health care delivery system

About 75% of health infrastructure, medical man power and other health resources are concentrated in urban areas where 28% of the populations live and only 25% of medical facilities are concentrated in rural areas where rest 72% people live (NFHS-3 data). Contagious, infectious and waterborne diseases such as diarrhoea, amoebiasis, typhoid, infectious hepatitis, worm infestations, measles, malaria, tuberculosis, whooping cough, respiratory infections, pneumonia and reproductive tract infections dominate the morbidity pattern, especially in rural areas. However, non-communicable diseases such as cancer, blindness, mental illness, hypertension, diabetes, HIV/AIDS, accidents and injuries are also on the rise.

According to NFHS III data, more than a third (36%) of women has a BMI below 18.5, indicating a high prevalence of nutritional deficiency. Among women who are thin, 44% are moderately or severely thin. More than half of the women (55%) are anaemic as depicted by NFHS III survey. Less than one-third of women in the lowest wealth quintile consume milk or curd at least once a week, as do less than half of women in the second wealth quintile. More than half of women in the three highest wealth quintiles consume milk or curd at least once a week. In the highest wealth quintile, three-quarters of women consume milk or curd at least once a week. The differentials in food consumption are even sharper for the consumption of fruit. Weekly consumption of fruit increases from 16 percent in the lowest wealth quintile to 72 percent in the highest wealth quintile.

The health status of Indians, is still a cause for grave concern, especially that of the rural women. This is reflected in the life expectancy (62.5 years), infant mortality rate (57/1000 live births), maternal mortality rate (230/100 000 live births) (NFHS-3 data); however, over a period of time some progress has been made. To improve the prevailing situation, the problem of rural health is to be addressed both at macro (national and state) and micro (district and regional) levels. This is to be done in a holistic way, with a genuine effort to bring the poorest of the population to the centre of the fiscal policies. A paradigm shift from the current 'biomedical model' to a 'socio-cultural model', which should bridge the gaps and improve quality of rural life, is the current need. A revised National Health Policy addressing the prevailing inequalities, and working towards promoting a long-term perspective plan, mainly for rural health, is imperative.

Diet and nutrition are important factors in the promotion and maintenance of good health throughout the life cycle. Income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, social and economic factors all interact in a complex manner to shape dietary consumption patterns and affect the morbidity and clinical status of women. A normal balanced diet must include daily foods from the various food groups in sufficient amounts to meet the needs of an individual and to increase immunity.

Importance of study

As is seen above, more than 50% of women are anaemic and more than 36% are severely undernourished, we intend to make an effort to investigate the nutritional status, dietary intake and the morbidity pattern among rural women.

The rural women population contribute significantly to our country in every sphere, be it census count, agriculture, economy, society or development. It has been very rightly said that the developmental status of a country shall be adjudged by the development of its countryside. Hence it should be a matter of prime concern that the rural population, particularly women shall be taken care of in terms of healthcare and other infrastructure

As responsible future health professionals, we chose to have an insight about the commonly existing health problems in rural population. We aim to find the nutritional status of a sample rural female population and relate it to the health problems occurring among them. Females have been singled out giving regard to their importance and role in the development and welfare of a family, society and a country as a whole.

The data from our study will also provide insight to policy makers/programmers to design/develop interventions for this group for health, life style etc.

Research objectives

The main objectives of the research study were:

- To assess the nutritional status of non-pregnant non-lactating rural women of reproductive age group (18-40 years)
- To study the dietary intakes of rural women.
- To study the morbidity pattern among rural women.
- To assess the general awareness and practices of rural women regarding nutrition, health and sanitary practices

LITERATURE REVIEW

India is the second most populous country of the world and has changing socio-political demographic and morbidity patterns that have been drawing global attention in recent years. Despite several growths orientated policies adopted by the government, the widening economic, regional and gender disparities are posing challenges for the health sector.

In order to obtain a detailed insight on the theme, researcher reviewed the existing literature from various sources. The reviewed studies are reported in the following sub-categories:

- Dietary intakes and nutritional status of rural women
- Morbidities among rural women
- General awareness and health practices among rural women regarding health, nutrition and sanitation

A. Dietary Intakes and Nutritional Status of rural women

Diet and nutrition are important factors in the promotion and maintenance of good health throughout the life cycle. Income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, social and economic factors all interact in a complex manner to shape dietary consumption patterns and affect the morbidity and clinical status of women. A normal balanced diet must include daily foods from the various food groups in sufficient amounts to meet the needs of an individual and to increase immunity. But the dietary intake and nutritional status of our rural women is found to be poor as a result of various studies conducted on them.

The Recommended Dietary Allowances (RDAs) for adult females are given in the Table 1.1.

Table 1.1: Recommended Dietary Allowances

NUTRIENTS	RDA
Energy (kcal)	1900
Protein (g)	55
Fat (g)	20
Carbohydrate	55-60% of total energy
NUTRIENTS	RDA
Calcium (mg)	600
Iron (mg)	21
Vitamin A (retinol –mcg)	600
Beta-carotene (mcg)	4800
Thiamine (mg)	1.0
Riboflavin (mg)	1.1
Niacin (mg)	12
Vitamin B6 (mg)	2
Vitamin C (mg)	40
Folate (mcg)	200
Vitamin B12 (mcg)	1

Source: ICMR (2010)

Various studies have been undertaken to find out the dietary intakes and nutritional status of rural women in India as well as the neighbouring countries. Some of the studies carried out among women are listed in Table 1.2.

Table 1.2: Studies showing dietary intakes and nutritional status of Indian rural women

S.No.	AUTHOR & YEAR	MAJOR FINDINGS
1.	NNMB & INP (1975-2005)	Decrease in energy, protein & Fe intake and increase in fat intake over three decades
2.	Khetarpal (2007)	Low intake of vegetables, fruits & milk products; adequate intake of oil, sugar & jiggery
3.	Johansson & Anderson (1998)	Low fruit, vegetable & calorie intake; 60% women were anaemic
4.	Mallikharjuna <i>et al.</i> (2010)	Low intake of all food groups except other vegetables, roots & tubers; micronutrient deficiency prevalent were Fe, Vitamin A & free folate
5.	Srivastava <i>et al.</i> (1998)	50% of women were undernourished
6.	Tanuja <i>et al.</i> (1995)	23.9% women had <145cm height; 95.9% had <45kg weight
7.	Mittal & Srivastava (2006)	Severe deficit of pulses, green leafy vegetables, flesh foods, milk & fruits; Energy intake is 52-53% of RDA
8.	Singh (2006)	18% & 43% of females consume milk daily & once a week, respectively
9.	Verma <i>et al.</i> (2003)	Calorie, Fe, Ca, Vitamin C, Vitamin A intake <RDA; protein intake >RDA
10.	Pant (1998)	Low dietary & nutrient intake; 42.54% women suffered from CED; >56% were underweight; Mean BMI was 19.26

NNMB surveys (2005) provided data on time trends in dietary intake (by 24 hours dietary recall) and nutritional status of the population in eight states from 1975 to 2005. NNMB surveys indicated that during the past three decades diets continued to be cereal based and monotonous; among poorer segments fruit, vegetable and animal food intake continues to be low. There had been

- a progressive reduction in already low pulse intake
- small increase in fats and oil intake in urban slums
- increase in dietary diversity among rural high income group

There had been reduction in energy and protein intake except among the poor; over all there had been a small decrease in total energy and protein intake in both urban and rural areas. There had also been some increase in dietary energy derived from fat and a reciprocal reduction in %age of dietary energy derived from carbohydrate.

Intakes of most micronutrients continued to be low. Iron intake was low; this coupled with poor bio-availability of iron from Indian diets was responsible for high prevalence of anaemia.

In another study conducted by Khetarpal (2007) on Health and Well-Being of Rural Women, it was found that only 10 per cent of the studied women were consuming a balanced diet. The women showed a poor intake of vegetables, fruits and milk products however, the intake of oil, sugar and jaggery was nearly adequate.

Johansson and Anderson (1998) in their study on nutritional intake by rural females reported that most people had an intake of fruits and vegetables below recommended level. The diet was deficient in minerals and vitamins. The calories obtained were also less than the minimum amount required by an adult woman. The study also revealed that 60% of them had anaemia as they consumed inadequate amounts of iron, B complex vitamins and vitamin C. 40% of the subjects had poor eyesight and 10 % had goiter.

Similar findings have also been presented in a study conducted on diet and nutritional status of women by Mallikharjuna Rao *et al.* (2010). Their study revealed that the intake of all the foods except for other vegetables and roots and tubers was lower than the suggested level among rural as well as tribal women. The study revealed inadequate dietary intake, especially micronutrient deficiency (hidden hunger) during reproductive years. The study showed that the intake of cereals and millets was 402 g and 365 g, respectively in tribal and rural NPWL women. Except for other vegetables and roots and tubers, the intake of all the other foods was lower than the suggested level in both rural and tribal areas. The intake of income elastic foods such as milk, oils and fats was higher in rural than in tribal NPWL. The intakes of all the nutrients were lower than the recommended levels suggested by ICMR in all the physiological groups in both the areas. The deficit was more with respect to micronutrients such as iron, vitamin A, riboflavin and free folic acid.

Srivastava *et al.* (1998) in their study on nutritional status of rural non-pregnant non-lactating women in reproductive age showed that the mean age, family size, gravida, parity, mean pregnancy interval and socio-economic index were comparable in the selected women of two blocks. The socio-economic and environmental characteristics of study women showed that 64.6% of the study women belonged to backward class followed by 24.2% in scheduled caste and only 11.1% belonged to upper class. The average income of these women was found to be Rs. 169.0±1.3 per month. As many as 67.5% women were still using well-water for domestic use. Only 33% of the households had electrification, remaining used kerosene lamp as a source of light. Illiterate women comprised 87.0% of the total and their main occupation was domestic activities (housewives). The means for height, weight and mid-arm circumference (MAC) in the ICDS were higher as compared to the non-ICDS by 0.8 cm, 1.1 kg and 0.2 cm, respectively. These differences were significant in view of large sample size. However, the 50th centile values for height and mid arm circumference did not differ >3% and for weight >6% for both the blocks at any point as compared to the corresponding 50th

percentile of the pooled data. It was felt that study women in two blocks are not varying much and therefore data were pooled to have a larger sample for calculation of percentiles in pre-pregnancy state.

A study on nutritional status of tribal women in Bihar (Tanuja *et al.* 1995) indicated that the tribal women of Singhbhum district were highly undernourished. The study reported 23.9% tribal women as having height <145 cm and 95.9% having weight <45 kg. If <38 kg was taken as cut-off for weight, then 36.0% of these women could be termed as low weight. This was quite high when compared to studies reported from other parts of India. Thus majority of the tribal women in Bihar were found to be at risk of delivering low birth weight babies and have pregnancy complications. Some of the reasons for under nutrition among tribal women could be poor diet intake, ignorance, early marriage, and high morbidity due to unhygienic practices and surroundings. Under-nutrition of mothers may be carried over to their children. Hence it was stressed that there was a need to provide special attention to this group in improving their nutritional status by intervening appropriate health and nutrition programmes like nutrition education, iron supplementation and de-worming both during adolescence and during adulthood.

Another study on diet, nutritional status and food related traditions of Oraon tribes of New Mal, West Bengal (Mittal and Srivastava 2006) found that the intakes of all groups are deficient in all food groups to a similar extent. The deficit of pulses and flesh foods was most severe in the diet of the Oraon women. The consumption of green leafy vegetables was also very deficient, and it consisted mostly of little known locally available greens. Large deficits in intake of protective foods such as milk, vegetables including green leafy vegetables, and fruit were found. Also, it was noteworthy that the mean BMI of women fell in the normal range, despite energy intakes of the order of 52-53% of ICMR RDA.

Singh (2006) in his study conducted in Haryana revealed that milk intake was so poor that only 18 per cent reported taking milk daily, once in a week(43%) and majority had never taken during the lactation.

A study conducted by Verma *et al.* (2003) on 320 female subjects representing rural population of selected areas of district Shimla of Himachal Pradesh found that wheat and maize were the main cereals consumed by the respondents. Among pulses, black gram dal was most commonly consumed. Desi ghee was consumed in good amounts with almost every food preparation. The calorie intake was below and protein intake was above the recommended levels but this difference was not statistically significant. The iron consumption was below the recommended levels. The intake of calcium, vitamin C and vitamin A was lower when compared with recommended levels. The BMI calculations suggested that majority of were of normal nutritional status.

