

## A cross sectional study on quantitative and qualitative food pattern of women of an urban slum of Varanasi

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■ **ABSTRACT** : The value of nutritional assessment is greatly enhanced when it is supplemented by an assessment of what people eat qualitatively and quantitatively. Special demands are made for increase amount of body building and protective nutrients during this period. Instead of this, women have received little investigative attention except during pregnancy and lactation. The objective of the study was to know the quantitative food intake by 24 hour recall methods in the study area and to find out consumption pattern for the qualitative value of food stuffs in women. This study was carried out in urban slum area of Varanasi. The approaches adopted for the study was cross-sectional one. For this study, 310 women belonging to reproductive age groups (15 to 49 years) in four Mohall's of Varanasi city by adopting multistage random sampling procedure. The tools in the study were pre-designed and pre-tested schedule comprising of family and individual schedule. In quantitative food intake, as much as 58.61 per cent and 45.81 per cent women had calorie and protein consumption, 80 per cent of RDA, respectively. Average intake of thiamine, riboflavin, niacin, pyridoxine, and cynocobalamine was 87.17 per cent, 87.37 per cent, 96.83 per cent, 79.70 per cent and 64.79 per cent, respectively. The average consumption of cereals was  $305.30 \pm 118.5$ g/day. This was 72.57 per cent of the estimated RDA. Consumption of pulses and green leafy vegetables were observed to be 75.18 per cent and 79.50 per cent, respectively of the estimated mean RDA. In majority (83.55%) of subjects, frequently of meals was fixed time for their meals and only 16.45 per cent subjects were irregular in their meals.

■ **KEY WORDS** : Reproductive age, Quantitative dietary intake, Consumption pattern, Qualitative value and Recommended Dietary Allowances (RDA)

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People eat qualitatively and quantitatively and find out the inadequacies in the existing dietary consumption and habits. Dietary profiles enable malnutrition by deficiency arising from dietary intakes, food gaps and malnutrition. In reality nutritional survey is the mirror of nutrition and diet is one of the main determinates of the nutritional status. So, the value of nutritional assessment is greatly enhanced when it is supplemented by an assessment of food consumption and calculated on scale of qualitative value. Turning to the adult part of the woman's life cycle, it is apparent that pregnancy and child birth are special events in a woman's life, a time of hope, anticipation and joy. Unfortunately, very often it turns out to be a time of fear,

suffering and even death. Nutritional status of women integrate related to their, dietary intake which is determined by availability of food in terms of quality and quantity and then ability to digest, absorb and utilize food. Food availability is influenced by food pattern, cultural traditions, family structure, birth intervals, meal patterns, political environments and food allocation. At the same time, digestion and absorption can be impeded by infection or metabolic disorders. In general, reproductive age groups women are the worst sufferers of the ravages of various forms of malnutrition (*viz.*, protein energy malnutrition, iron, calcium and other specific nutrient deficiencies) because of their increased nutritional needs and low social power. The Objective of the study was to know

quantitative food intake by 24 hour recall methods in the study area and to find out consumption pattern for the qualitative value of food stuffs in women of Varanasi.

## ■ RESEARCH METHODS

The study was conducted for a period of two years. During the initial period of study extensive literature search, designing and pre-testing of interview schedule were done. The field data collection was carried out for a period of one year extending from October 2002 to September 2003. The desired sample size for this cross-sectional study was computed by taking the prevalence of under nutrition as 56.68 per cent and permissible level of error of 10 per cent. The required sample size of 310 women of reproduction age groups (*i.e.* 15 to 49 years) were considered as study subjects. As weight gain during pregnancy particularly 2<sup>nd</sup> and 3<sup>rd</sup> trimester may affect Body Mass Index, women with gestational period more than 4 months were excluded from the study.

Multistage random sampling was followed in