Another study on women and nutrition in Himalayan region (Pant 1998) revealed that 49.26, 27.94 and 15.44 % women had milk, curd and ghee daily while the rest consumed occasionally. Likewise daily pulse intake accounted for only 5.15% of the total sample women while 17.64, 34.56, 36.77 and 5.88%, respectively were taking pulses four times per week, twice, weekly and monthly. Pulses are another source of nutrients particularly for protein. Out of total 136 sample women, 32.35 and 61.65% were vegetarian and non-vegetarian, respectively. Out of total non-vegetarian 16.30, 48.91 and 34.79% women consumed flesh products respectively weekly, bimonthly and occasionally. It was very considerable that 96.32% women consumed green vegetables monthly. Only 2.21 and 1.47% took green vegetables weekly and daily, respectively. Green vegetables are important source of vitamins, the deficiency of which causes various nutritional deficiency diseases. It is also worth to mention that in the rainy and winter seasons people consumed green vegetables twice even thrice in a day but not regularly. Taking together all the 136 samples, approximately the per capita per day cereal intake was 389.29 grams which was 11.53% less than the standard requirement of 440 grams. Per capita daily intake of pulses was only 23.18 grams which was 49.49% less than the standard requirement of 45 grams. The per capita daily vegetable consumption in the region was 41.21 grams which is 78.31% lower than the standard requirement of 190 grams (including root, leafy and other vegetables). The consumption of ghee and cooking oil per

capita per day was found to be 17.58 grams which was 56.05% less than the 40 grams standard requirement. The average intake of milk products per capita per day was found to be 81.01 grams, which was 46% lower than the 150 grams standard requirement. In the entire sample, the average energy intake per capita per day was found to be 1942.2 kcal, which was 21.78% below the standard requirement. The average per capita, per day protein intake was found to be 49.25 grams which was 20.56% below the standard requirement of 62 grams. The average fat intake per capita per day was found to be 29.81 grams which was 6.84% below the standard requirement of 32 grams. On average carbohydrates intake was found to be 363.37 grams per head per day which was 15.5% below the standard requirement (430 grams). The average per capita daily calcium intake was found to be 544.52 mg in the region which was 31.94% below the standard requirement of 800 mg. The average iron intake per capita per day was found to be 33.59 mg, which was 1.79% above the standard requirement of 33 mg. In the sample villages of the region, the average phosphorus intake per capita per day was found to be 1299.38 mg, which was 7.19% below the standard requirement of 1400 mg. Using BMI 18.5 as the criteria (optimum) for Chronic Energy Deficiency (CED), 42.54% of the total 136 surveyed women were found suffering from various degrees of CED. Among them 1.47%, were suffering from CED grade III (severe), 11.76% from CED grade II (mild), and 29.41% from CED grade I (moderate) form of mal- nutrition. More than 56% of total women were suffering low weight categories. Only one case (0.74%) of the total was found in the obese grade I. The mean BMI was 19.26.

Similarly, various studies undertaken in the other parts of the world also showed similar findings. The studies on dietary intake and nutritional status of rural women conducted in other countries are listed in Table 1.3.

Table 1.3: Studies showing dietary intakes and nutritional status of rural women in other countries

S.No.	AUTHOR & YEAR	MAJOR FINDINGS
1.	Ahmed (2008)	Mean age: 30.2 (± 2.9)y; weight: 46 (± 8.5); height: 149 (± 5) cm & BMI: 20.5 (± 3.5); 52% & 65% had Vitamin A & B-complex deficiencies, respectively
2.	Islam <i>et al.</i> (2004)	Energy intake < RDA
3.	Ene-Obong <i>et al.</i> (2001)	More educated women had higher incomes, had significantly better health and nutrition knowledge, food habits, nutrient intakes, health, self-concept
4.	Kobati <i>et al.</i> (2012)	Poor dietary intake & nutritional deficiency
5.	EDHS (2000 & 2005)	2000: 19.4% & 11.1% women were moderately & severely undernourished, respectively; 2005: 18% & 8.9% women were moderately & severely undernourished, respectively

A study on nutritional status, hypertension, proteinuria and glycosuria amongst the women of rural Bangladesh (Ahmed 2008) found that of 501 women participants, 30.3% were illiterate. Almost all of them had supply of tube-well water and 68% had sanitary latrines. Their mean (\pm SD) age was 30.2 (± 2.9) y, weight was 46 (± 8.5) kg, height was 149 (± 5) cm and BMI was 20.5 (± 3.5). The poor women had significantly lower BMI than the rich [20.0 (2.93) vs. 21.2 (4.1), ($p < 0.05$)]. Regarding nutritional deficiency, about half of the rural women (52%) had some form of signs relating to vitamin A deficiency and 65% had signs of vitamin B complex deficiency either in the form of glossitis or of angular stomatitis or both.

Islam *et al.* (2004) in their study on nutritional status of women in Bangladesh: comparison of energy intake and nutritional status of a low income rural group with a high income urban group conducted study on premenopausal women ($N = 191$) aged 16–40 years found that socio-economic status had a significant effect on body weight, height, biceps and triceps skinfolds, BMI, TBF (total body fat), FFM (fat-free mass) and BF% (body fat). These variables were significantly higher in group H (higher-income)

than in group L (lower income). The influence of physiological status on most of these variables was not significant. EI (energy intake) was, however, influenced by both socio-economic and physiological status. The mean EI was significantly lower in group L than in group H. The contributory sources were different in high and low income groups. In both groups, EI was lower than the recommended level. Based on the dietary and anthropometric results, it was concluded that malnutrition is a common feature among low income rural women.

Based on the data presented in the paper ‘determinants of health and nutritional status of rural Nigerian women’, it can be said that education influences the health and nutritional status of rural women in Nigeria. As expected, the more educated women had higher incomes, had significantly ($p < 0.05$) better health and nutrition knowledge, food habits, nutrient intakes, health, self-concept, and less adherence to detrimental cultural practices, and had a higher mean age-at-marriage and age-at-first birth. Poor education of the women was attributed to lack of money from parents, sex discrimination, and marriage while in school, among other reasons.

Another study on dietary intakes and body mass indices of non-pregnant, non-lactating (NPNL) women from the coastal and guinea savannah zones of Ghana (Kobati *et al.* 2012) showed that more women in the Coastal zone had significantly fewer births and were heads of their households. Cereal-based foods were consumed daily by all women during the two-day observation period. Fish was the predominant animal source food in the diet in both zones. Significantly more women in the Guinea Savannah zone did not meet their Estimated Average Requirements (EAR) for protein (81%), vitamin A (94.4%), and vitamin C (72%) compared to women in the Coastal zone (44%, 22%, and 31% respectively). The diets of both groups of women were low in calcium. Generally, women in the Coastal zone had a significantly higher BMI ($24.2 \pm 4.6 \text{ kg/m}^2$) than their counterparts in the Guinea Savannah zone ($21.3 \pm 2.4 \text{ kg/m}^2$). The overall quality of dietary intakes and nutritional status of women in the Guinea Savannah zone was poorer than that of Coastal women. Dietary deficiencies are also present in NPNL women in Ghana.

Similarly, a study on under-nutrition among non-pregnant non-lactating women of Ethiopia (aged 15-49 years) found that 30.5% of women in the 2000 Ethiopian Demographic and Health Surveys (EDHS) and 26.9% of the women in the 2005 survey were undernourished, of whom in the 2000 survey 19.4% were moderately undernourished and 11.1% were severely undernourished. Similarly, in the 2005 survey 18.0% were moderately undernourished and 8.9% severely undernourished.

B. Morbidities among rural women

The health of Indian women is intrinsically linked to their status in society. Researches into Indian women’s status have found that their family contributions are often overlooked and they are likely to be regarded as an economic burden, especially in rural areas. This attitude has a negative impact on their health status. Poor health has repercussions not only for women, but also for their children and other family members.

Various studies have been undertaken to find out the morbidities among rural women in India as well as the neighbouring countries. The studies carried out in India are listed in Table 1.4. depicting the outcomes of the study.

Table 1.4: Studies showing morbidities among Indian rural women

S.No.	AUTHOR & YEAR	MAJOR FINDINGS
1.	Sharma & Dhawan (1986)	Prevalent diseases were bronchitis, coryza, indigestion, constipation, diarrhoea, conjunctivitis, dandruff, tartar deposits on teeth, skin diseases, gynaecological diseases & some other diseases like rheumatism, arthritis
2.	Khetarpal (2007)	Major morbidities were anaemia, backache, headache & body pain

3.	Mallikharjuna <i>et al.</i> (2010)	Major diseases were goiter (4.9%), bitot's spot (0.6%), angular stomatitis (1.1%), dental caries (14%)
4.	Saha <i>et al.</i> (2010)	2%, 35% & 15% of women had severe, mild & moderate anaemia, respectively
5.	Ravindran (1995)	42% had pregnancy complications, 19% had severe backache & joint pain
6.	Ghosh & Mohanty (2005)	18% reported abdominal pain during menses
7.	Netravati (2006)	76.7% had menstrual problems like body pain, white discharge, backache, etc.
8.	Brabin <i>et al.</i> (2000)	Anaemia was the major problem

A study conducted by Sharma and Dhawan (1986) on health problems of rural women indicated the prevalence of a number of health problems among rural women and a need for their education on health aspects. A sizeable number of them were found to have suffered from bronchitis, coryza, indigestion, constipation, diarrhoea, conjunctivitis, dandruff, tartar deposits on teeth, skin diseases, gynaecological diseases and some other diseases like rheumatism, arthritis, etc. The existence of a government hospital in village had no association of significant level with the health problems of rural women. Majority of the respondents perceived the treatment given in government hospital to be not effective and several other constraints in availing of the treatment facilities. The frequency of various diseases suffered by the females is given in Table 1.5.

Table 1.5: Morbidity profile of rural women

DISEASES	PERCENTAGE
<i>Respiratory Diseases</i>	
Bronchitis	53
Coryza	48
Asthma	16
<i>Diseases of Gastro-Intestinal Tract</i>	
Indigestion	29
Constipation	23
Diarrhoea	17
Enteric fever	9
<i>Diseases of Reproductive System</i>	
Irregular menstrual cycle	13
Leucorrhoea	10
Irregular menstrual flow	6
Prolapsed of vagina	4
<i>Diseases due to Lack of Hygiene</i>	
Conjunctivitis	19
Tartar deposit on teeth and molars	36
Dental caries	29
Pyorrhoea	19
Dandruff	19
Alopecia	7
Pediculosis	5
<i>Skin Diseases</i>	
Boils	9
Dermatitis	8
Scabies	7
Ring worm	3
Eczema	1
<i>Deficiency Diseases</i>	
Vitamin A deficiency	19
Anaemia	5
Osteomalacia	4
Vitamin B deficiency	3
<i>Other Diseases</i>	
Headache	55

Rheumatism	29
Arthritis	27
Malaria	25
Hysteria	5
Piles	1

Source: *Health Problems of Rural women by Sharma and Dhawan (1986)*

Similar findings were reported in another study on women's health in a rural poor population in Tamil Nadu (Ravindran 1995). The study showed that 42 per cent have suffered from one or more serious problems related to pregnancy and childbirth. 22 per cent of the women encountered problems during pregnancy or childbirth, while 32.9 per cent had complications in the postpartum period. Nineteen percent of the women complained of severe backaches or joint pains that restricted them to bed, while respiratory infections accounted for a further 15 percent. Other important problems reported include oral infections, diarrhoea, eye infections and injuries related to work and to domestic violence.

Similarly, Mallikharjuna Rao *et al.* (2010) in their study on diet and nutritional status of women in India found that the prevalence of goiter was relatively higher (4.9%) among tribal women compared to their rural counterparts (0.8%). Tribal women were particularly vulnerable to under-nutrition compared to women in rural areas. The prevalence of chronic energy deficiency was higher (56%) among tribal NPNL women compared to rural women (36%). The prevalence of bitot's spots, a sign of Vitamin A deficiency was 0.6% among tribal and 0.3% among rural women. The prevalence of angular stomatitis, a sign of B complex vitamin deficiency was 1.1% and 0.8% in tribal and rural women respectively. About 14% of tribal and 12% in rural women had dental caries.

Another study conducted by Khetarpal (2007) on Health and Well-Being of Rural Women found that majority of the women were suffering from anaemia and complained of backache, head ache and pain in the body. This may be due to considerable workload for women who spend 10-11 hours at working in fields, continue doing their work at home also and consume less food.

A study conducted on a trend in women's health in India – what has been achieved and what can be done (Saha *et al.* 2010) found that every second woman in India suffers from some degree of anaemia; 2% are severely anaemic, while 35% and 15% have mild and moderate anaemia levels, respectively. Inter-state differences were pronounced. Lack of adequate resources prevented women from poorer households using health services. Undernourished, ill-fed and overworked, most women from such households were extremely vulnerable to ailments and disease, which may not be properly diagnosed and treated. Poor sanitation, unhygienic surroundings and difficulty in procuring safe drinking water were some additional factors that affect the general health of women. The study also showed that the mother's education was highly correlated with the level of malnutrition among children. The children of illiterate mothers were twice as likely to be undernourished or stunted as were children whose mothers have completed at least high school. The differentials were even larger when severely undernourished children were considered. Children of illiterate mothers were three times as likely to be severely undernourished as children of mothers with at least a high school education.

Ghosh and Mohanty (2005) in their study found that, 18 per cent of the young married women reported abdominal pain during menses.

Likewise, a study on reproductive health of rural married adolescent girls (Netravati 2006) found that 76.7 per cent of the respondents faced one or the other menstrual problems. Irregular menses was the major problem reported by 24.7 per cent of the respondents. Pain in body and legs (18.0%), white discharge (15.3%), excessive bleeding (13.3%), lower abdominal pain (12.7%), long period of menses (12.7%) and backache (10.7%) were the other problems reported by the respondents. Regarding vaginal or

uterine problems 23.3 per cent of the respondents had problems, among them 13.3 per cent had vaginal problems. Burning sensation during urination (11.3%) and itching (2.0%) were the vaginal problems reported by the respondents. 10 per cent had uterine problems, among them 5.3 per cent of them reported as pain in uterus and 4.6 per cent reported swelling of the uterus.

Another study on higher prevalence of anaemia among women in Mumbai (Brabin *et al.* 2000) showed that infertile women and women without living children had the highest haemoglobin values. The study concluded that nutritional interventions that focus on reducing fertility or iron supplementation during pregnancy were beneficial, but many women remained iron deficient. Action was needed to improve nutritional status before pregnancy - a policy that was feasibly given the interest in adolescent sexual and reproductive health programmes.

Similarly, various studies undertaken in the other parts of the world also showed similar findings. The studies on morbidities among women conducted in other countries are listed in Table 1.6.

Table 1.6: Studies showing morbidities among rural women in other countries

S.No.	AUTHOR & YEAR	MAJOR FINDINGS
1.	Ahmed <i>et al.</i> (2008)	Prevalence of hypertension, proteinuria and glycosuria were 16.6, 10.4 and 2.6%, respectively
2.	Rahman & Shahidullah (2005)	58.6% reported lower abdominal pain during menstruation
3.	Houdegbe (1985)	Major problems were malaria, malnutrition & placenta previa
4.	Ziauddin <i>et al.</i> (2000)	52% & 20% of women had mild & moderate anaemia

Ahmed *et al.* (2008) in their study on nutritional status, hypertension, proteinuria and glycosuria amongst the women of rural Bangladesh found that of 501 subjects studied, the mean (\pm SD) systolic and diastolic blood pressure were 116 (\pm 17) and 73 (\pm 12) mmHg, respectively. The prevalence of hypertension, proteinuria and glycosuria were 16.6, 10.4 and 2.6%, respectively. The frequencies of proteinuria and ring-worm were significantly higher among the poor than among the rich social class (both cases $p < 0.05$).

Rahman and Shahidullah (2005) conducted a study on adolescent self-reported reproductive morbidity and health care seeking behaviour in Bangladesh. The results revealed that, 58.6 per cent of the adolescents reported lower abdominal pain during menstruation.

A discussion identifying some of the health problems experienced by rural women in Africa (Houdegbe 1985) found that the first of these health problems was malaria. Next on the list was malnutrition, with anaemia as its corollary. It was caused by ignorance, or lack of information on what food should be eaten; dietary customs and taboos deeply anchored in some families and which deprived women of the nutrients required by their bodies, especially after childbirth; lack of time; and financial difficulties. Since planned parenthood is "unknown" in rural areas, most women bear a great many children -- 8-10 or more. Placenta previa is a frequent condition in such women, and often results in the mother's death, since the delivery was done in a poorly equipped centre and the diagnosis was only made at the beginning of labour. In sum, these were some of the everyday problems encountered in rural areas: the lack of information on health matters; the distance from health centers; limited financial resources in the rural population; and the precariousness of means of transportation, and the absence of an emergency transferral system.

Another study on anaemia among non-pregnant women in rural Bangladesh (Ziauddin *et al.* 2000) found that anaemia was highly prevalent (73%). Most of the women had mild (52%) or moderate (20%) anaemia, but a few of them suffered from severe anaemia (1%). *Ascaris* was common (39%) while hookworm was not (1%). The anaemia prevalence had no statistically

significant association with age, parity or *Ascaris* infestation. Women with less than 1 year of schooling, who were landless or who reported having an economic deficit in the household had significantly higher prevalence of anaemia. There was a significantly increasing trend in anaemia prevalence with decreasing socioeconomic situation. However anaemia was common in all social strata.

C. General awareness and health practices regarding health, nutrition and sanitation among rural women

Nutrition education activities in any developing country, without a simultaneous educational process for better personal and food hygiene and the control of diarrhoeal disease would have no impact. Education for the promotion of immunization is needed an indirect nutrition promotes. It has been rightly pointed out that nutrition education should be so designed as to promote desirable practices in all aspects of human life which have direct or indirect effects on nutritional status. In recent time combination of mass media mix approach is an appropriate tool for technology transmission and knowledge dissemination, in the prevailing circumstances of constraints of illiteracy, and the need to achieve developmental objectives within a short span of time.

Various studies have been undertaken to find out the general awareness and health practices regarding health, nutrition and sanitation among rural women. The various studies carried out are listed in Table 1.7. depicting the outcomes of the study.

Table 1.7: Studies showing general awareness and health practices among rural women

S.No.	AUTHOR & YEAR	MAJOR FINDINGS
1.	Mittal & Srivastava (2006)	Poor knowledge and awareness about health and nutrition
2.	Deshpande <i>et al.</i> (1994)	Women in rural area posses average knowledge (50%) about the health practices
3.	Dhanesekharan (2005)	Inadequate awareness regarding maintenance of sanitary latrines
4.	Abdad <i>et al.</i> (2006)	98.0% of respondents had knowledge about family planning methods
5.	Manisha kale <i>et al.</i> (1998)	52% adopted personal hygiene practices
6.	Merchant (1998)	17% of the rural women completely adopted the recommended weaning practices
7.	Manay & Farzana (2000)	21.2% of the family were found to be poor in hygiene followed by 69.9% as moderately clean
8.	Kaur & Sehgal (1995)	66.7% of the respondents had inadequate knowledge about proper cooking of foods
9.	Devi & Saroda (1997)	Knowledge of the respondents increased after the nutrition education intervention programmes
10.	Sivnarayana <i>et al.</i> (1999)	Education & knowledge were positively and significantly co-related
11.	Karpagam (2000)	Education had positive and significant relationship with the adoption level of the respondents
12.	Vani (2007)	31.33%, 49.34% & 19.33% of the respondents had high, medium & low knowledge level regarding health and nutritional practices, respectively
13.	Vinitha <i>et al.</i> (2007)	9.5 per cent of the adolescents interviewed had knowledge on safe sex
14.	Bhatnagar & Jain (2004)	90% of the subjects belonged had average awareness about their

		diet, general health and medicines
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Mittal and Srivastava (2006) in their study on diet, nutritional status and food related traditions of Oraon tribes of New Mal (West Bengal) found that the knowledge of contraception, vaccinations, proper diet and supplements among rural females was severely deficient, indicating poor knowledge and awareness about health and nutrition.

Similarly, Deshpande *et al.* (1994) in their study concluded that women in rural area possess average knowledge (50%) about the health practices but they should receive more education through available media. The efforts by voluntary women organization should also be directed to rural women necessary practical education regarding health practices, by conducting campus and rural stay programmes.

Similar findings were reported by Kaur and Sehgal (1995) in their study conducted in the Hissar district of Haryana that 66.7% of the respondents having inadequate knowledge about proper cooking of foods before imparting nutrition education. After the education 93.2% had adequate knowledge of cooking of cereals.

Another study by Dhanesekharan (2005) conducted in Batlagundu and Dindigul district of Tamil Nadu revealed that 65% of the samples were not fully aware regarding maintenance of sanitary latrines and remaining have only partial awareness. Abdad *et al.* (2006) conducted their study in tribal areas Madhya Pradesh reported that majority (98.0%) of respondents having knowledge about family planning methods and 6% of them having the knowledge on tubectomy, and 13% of them having knowledge on vasectomy and 26% having knowledge on both.

Manisha kale *et al.* (1998) revealed that majority of the tribal women (52%) belonging the medium category of adoption of personal hygiene practices found to have the nutritional status ranging between normal, but none of them were malnourished. Marchant (1998) in her study conducted in Akola found that 17% of the rural women completely adopted the recommended weaning practices followed by 46.66% who partially adopted the recommended weaning practices. Manay and Farzana (2000) conducted study in Doddaballapur taluk of Bangalore district revealed that 21.2% of the family were found to be poor in hygiene followed by 69.9% as moderately clean.

Devi and Saroda (1997) reported in the study conducted in Timpet village of Andhra Pradesh, the knowledge level of respondents were higher after intervention than the initial mean knowledge scores. It indicated the knowledge of the respondents had increased after the nutrition education intervention programmes.

Sivanarayana *et al.* (1999) in their study in Uttar Pradesh revealed that the correlation coefficients revealed that education, and knowledge were positively and significantly related with the information output pattern of the integrated child development services (ICDS) and non-ICDS rural women of Uttar Pradesh, India. Further, the results of path analysis also explained that education, knowledge and adoption have the largest direct effects on information output pattern in descending order. Karpagam (2000) in his study conducted in Erode district, Tamil Nadu revealed that education had positive and significant relationship with the adoption level of the respondents.

A study on knowledge and adoption of selected health and nutritional practices by rural women in Belgaum district, Karnataka (Vani 2007) found that 31.33 percent of the respondents had high, 49.34 percent had medium and the remaining 19.33 percent had low knowledge level regarding health and nutritional practices. The data also revealed that, more than half of the respondents had knowledge about detailed health practices of children, immunization is must for health of the child (100%), bathing the child daily (100%), giving the child enough safe water (100%), washing hands before holding and feeding the baby is necessary (77%),

regular health check up every month in baby clinic or health centers is needed (74%). With regard to the knowledge level of respondents about health practices for adults it was revealed that keeping the house clean by sweeping and swabbing daily is necessary (83%), the diseases caused by mosquitoes, bed bugs, house flies etc., can be prevented by keeping surroundings clean without water stagnation (60.00%), trimming nails reduces many food borne diseases (54.00%), taking boiled or filtered water prevents many water borne diseases (77.00%), keeping the food articles or items covered will protect food from flies and dirt (76.00%), washing vegetables before cutting them is good for health (84.00%), and the washing of utensils, hands and plates before cooking and taking meals is good (85.00%). It was found that majority (42.67%) partially adopted the health and nutritional practices, whereas, 20.66% of the respondents were fully adopted and 36.67 percent of respondents had not adopted the health and nutritional practices.

Vinitha *et al.* (2007) in their study found that only 9.5 per cent of the adolescents interviewed had knowledge on safe sex. Adolescents aged 15 years and above, belonging to an extended family with educational status of above 5th grade, working outside home and having a high standard of living had significantly more awareness on safe sex. 79.5 per cent women aged 13-49 years knew it was unsafe to bear children before 20 years. Age, marital status and place of residence were significantly associated with awareness. Hence, this study shows that adolescents (<19 years), women who are illiterate or educated less than grade 10 and living away from basic health care services with a low standard of living are less aware of reproductive health issues and need targeted interventions for reproductive health messages.

The study was conducted by Bhatnagar and Jain (2004) in Ajmer to predict cardiovascular diseases among young adult females (20-40 years). Detailed information about the history of disease, diet and general health was obtained through a questionnaire, and general awareness of the subjects was judged by an awareness schedule. Anthropometric parameters and lipid profile of the subjects were also studied. The results of the study revealed that 90 per cent of the subjects belonged to the age group 30- 40 years. Females were found to have average awareness about their diet, general health and medicines.

METHODOLOGY

The present research was proposed to investigate the nutritional status of rural women and its impact on lifestyle problems/diseases among them. A well-structured questionnaire was developed considering the specific objectives of the study.

Study area: The village 'Badshahpur' near the vicinity of Gurgaon, Haryana was selected for the study as per the feasibility of the researchers and the availability of the sample population. Badshahpur is the biggest village in the region having a population of about 18,734 people out of which 2,970 females fall under the age group 18-40 years (the study group).

Sample size: 100 rural women were selected as samples for the study. The inclusions were

- the women of reproductive age group (18-40 years)
- those who are willing to participate

The exclusions included

- the pregnant women
- the lactating mothers

Data collection: The data was collected after conducting surveys in the area and various health centres were found to be ideal places for data collection. Purposive sampling method was used to select the respondents as volunteers were welcomed. The samples for the present survey were collected mainly from the Primary Health Centre (PHC) and a Homeopath Clinic, which provides free medical services to the rural people.

Development of Tools: Various methods were used for the assessment of different lifestyle problems among rural women, namely, anthropometric measurements, dietary assessment using questionnaire method. In this study, these methods were used due to the ease with which these can be conducted in the field.

A. Nutritional Anthropometry: Nutritional anthropometry is concerned with the measurement of the physical dimension and the gross composition of human body at different age levels and degrees of nutrition. The report of the committee on Nutritional anthropometry established by the National Research Council lists the number of measurement that would indicate skeletal build and the thickness of subcutaneous fat. Body weights and heights reflect their state of health and growth rate (ICMR, 1989).

- **Height:** The height of an individual is made up of the sum of 4 components – legs, pelvis, spine and skull. For field nutritional anthropometry, usually only the total height for length is measured.

Method: In the present study, heights were measured using a metric measuring tape. The subjects were made to stand erect looking straight on a leveled surface with heels together and toes apart, without shoes. The moving head piece of the tape was lowered to rest flat on the top of the head and the reading was taken. Height was read to the nearest 0.5 cm. An average of three measurements was taken as the final measurement.

- **Weight:** The weight of an individual is the sum of fat and fat free mass (water + protein + glycogen + mineral).
Method: For measuring body weight of subjects, bathroom scales were used. Weights were taken with the individuals under basal conditions with minimum clothing and without shoes. The zero error of the weighing scale was checked before taking the weight and corrected as and when required.

Analysis of Anthropometric Measurements

Many formulae have been proposed to describe the way in which weight varies with height during growth. Rao and Singh (1970) found that Quetlet’s index or Body Mass Index (BMI) – Weight/Height² was independent of age group. The samples were then categorized under undernourished, normal, overweight and obese using WHO classification given in Table 2.1.

Table 2.1: BMI Classification

Classification	BMI(kg/m ²)	
	Principal cut-off points	Additional cut-off points
Underweight	<18.50	<18.50
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 - 16.99	16.00 - 16.99
Mild thinness	17.00 - 18.49	17.00 - 18.49
Normal range	18.50 - 24.99	18.50 - 22.99
		23.00 - 24.99
Overweight	≥25.00	≥25.00
Pre-obese	25.00 - 29.99	25.00 - 27.49
		27.50 - 29.99
Obese	≥30.00	≥30.00
Obese class I	30.00 - 34.99	30.00 - 32.49

		32.50 - 34.99
Obese class II	35.00 - 39.99	35.00 - 37.49
		37.50 - 39.99
Obese class III	≥40.00	≥40.00

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

- WHR (Waist-Hip Ratio):** WHR is the ratio of circumference of the waist to that of the hips. It was determined by using a measuring tape to measure the circumference of hips at the widest part of buttocks and waist at the smaller circumference of natural waist, usually just above the belly button. The ratio was determined by dividing waist measurement by hip measurement and the health risk was determined thereafter as given in Table 2.2.

Table 2.2: WHR Categories

Male	Female	Health Risk Based Solely on WHR
0.95 or below	0.80 or below	Low Risk
0.96 to 1.00	0.81 to 0.85	Moderate Risk
1.0+	0.85+	High Risk

B. Development of questionnaire

Various questionnaires were developed to find out the socio-economic profile, dietary intake, nutritional status, morbidity pattern, general awareness and general practices about health, hygiene and sanitation of the rural females.

1. Background questionnaire

It consisted of personal profile, family profile, family income and anthropometric measurements. A copy of background questionnaire is attached in Annexure I.

- Personal profile:** It included the basic information about the sample i.e. name, age, category (general, scheduled caste, schedules tribe or other backward class), food habits (vegetarian, non-vegetarian or eggetarian), marital status (single, married, divorced or widowed), age of marriage, number of children, pregnancy wastage (number of miscarriages plus number of still births) and educational status (uneducated, primary level, secondary level, matriculation), etc. The data was analysed by calculating the frequencies of variables.
- Family profile:** It included information about the head of the family, number of family members, types of family (nuclear, joint or extended) and occupation of the family (agriculture, milking, self-employed, job), etc.
- Family income:** It included information about the number of earning members, principle earning member and total monthly income of the family. The data was analysed by dividing samples into various categories of income group (<10,000 pm, 10-20,000 pm, and so on) and the frequency of samples in these categories was calculated to know the economic status of individuals.

2. Food frequency questionnaire

It included information about the consumption of various food groups, their amounts and their frequencies of consumption. A copy of food frequency questionnaire is attached in Annexure II. The questionnaire consisted of all the common food products that were consumed in the study area. The frequency of consumption and also the amounts of food products were collected on the basis of which nutrient consumption in a day was calculated for each sample. The data was analysed to find out:

- The frequency of consumption of all the food products,
- The minimum, maximum and mean intake of all the food products and,
- The minimum, maximum and mean intake of the various macronutrients and micronutrients including energy, protein, carbohydrate, fat, iron, calcium, vitamin A, vitamin C, vitamin B-complex, crude fibre, etc.
- Nutrient adequacy ratio (NAR) for energy, protein and various other nutrients.

Nutrient Adequacy Ratio (NAR): It is defined as the percent intake of RDA.

$$\text{NAR} = \frac{\text{Nutrient Intake}}{\text{RDA}} \times 100$$

NAR for energy was divided in to four categories, viz. <50%, 50-75%, 75-90% and >90%, and the frequency of individuals occurring in these categories were calculated. Similarly, NAR for other macro and micro-nutrients were divided into three categories, viz. 0-66%, 66-99% and $\geq 100\%$ and the frequency of samples occurring in these categories were also calculated to find out their nutrient intakes.

3. Medical history questionnaire

It consisted of a list of various commonly occurring health problems among rural women. A copy of medical history questionnaire is attached in Annexure III. The data related to the past three months of the medical history of the samples was collected and analysed to find out the mean number of diseases suffered by the females and also the frequency of each disease among the study group so as to know about the most prevalent diseases in the study area.

4. General awareness questionnaire

A copy of general awareness questionnaire is attached in Annexure IV. It was prepared under the guidance of an expert by first classifying the objectives into 3 major issues namely, health, nutrition and sanitation. These issues were further classified under various sub-headings e.g.

- Health was divided into 2 sub-sections, diseases and family planning and various awareness questions were framed thereafter keeping in mind the prevalence of various diseases and family planning issues among them.
- Likewise, nutrition was divided into 4 sub-headings namely, micronutrients, macronutrients, cooking practices and consumption of tea and coffee. Various nutrient deficiencies, faulty cooking practices and wrong dietary patterns were identified and the awareness questions were framed accordingly.
- Sanitation was classified under 2 sub-headings, namely cleanliness and personal hygiene and the questions were framed based on these issues.

The multiple choice questions were framed on the basis of above issues and the correct response was given a score. The data was analysed by calculating the frequency of various responses of all the questions individually and also the frequency of number of total correct responses overall to find out the general awareness status of the samples. The mean awareness score and the mean awareness quotient were calculated thereafter.

$$\text{Awareness Quotient} = \frac{\text{Number of Correct Responses}}{\text{Total Number of Questions}}$$

5. General practice questionnaire

A copy of general practice questionnaire is attached in Annexure V. It was also divided into 3 sections, namely nutrition, health and sanitary practices. Health was further divided into bone health and diarrhoea; nutrition was divided into meal pattern, micronutrients and cooking practices; and sanitation was divided into drinking water, cleanliness and personal hygiene. Various practice questions were framed accordingly based on the above issues. Here, the frequency of the various practices followed by the samples regarding a particular issue was calculated. Also, 11 questions were chosen to find out how many samples were following the correct general practices.

Statistical analysis of data

Using SPSS windows software, statistical analysis including mean, frequency, cumulative percent, standard deviation and correlation was carried out. The average daily intake of foods and their nutrients was calculated and compared with RDAs suggested by ICMR.

RESULTS AND FINDINGS

A total of 100 samples from the study area were included in the analysis. Various criteria like socio-economic profile, anthropometry, food consumption pattern, medical history, general awareness and practices were studied and analysed and the data presented herewith.

Background profile

Various data were collected regarding personal profile, family profile, income status and anthropometric measurements and the results presented herewith.

A. Personal Profile

The data regarding the personal profile of the subjects is depicted in Table 3.1 and Figures 3.1, 3.2, 3.3 and 3.4. The mean age (\pm SD) of the study group was found to be 30 (\pm 2.5) years and the mean age at marriage was 17 (\pm 2) years. The mean number of children per subject was found to be 2.5 (\pm 2). About 44% of females had atleast one or more abortions during their pregnancies. The data related to the category, food habits, marital status, number of children, pregnancy wastage, education, etc. is shown in the Table 3.1.

Table 3.1: Personal profile of the subjects (n=100)

S.No.	Personal variables	Frequency (%)
1.	<i>Category</i>	
	General	24
	SC	2
	ST	12
2.	<i>Food Habit</i>	
	Vegetarian	76
	Non-vegetarian	17
	Eggetarian	7
3.	<i>Marital Status</i>	
	Single	16
	Married	82
	Divorced	0

	Widowed	2
4.	<i>Educational Status</i>	
	Uneducated	19
	Primary (upto V)	19
	Secondary (VI-IX)	14
	10 th class	21
	10+2	19
	Graduate	6
	Post-graduate	2

Figure 3.2: Food Habit

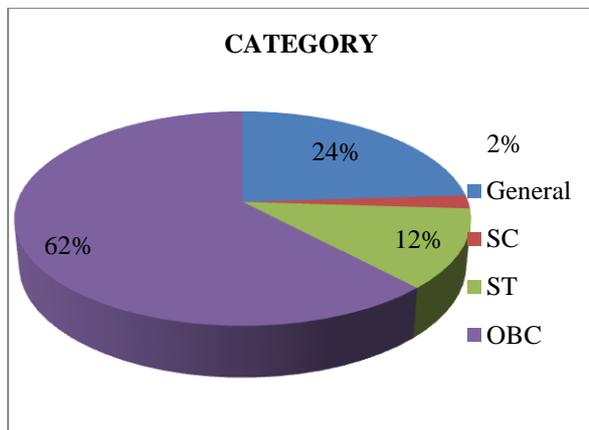


Figure 3.1: Social Category

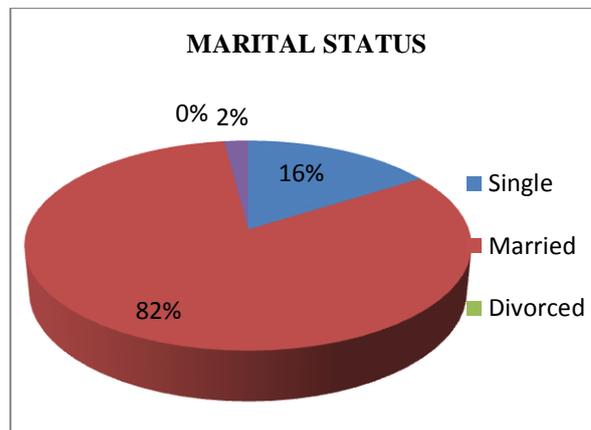


Figure 3.3: Marital Status

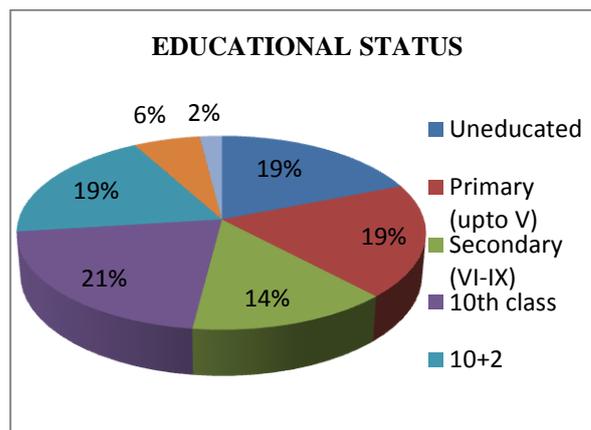
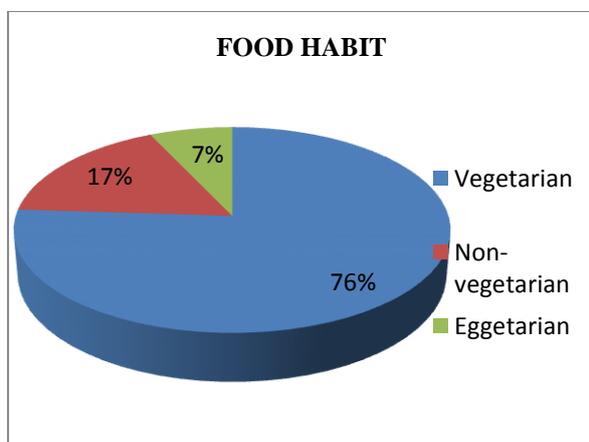


Figure 3.4: Educational Status



The data shown in Figures 3.1, 3.2, 3.3 and 3.4 depicts that majority of the samples belonged to OBC category (62%). The frequency of subjects from general, SC and ST categories were 24%, 2% and 12%, respectively. Most of the samples were found to be vegetarian (76%) while only 17% and 7% were non-vegetarian and eggetarian, respectively. 82% of the study group was married, 16% were unmarried and 2% were widowed. The

educational status was found to be average with almost 50% of the samples with qualifications 10th and above, and 50% below 10th among which 19% were illiterate.

B. Family Profile

The data regarding the family profile of the study group is depicted in Table 3.2 and Figures 3.5, 3.6, 3.7 and 3.8. The mean number of family members was found to be 8 (± 2) as majority (43%) of the subjects were living in joint family. The data related to the type of family, occupation, activity pattern and monthly income is shown in the Table 3.2.

Table 3.2: Family profile of the subjects (n=100)

S.No.	Family variables	Frequency (%)
1.	<i>Type of family</i> Joint Nuclear Extended	43 38 19
2.	<i>Family occupation</i> Agriculture Milking Service Self-employed	6 5 59 30
3.	<i>Self- occupation</i> Milking Service Self-employed Housewife Any other (Student)	8 11 2 66 13
4.	<i>Activity pattern of subjects</i> Sedentary Moderate Heavy	100 0 0
5.	<i>Monthly income (Rs.)</i> <10,000 10,000-20,000 21,000-30,000 31,000-40,000 >40,000	55 21 16 3 5

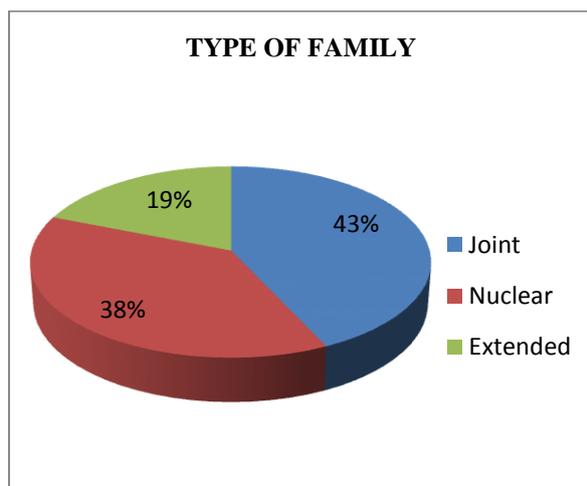


Figure 3.5: Type of Family

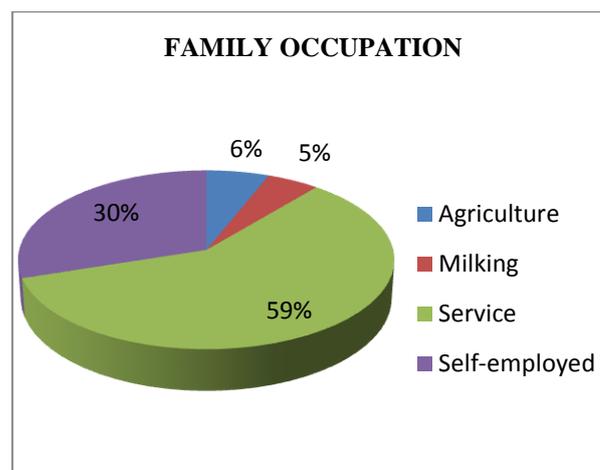


Figure 3.6: Family Occupation

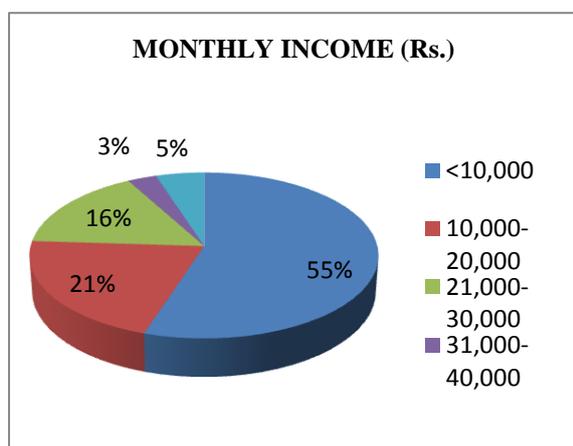


Figure 3.7: Monthly Income (Rs.)

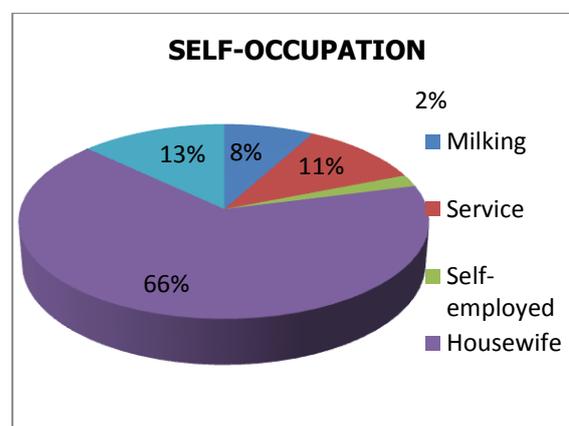


Figure 3.8: Self-Occupation

The data presented in Figures 3.5, 3.6, 3.7 and 3.8 shows that about 38% of the samples were residing in nuclear families and 19% in extended families compared to 43% in joint families, which shows the decreasing joint family trend among rural population as well. The major family occupation was found to be service/jobs (59%) and self-employment (30%) compared to agriculture (6%) and milking (5%). More than 50% of the samples belonged to lower income group, i.e. <10,000 pm.

C. Anthropometrical Measurements

The data regarding the height, weight, BMI and WHR of the samples is shown in the Table 3.3 and Figures 3.9 and 3.10. The mean height, weight and BMI of the samples were found to be 152.5 (± 5.9) cm, 49.3 (± 9.4) kg and 21.12 (± 3.7) kg/m², respectively. The data shows that the mean waist, hip and WHR were 27 (± 3.2) cm, 33.8 (± 3.4) cm and 0.79 (± 0.04), respectively.

Table 3.3: Anthropometrical Measurements

S.No.	Anthropometry variables	Frequency (n=100)
1.	BMI (kg/m ²)	
	<18.5	25
	18.5-24.99	59
	25-30	13
2.	WHR	
	<0.8	55
	0.81-0.85	37
	>0.85	8

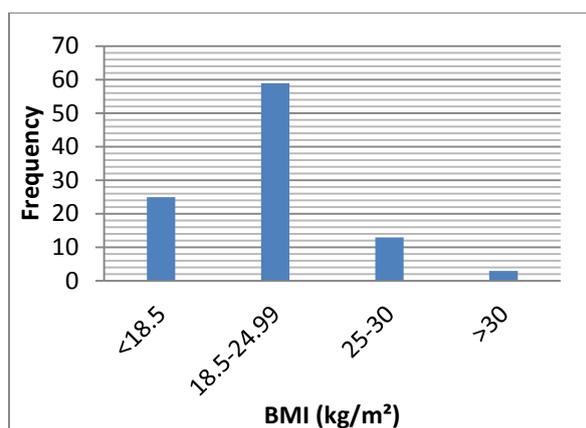
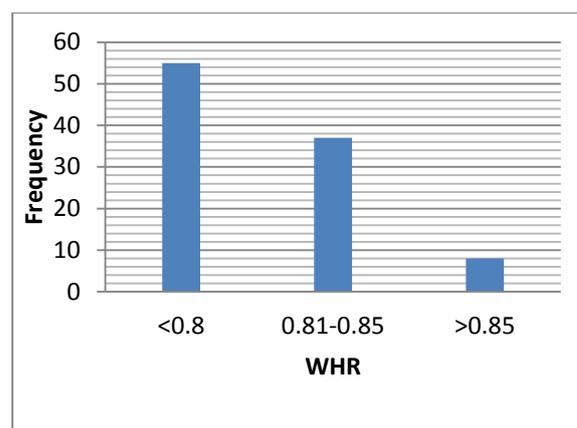
Figure 3.9: BMI (kg/m²)

Figure 3.10: WHR

The data shown in Figures 3.9 and 3.10 depicts that more than 50% of the samples fell under normal BMI range, i.e. 18.5-24.99, 25% were underweight having a BMI <18.5 and 16% were overweight or obese. The ratio of samples with normal WHR, i.e. <0.8 was found to be 55% while 37% fell under 0.81-0.85 category and 8% were found to have >0.85 WHR indicating increased health risks for women due to excess fat in the abdominal region.

Food and Nutrient Intake

The data related to food intake and nutritional status was collected through food frequency questionnaire and presented herewith.

A. Food Intake Data

The data related to food intake for all the subjects is shown in Table 3.4 and Figure 3.11. The % adequacy of the food groups and their mean intakes are presented along with their Recommended Dietary Intakes (RDI). The mean intake of the major seven food groups, namely, cereals and pulses, milk and milk products, meat and poultry, vegetables, fruits, fats and oils and sugars are 148 (± 46.8) g, 270 (± 129) g, 0.29 (± 0.85) g, 82 (± 50.7) g, 34 (± 46.6) g, 18 (± 16.4) g and 21 (± 17.6) g, respectively. About 45% of the samples consumed milk and milk products daily including curd, paneer etc. In case of green leafy vegetables, only 5% were found to consume it daily, 61% consumed thrice a week and rest consumed it occasionally. Similar were the findings in case of fruits wherein only 7% of samples consumed some fruit daily, rest consumed it weekly or occasionally. Whereas the intake of tea/coffee was found to be higher as about 45% of samples consumed >2-3 servings of tea/coffee per day and 45% consumed it at least once a day.

Table 3.4: Food Intake Data

Food groups	RDI (g)	Mean Intake \pm SD(g)	% Adequacy
Cereal and pulses	300	148 (± 46.8)	49.3

Milk and milk products	300	270 (± 129)	90.0
Meat and poultry	30	0.29 (± 0.85)	0.96
Vegetables	300	82 (± 50.7)	27.3
Fruits	100	34 (± 46.6)	34.0
Fats and oils	20	18 (± 16.4)	90.0
Sugars	20	21 (± 17.6)	105

Source: Dietary guidelines for Indians- A manual, 2010, NIN, ICMR, Hyderabad

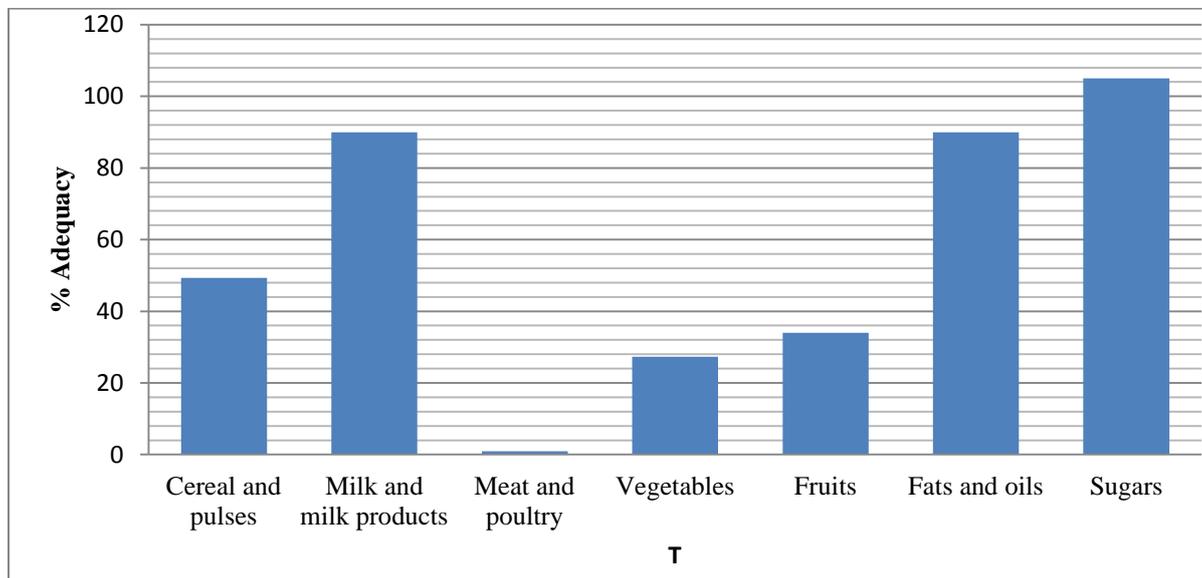


Figure 3.11: Food Intake Data

The data given in Figure 3.11 reveals that the intake of all the food groups was low except for the fats, sugars and milk and milk products (almost 100% adequate) which can be attributed to the economic constraints as most of the population belonged to lower income groups. The intake of cereals and pulses, meat and poultry, vegetables and fruits was 49.3%, 0.96%, 27.3% and 34.0% of RDAs, respectively. The consumption of meat and poultry was also low as more than 50% of the samples were vegetarian.

B. Nutrient Intake Data

The data related to the nutrient intakes of the subjects is presented in the Table 3.5 and Figure 3.12. The mean intake of all the nutrients including both macronutrients and micronutrients, is shown in the following table along with their Recommended Dietary Allowances (RDAs) and % adequacy intakes. The mean energy intake was found to be low meeting 52% of energy needs only. Similarly, the mean intake of protein also met only 50% of the requirement.

Table 3.5: Nutrient Intake Data

Nutrients	RDA	Mean Intake \pm SD	% Adequacy
Energy (kcal)	1900	983.60 (± 309.6)	51.7%
Protein (g)	55g	27.33 (± 8.2)	49.7%
Iron (mg)	21	7.95 (± 2.7)	37.8%
Calcium (mg)	600	275.76 (± 239.9)	45.9%
Thiamine (mg)	1.0	0.63 (± 0.15)	63.0%
Riboflavin (mg)	1.1	0.45 (± 0.17)	40.9%
Niacin (mg)	12	5.75 (± 1.47)	47.9%
Vitamin A (mcg)	600	134.74 (± 163.6)	22.4%
Vitamin C (mg)	40	22.66 (± 15.1)	56.6%
Folic acid (mcg)	200	22.14 (± 30.5)	11.0%
Crude fibre (g)	25-40	3.27 (± 1.03)	10%

Source: ICMR (2010)

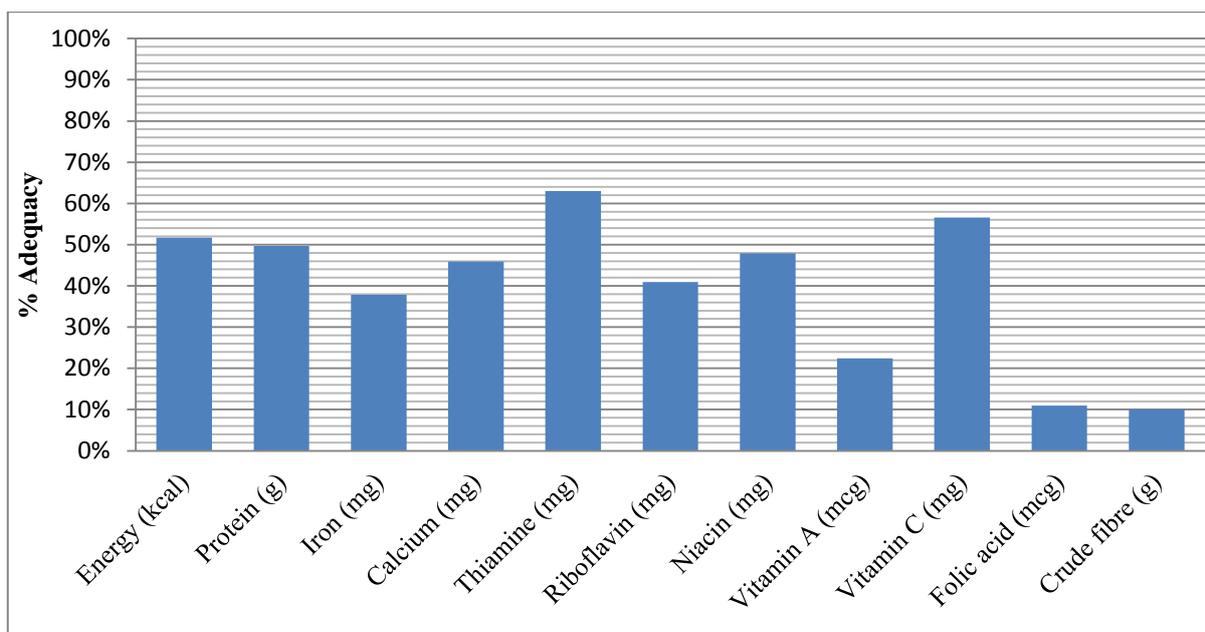


Figure 3.12: Nutrient Intake Data

The data presented in Figure 3.12 shows that the intake of most of the nutrients was low. Dietary intake of iron in Indian dietaries has always been low which in this case is almost 40% of the RDA. The intake of B-complex vitamins including thiamine, riboflavin, niacin and folic acid was found to be 63%, 40.9%, 47.9% and 11.0% of the RDAs, respectively. The intake of other vitamins and nutrients like vitamin A, vitamin C and crude fibre was also found to be low.

C. Nutrient adequacy ratio (%intake of RDA)

The data regarding the nutrient adequacy ratio for energy is provided in the Table 3.6 and Figure 3.13. The energy intake has been divided into 4 categories, viz, <50%, 50-75%, 75-90% and >90% of RDA.

Table 3.6: NAR for Energy

S.No.	Energy	Frequency
1.	<50%	90
2.	50-75%	8
3.	75-90%	1
4.	>90%	1
Total		100

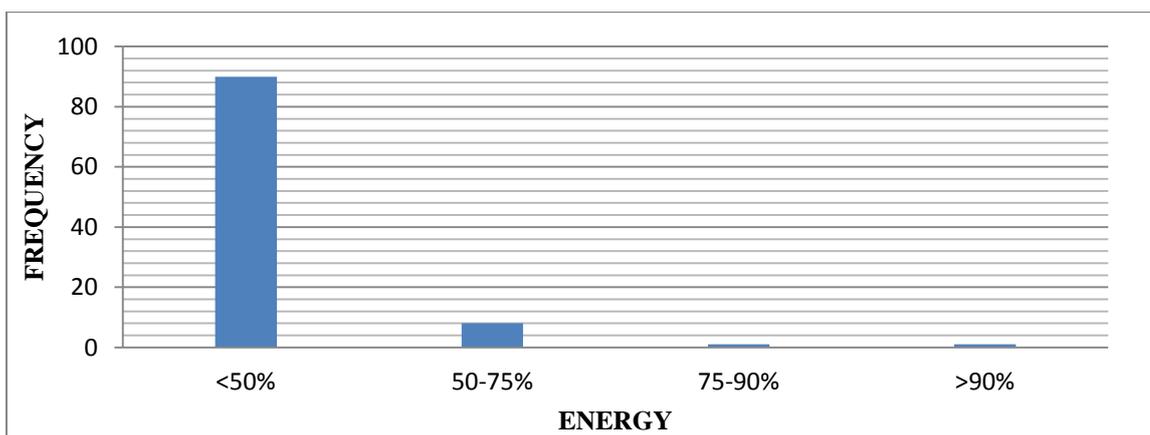


Figure 3.13: NAR for Energy

The data presented in Figure 3.13 reveals that 90% of the samples were not consuming even 50% of the total energy requirements. 9% were consuming marginally adequate i.e. 50-90% of total energy requirements and only 1% samples were consuming adequate amount of energy, i.e. >90% of RDA.

The data regarding the nutrient adequacy ratio for other macronutrients and micronutrients is provided in the Table 3.7 and Figure 3.14. The nutrient intake has been divided into 3 categories, viz, 0-66%, 66-99% and $\geq 100\%$ of RDA.

Table 3.7: NAR for Macro and Micronutrients

% RDA	Protein	Fat	Iron	Calcium	Vit. B1	Vit. B2	Niacin	Folic Acid	Vit. C	Vit. A
0-66%	86	15	99	51	58	91	94	94	81	97
66-99%	13	14	0	19	42	9	6	6	8	1
$\geq 100\%$	1	71	1	30	0	0	0	0	11	2
Total	100	100	100	100	100	100	100	100	100	100

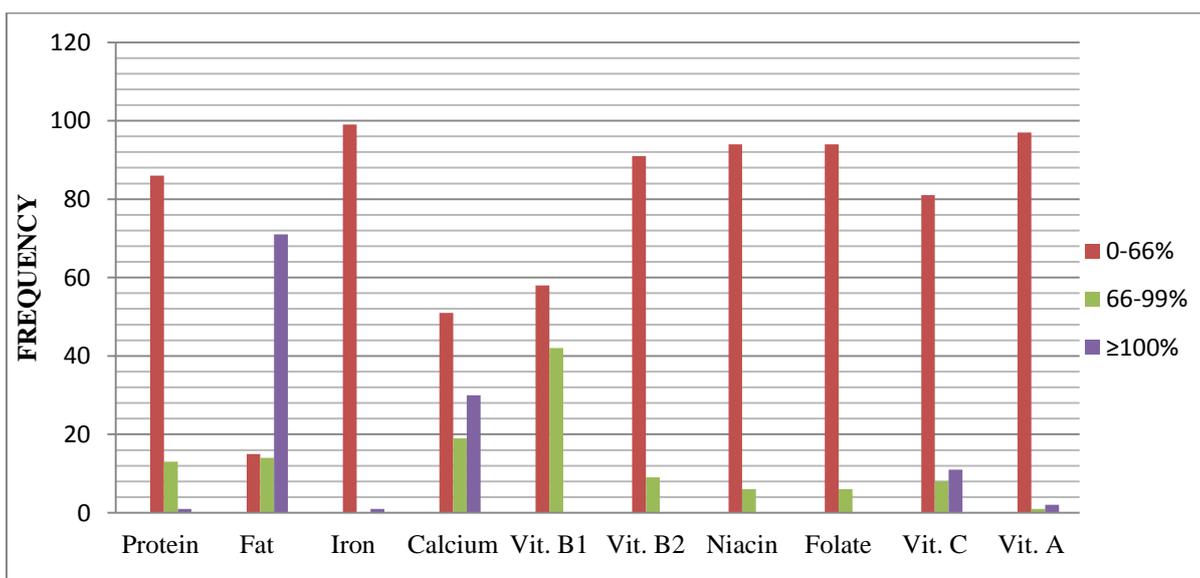


Figure 3.14: NAR for Macronutrients and Micronutrients

The data shown in Figure 3.14 shows that majority of the samples were consuming most of the nutrients in inadequate amounts e.g. 86% females were consuming <66% of total protein requirements, 94% were consuming <66% of niacin and folate requirements etc. None of the samples were consuming B-complex vitamins in adequate amounts. Also it was found that 99% and 97% of females were consuming inadequate amounts of iron and vitamin A respectively. Only the consumption of fat was adequate in most of the cases.

Medical History

The data related to the past 3 months of the medical history of the samples is shown in Table3.8 and Figure 3.15 in which the frequency of various diseases is depicted. The mean number of diseases suffered by females was found to be 2.5 (±2.4). The frequency is more than 100 because samples were suffering from more than one disease at a time.

Table 3.8: Medical History

S.No.	Disease	No. & Frequency	S.No.	Disease	No. & Frequency
1.	Pale conjunctiva	65	13.	Chicken pox	8
2.	Worms in stools	3	14.	Common cold	47
3.	Skin disorders	6	15.	Dengue	13
4.	Asthma	6	16.	Diabetes	3
5.	Diarrhoea	17	17.	Defective vision	8
6.	Gum problem	28	18.	Obesity	16
7.	Goiter	0	19.	Pneumonia	0
8.	Heart Attack	0	20.	Tuberculosis	3
9.	Hypotension	45	21.	Pregnancy complication	58
10.	Jaundice	5	22.	Typhoid	6
11.	Joint pain	25	23.	Underweight	26
12.	Malaria	15	24.	Menstrual problem	57

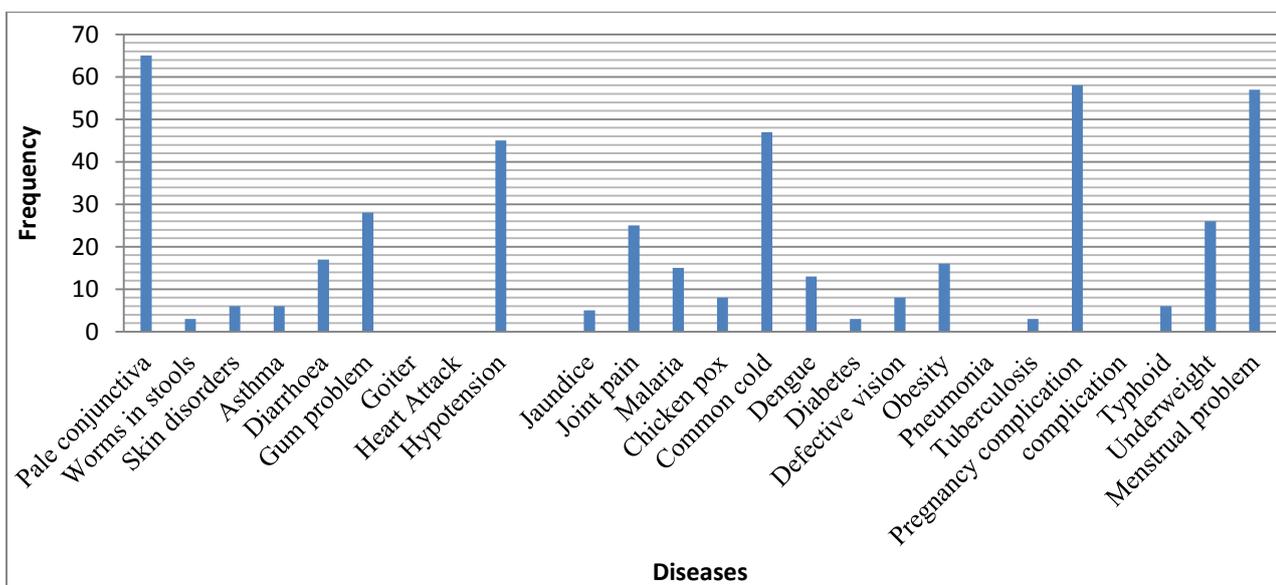


Figure 3.15: Medical History

The data presented in Figure 3.15 shows that the most prevalent diseases among females were pale conjunctiva (65%), menstrual problems (57%) and pregnancy complications (58%) which could be attributed to their lower iron intake. The common menstrual

problems included acne, backache, sore breasts, fatigue, constipation, irritability etc. and the common pregnancy complications included constipation, pica, nausea, vomiting, oedema, back pain etc. The other common problems were common cold, hypotension and gum problems with the frequencies 47%, 45% and 28%, respectively.

Co-relation between Frequency of Disease and BMI

The data related to the co-relation between the occurrence and frequency of various diseases and the BMI of samples is shown in Table 3.9.

Table 3.9: Co-relation between Frequency of disease & BMI

	Frequency of disease	BMI
Frequency of disease	1	-0.205*
BMI	-0.205*	1

*. Correlation is significant at the 0.05 level (2-tailed).

The data given in Table 3.9 depicts that BMI (Body Mass Index) showed a negative relation with the no. and frequency of diseases, i.e. the frequency of diseases was found to be more among underweight females than females with normal BMIs. BMI was also found to be positively co-related with the general awareness of the females, i.e. the females with better awareness about health and hygiene had normal BMIs than the females with lesser awareness.

General Awareness about Health, Nutrition and Sanitation

The general awareness about the commonly occurring diseases, their symptoms, health and hygiene was found to be average. About half of the samples got 50% of the responses correct. The mean awareness score and the mean awareness quotient were found to be 12 (± 3.2) and 0.54 (± 0.12) respectively. The maximum score was found to be 18 out of 22. The data regarding the question-wise correct responses of the subjects is depicted in Table 3.10.

Table 3.10: General Awareness

Q.No.	Topic	Frequency of correct response
1.	Symptoms of T.B.	65
2.	Causes of anaemia	17
3.	Symptoms of anaemia	34
4.	Nutrient increasing bone-strength	78
5.	Synthesis of Vit. D	11
6.	Foods relieving constipation	75
7.	Oil preventing heart-disease	16
8.	Risks of high SFA intake	60
9.	Cause of night-blindness	50
10.	Minimum gap between 2 pregnancies	84
11.	Food deficiency leading to anaemia	97
12.	Foods improving vision	97
13.	Food curing goiter	66
14.	Food deficiency leading to bleeding gums	16
15.	Foods providing strength to bones	83
16.	Most nutritious flour	31
17.	Food yielding maximum energy	6
18.	Method making pulse most nutritious	73
19.	Effect of high intake of tea/coffee	39
20.	Diseases due to water-logging	58
21.	Causes of malaria	100
22.	Hand hygiene	81

The data shown in Table 3.10 depicts that 65% of the samples were aware about the symptoms of TB. The awareness about the cases and symptoms of anaemia was 17% and 34% respectively, which was very low. Most of the samples knew that calcium provides strength to the bones and also knew the food products rich in calcium. While 60% of the subjects were aware about the ill-effects of high SFA intake, only 16% knew that vegetable oil prevents heart diseases. About 75% of the samples were aware about the role of fruits and salads in relieving constipation. While 97% of the study group knew vitamin A rich sources, only 50% of them were aware about the role of vitamin A in preventing night-blindness. The awareness about cleanliness and hygiene was found to be higher with 100% samples knowing the cause of malaria and 81% knowing the importance of hand hygiene.

General Health, Nutrition and Hygiene Practices

A total of 19 general health and hygiene practice questions were framed out of which 11 were selected to score the correct health practices and the data related to the rest health practices is shown in Table 3.11 which includes the data on the meal frequency, type of cooking oil used, type of flour used, source of drinking water, facility of drinking water, practice followed to make water safe for drinking, toilet facilities and cleanliness of coolers.

Table 3.11: General Health and Hygiene Practices

S.No.	Practices	Frequency
1.	Meal frequency	
	1-2	33
	3-4	63
	5-6	4
	7-8	0
2.	Cooking oil	
	Ghee	3
	Vegetable oil	1
	Mustard oil	66
	Refined oil	19
	Blend of oils	11
3.	Flour	
	Sieved wheat flour	67
	Unseived wheat flour	3
	Sieved mixed flour	18
	Unseived mixed flour	12
4.	Source of drinking water	
	Well	0
	Municipal tap	52
	Motor/hand pump	48
	Neighbours	0
5.	Drinking water facility	
	24X7	7
	Fixed hours	72
	No fixed hours	21
6.	Practice to make water safe	
	Boiling	7
	Sieve through cloth	0
	Use filter	26
	Keep in pot	33
	Nothing	34
7.	Toilet facilities	

	In open outside house	4
	Open pits inside house	1
	Closed toilets inside house	95
8.	Cleaning of coolers	
	Twice a week	15
	Once a week	12
	15 days	17
	No cooler	56

Data shows that 63% of the females were consuming 3-4 meals in a day while 33% and 4% were consuming 1-2 meals and 5-6 meals respectively. The commonly used oil for cooking was mustard oil and the commonly used flour was sieved wheat flour. Almost 52% of the households were dependant on municipal taps for the drinking water and rest 48% on motor/hand pumps. Also the drinking water in 72% cases was available for fixed hours only. 26% and 7% of the samples were making water safe for drinking by filtering and boiling respectively. Rest 33% were keeping it in pots and 34% were not doing anything to make the water clean for drinking purposes. As far as toilet facilities are concerned, 95% of the households had closed toilets inside house, rest 4% and 1% people open pits outside and inside house respectively.

The data related to the rest 11 questions selected to mark the correct health practices is depicted in Table 3.12. The mean correct practices and the mean correct practice quotient were found to be 7.5 ± 2 and 0.68 ± 0.32 , respectively.

Table 3.12: Correct Health Practices

Q.No.	Topic	Frequency of Correct practices
1.	Foods for bone health	85
2.	First-aid in case of diarrhoea	52
3.	Foods for blood formation	95
4.	Cooking salt	69
5.	Foods for healthy eyes	98
6.	Preliminary treatment before cooking	94
7.	Healthy cooking practice	96
8.	Cleanliness of surroundings	93
9.	Malaria prevention	93
10.	Water-logging	93
11.	Hand hygiene	100

Data shows that most of the samples were following healthy practices related to health, hygiene and nutrition. 85% and 95% of the study group was consuming the right food to keep their bones healthy and for blood formation respectively. In case of diarrhoea and vomiting, almost half of the samples were using ORS as first-aid, while others were either using some medicine or were visiting the doctor. 69% of the samples were using iodised salt for their cooking, 1% were using any salt that was available, while 30% were not even aware about the salt they were using at their households. Most of the subjects were following healthy cooking practices like washing vegetables before cutting them and also cooking in covered vessels or pressure cookers to keep the nutrients intact. Most of them were also following healthy sanitation practices by keeping their surroundings clean and also taking care of the hand hygiene.

Co-relation between General Awareness and Practices and other variables

The data related to the co-relations between general awareness and general practices regarding health and hygiene and various other variables like present age, age at marriage, BMI, income, frequency of diseases, pregnancy wastage etc. is depicted in Table 3.13.

Table 3.13: Co-relation between general awareness and practices and other variables

	General awareness	General practices
General awareness	1	0.691*
General practices	0.691*	1
Energy	0.422**	0.242*
BMI	0.337**	0.134
Present age	-0.208*	-.078
Income	0.289**	.087
Frequency of disease	-0.478**	-0.229*
Pregnancy wastage	-0.554**	-0.391**

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The data given in Table 3.13 shows that the age of the females was negatively co-related with the general awareness, i.e. younger females were more aware about the general nutrition and health practices as compared to the older females.

The energy consumption shows a perfect positive co-relation with the general awareness and practice quotients. This means that with better awareness and health practices, the energy status of females increased. Also the general awareness and general practices were found to be perfectly co-related. Females with better general awareness were following healthy nutritional and health practices.

The frequency and number of diseases showed a perfect negative co-relation with the general awareness. The females who were more aware about the general health and hygiene suffered from lesser no. of diseases. Also the frequency of diseases showed a negative co-relation with the general health practices, i.e. the females who were following healthy life-style practices encountered lesser no. of diseases as compared to others.

The pregnancy wastage showed a perfect negative co-relation with the general awareness quotient. The females who were less aware had more no. of abortions or still births as compared to females with more awareness. The pregnancy wastage also showed a negative co-relation with the general practices, i.e. healthier were the health practices, lesser were the abortions or still births.

CONCLUSION

One of the foremost objectives of our nation building activity is the maintenance, sustenance and improvement of the health and nutritional status of the people. If a country is to be healthy, community or society should be healthy. So it is required to conduct the educational programmes on health and nutritional aspects. But the society heavily depends on women for its economic support and family health care.

So looking at the importance of health in our day to day life and the role of women in that, the present study was conducted to assess the nutritional status and morbidity patterns among non-pregnant non-lactating rural women of reproductive age group (18-40 years). The specific objectives of the research study were:

- To assess the nutritional status of non-pregnant non-lactating rural women of reproductive age group (18-40 years)
- To study the dietary intakes of rural women.
- To study the morbidity pattern among rural women.
- To assess the general awareness and practices of rural women regarding nutrition, health and sanitary practices

The study was carried out in the village ‘Badshahpur’ near the vicinity of Gurgaon. A total of 100 rural women constituted sample for the study. The data was collected through purposive sampling and survey method. The tools used for data collection were nutritional anthropometry including BMI and WHR; food frequency questionnaire including both frequency and amount of

various food groups consumed; medical history questionnaire including past three months of medical history of the samples; and general awareness and practice questionnaires related to health, nutrition and sanitation. The data were tabulated and analyzed using statistical measures like frequency, mean, standard deviation, correlation co-efficient.

The summary of major findings is:

- The mean age at marriage was 17 (± 2) years and the mean number of children per subject was 2.5 (± 2) with a high incidence of pregnancy wastage as 44% of females had atleast one or more abortions during their pregnancies.
- The mean BMI and WHR of the subjects were 21.12 (± 3.7) kg/m² and 0.70 (± 0.04), respectively. 25% of the females were found to be undernourished with a BMI <18.5 whereas 16% of females were found to be overweight or obese.
- The intake of all the food groups was low except for the fats and sugars (almost 100% adequate) and the mean nutrient intake for both the macronutrients and micronutrients was also found to be much less as compared to their RDAs. These findings could be a reflection of low socio-economic conditions in the area.
- The mean number of diseases suffered by females was found to be 2.5 (± 2.4) and the most prevalent medical problem were pale conjunctiva, menstrual problems and pregnancy complications which could be attributed to their lower iron intake.
- The general knowledge and awareness about the commonly occurring diseases, their symptoms, health and hygiene was found to be average.

Limitations of the study

- The major limitation felt during the analysis of data was that the iron status of the samples was concluded solely on the presence of clinical signs and symptoms. Had some biochemical method like haemoglobin estimation been used, it would have added more value to the results.

ANNEXURE I

BACKGROUND QUESTIONNAIRE

1. PERSONAL PROFILE

a) Name : _____

b) D.O.B : _____ (dd/mm/yy)

c) Category : General / SC / ST / OBC

d) Food Habits : Vegetarian / Non-Vegetarian/Eggetarian

e) Marital Status: Single/Married/Divorced/Widowed

f) Age of marriage (If married) : _____

g) Pregnancy wastage

- No. Of children (if any): _____
- No. Of miscarriages (If any): _____
- No. Of still births (if any): _____

h) Education:

Level		Level	
Uneducated		10+2	
Primary (upto class V)		Graduate	
Secondary (VI-IX class)		Post-graduate	
10 th class			

2. FAMILY PROFILE

a) Name of Head of Family : _____

b) Type of Family : Joint / Nuclear / Any Other _____

c) Number of Family members : _____

d) Occupation

Occupation	Spouse/Family	Self
------------	---------------	------

Agriculture		
Milking		
Service/Job		
Self-employed		
Housewife		
Unemployed		
Any other		

3. INCOME

a) No. of earning members: _____

b) Principle earning member: _____

Monthly Household Income

<10,000	
10,000-20,000	
21,000-30,000	
31,000-40,000	
>40,000	

4. ANTHROPOMETRIC MEASUREMENTS

a) Height (cm): _____ Weight (kg): _____

BMI (kg/m²): _____

b) Waist (cm): _____ Hip (cm): _____

WHR: _____

ANNEXURE II

FOOD FREQUENCY QUESTIONNAIRE

Items	+6 per day	4-6 per day	2-3 per day	1 per day	Thrice a week	Once a week	2-3 in a month	Once a month	Never
MILK & MILK PRODUCTS									
Cow Milk (250ml)									
Buffalo Milk (250 ml)									
Mother Dairy Milk(250ml)- Full cream Toned Double Toned									
Amul Milk (250 ml) Full cream Toned Double Toned									
Curd (1 katori-125 g)									
Butter Milk (250ml)									
Khoa (25g/50g/100g)									
Paneer (50g)									
CEREALS									
Chapati (20g)									
Paratha (30g)									
Rice (¼ plate- 20g)									
Rice Flakes (¼ plate- 20g)									
Puffed Rice (1 katori- 20g)									
Semolina (¼ plate- 20g)									
Bread (1 slice/2 slices)- Brown White									
Fan/Rusk/Biscuit (1 pc.)									
PULSES									
Red gram, Black gram, Green gram, Lentil, Bengal gram, Rajmah, Lobia, Soyabean, Peas (1 katori- 30g)									
MEAT & POULTRY									
Egg (1 medium- 50g)									
Meat (lamb/Sheep) (30g)									
Chicken (30g)									
Fish/Shell fish (30g)									
GREEN LEAFY VEGETABLES									
Cabbage, Bathua, Coriander leaves, Fenugreek leaves, Spinach (1 katori- 100g)									
ROOTS & TUBERS									
Potato, Carrot, Colocasia, Onion, Turnip (1 katori- 50g)									
OTHER VEGETABLES									

Bitter gourd, Bottle gourd, Brinjal, Beans, Cauliflower, Cucumber, Jack fruit, Lady finger, Pumpkin, Tinda (1 katori- 50g)									
FRUIT									
Orange, Lime, Kino, Guava, Tomato etc. (quat/half/one)									
Banana (quat/half/one)									
Apple/Pear (40g)									
Mango/Papaya (40g)									
Melon (40g)									
SUGARS									
Table sugar (1tsp- 5g)									
Honey (1tsp- 5g)									
Jaggery (5g)									
FATS									
Mustard oil (1tsp- 5g)									
Butter (1tsp- 5g)									
Ghee (1tsp- 5g)									
Refined Oil (1tsp- 5g)									
NUTS & OIL SEEDS									
Groundnuts, Cashewnuts, Almonds, Coconut, Raisins, Walnuts (25g/50g/100g)									
MISCELLANEOUS									
Tea/Coffee/Cocoa									
Health drinks like Bournvita									
Pickle									
Any other									

ANNEXURE III

MEDICAL HISTORY QUESTIONNAIRE

MEDICAL HISTORY (PAST 3 MONTHS)

S.No.	Disease	Yes/No	S.No.	Disease	Yes/No
1.	Pale conjunctiva		13.	Chicken pox	
2.	Worms in stools		14.	Common cold	
3.	Skin disorders		15.	Dengue	
4.	Asthma		16.	Diabetes	
5.	Diarrhoea		17.	Defective vision	
6.	Gum problem		18.	Obesity	
7.	Goiter		19.	Pneumonia	
8.	Heart Attack		20.	Tuberculosis	
9.	Hypertension/ Hypotension		21.	Pregnancy complication	
10.	Jaundice		22.	Typhoid	
11.	Joint pain		23.	Underweight	
12.	Malaria		24.	Menstrual problem	

ANNEXURE IV

GENERAL AWARENESS QUESTIONNAIRE

1. दो हफ्तों से ज्यादा बलगम वाली खांसी किस बीमारी का संकेत हो सकती है?

- टी.बी.
- हैजा
- मधुमेह
- पता नहीं

2. शरीर में खून की कमी किन कारणों से हो सकती है?

- दोहराया गर्भावस्था
- हरी-पत्तेदार सब्जियां, दालें इत्यादि का सेवन न करना
- पेट में कीड़े होना
- उपरोक्त सभी
- पता नहीं

3. शरीर में खून की कमी होने के क्या लक्षण हो सकते हैं?

- थोड़ा काम करते ही थकावट व सास फूलना
- त्वचा का पीला पड़ना
- दोनों
- पता नहीं

4. हड्डियों को मजबूती देने वाला तत्व कौनसा है?

- लौह-तत्व
- कैल्शियम व विटामिन-डी
- प्रोटीन
- पता नहीं

5. हमारे शरीर को विटामिन-डी इनमें से किससे प्राप्त होता है?

- दूध, दही, हरी-पत्तेदार सब्जियां
- सूर्य की किरणों से
- उपरोक्त सभी
- पता नहीं

6. कब्ज का रोग इनमें से क्या खाने से दूर हो सकता है?

- फल व सलाद
- घी
- चीनी
- पता नहीं

7. इनमें से कौन से खाद्य-पदार्थ के सेवन से हृदय-रोगों से बचाव हो सकता है?

- घी
- वनस्पति
- रिफाइंड
- उपरोक्त सभी

- पता नहीं

8. ज्यादा घी खाने से इनमे से कौन-सा रोग हो सकता है?

- मोटापा
- हृदय-रोग
- दोनों
- पता नहीं

9. रतौंधी इनमे से किस कारण से होती है?

- विटामिन-ए की कमी से
- आँखों में इन्फेक्शन से
- लौह-तत्व की कमी से
- पता नहीं

10. माँ व बच्चे के अच्छे स्वास्थ्य के लिए दो गर्भावास्थाओं में कम से कम कितना अंतर होना चाहिए?

- 1 साल
- 2 साल
- 3 साल
- पता नहीं

11. शरीर में खून की कमी इनमे से किस खाद्य-पदार्थ का सेवन ना करने से होती है?

- दूध, दही
- हरी-पत्तेदार सब्जियां
- घी, तेल
- पता नहीं

12. आँखों की रौशनी बढ़ने के लिए इनमे से किस खाद्य-पदार्थ का सेवन करना चाहिए?

- आलू
- चीनी
- गाजर, हरी सब्जियां व पीले फल
- उपरोक्त सभी
- पता नहीं

13. घेंगा निम्नलिखित किस खाद्य-पदार्थ को खाने से ठीक हो सकता है?

- दूध, दही
- आयोडीन-युक्त नमक
- चीनी
- घी

- पता नहीं

14. मसुडो में खून आने का कारण निम्नलिखित किस खाद्य-पदार्थ को न खाने से हो सकता है?

- खट्टे फल
- हरी-पत्तेदार सब्जियां
- दूध, दही
- पता नहीं

15. हड्डियों को मजबूती प्रदान करने वाला पदार्थ इनमें से किस खाद्य-पदार्थ में पाया जाता है?

- घी, तेल
- फल व सब्जियां
- दूध, दही व हरी सब्जियां
- पता नहीं

16. इनमें से कौनसा आटा सबसे अधिक पौष्टिक है?

- गेहूं का छना हुआ
- गेहूं का बिना छना
- मिस्सा आटा छना हुआ
- मिस्सा आटा बिना छना

17. इनमें से सबसे ज्यादा ऊर्जा कौन प्रदान करता है?

- 1 चम्मच चीनी
- 1 चम्मच घी
- 1 चम्मच आटा
- 1 चम्मच दाल

18. इनमें से किस तरीके से दाल को सबसे अधिक पौष्टिक बनाया जा सकता है?

- पीसकर
- उबालकर
- अंकुरित करके
- पता नहीं

19. ज्यादा चाय या कॉफी पीना का क्या प्रभाव होता है?

- लौह-तत्व के अवशोषण में बाधा डालना
- पाचन-शक्ति बढ़ती है
- दोनों

- पता नहीं

20. घर के आस-पास पानी इकट्ठा होने से इनमें से कौन सी बीमारियाँ हो सकती हैं?

- उल्टी-दस्त
- हैजा
- दोनों
- पता नहीं

21. मलेरिया किन कारणों से हो सकता है?

- गन्दा खाना खाने से
- मच्छर के काटने से
- ज्यादा मीठा खाने से
- पता नहीं

22. हाथों की साफ सफाई इनमें से कब महत्वपूर्ण होती है?

- खाना बनाने व परोसने से पहले
- शौच के बाद
- खाना खाने से पहले
- उपरोक्त सभी
- पता नहीं

ANNEXURE V

GENERAL PRACTICE QUESTIONNAIRE

1. हड्डियों को मज़बूत रखने के लिए आप इनमें से किसका सेवन करते हैं?

- घी, तेल
- फल व सब्जियाँ

- दूध, दही व हरी सब्जियां
- पता नहीं

2. उल्टी-दस्त होने पर सबसे पहले आप क्या करते हैं?

- दवा देती हैं
- नीम्बू-चीनी का घोल देती हैं
- डॉक्टर के पास ले जाती हैं
- पता नहीं

3. आप दिन में कितनी बार आहार लेती हैं?

- 1-2 बार
- 3-4 बार
- 5-6 बार
- 7-8 बार

4. शरीर में खून बनाने के लिए आप इनमें से किसका सेवन करते हैं?

- दूध, दही
- हरी-पत्तेदार सब्जियां
- घी, तेल
- पता नहीं

5. खाना बनाने के लिए आप कौंसे नमक का प्रयोग करते हैं?

- आयोडीन-युक्त जैसे टाटा
- कोई भी
- सस्ते वाला
- पता नहीं

6. आँखों की रौशनी बढ़ने के लिए आप इनमें से किसका सेवन करते हैं?

- गाजर
- गाजरवहरीसब्जियां
- गाजर, हरीसब्जियांवपीलेफल
- पता नहीं

7. खाना बनाते समय सब्जियां

- धोकर काटती हैं
- काटकर धोती हैं
- नहीं धोती
- पता नहीं

8. खाना बनाने के लिए कौनसे तेल का अधिक प्रयोग करती है?

- घी
- वनस्पति
- सरसों का तेल
- रिफाइंड
- सब मिलाकर

9. भोजन के आवश्यक तत्वों को बनाए रखने के लिए आप खाना

- खुले बर्तन में देर तक पकाती हैं
- ढककर या कूकर में पकाती हैं
- ज्यादा पानी में पकती हैं
- पता नहीं

10. आप कौनसा आटा प्रयोग करती है?

- गेहूं का छना हुआ
- गेहूं का बिना छना
- मिस्सा आटा छना हुआ
- मिस्सा आटा बिना छना

11. आपके पीने के पानी का क्या स्रोत है?

- कुआँ
- मोहल्ले का नल
- घर में मोटर या हैण्ड-पम्प है
- पड़ोसी के घर से लाते हैं

12. नल के पानी की सुविधा कैसी है?

- 24 घंटे आता है
- नियमित समय के लिए आता है
- कोई नियमित समय नहीं है

13. पीने का पानी शुद्ध करने के लिए आप इनमें से क्या करती है?

- उबलती है
- कपड़े में से छानती है
- फिल्टर का प्रयोग करती है
- मटके में रखती है
- कुछ नहीं

14. घर की सफाई करके कूड़ा कहाँ फेंकती हैं?

- घर के बहार
- कूड़ेदान में
- नदी या नाले में
- पता नहीं

15. शौच करने कहा जाती है?

- घर के बहार खुले में
- घर के अन्दर खुले-गड्ढे में
- घर के अन्दर ही शौचालय है

16. मलेरिया से बचाव के लिए आप क्या करते हैं?

- घर व आस-पास की सफाई
- मच्छरदानी या आल-आउट का प्रयोग
- दोनों
- पता नहीं

17. घर के आस-पास गन्दा पानी इकट्ठा होने पर आप क्या करते हैं?

- उसकी सफाई करते हैं
- उसमें मिट्टी का तेल डालते हैं
- दोनों
- पता नहीं

18. कूलर की सफाई कितने दिनों में करती है?

- सप्ताह में दो बार
- सप्ताह में एक बार
- 15 दिन में
- कूलर नहीं है

19. खाना बनाने व परोसने से पहले हाथों की साफ सफाई का कितना ध्यान देती है?

- हमेशा हाथ साफ करती है
- कभी-कभी करती है
- कभी नहीं करती

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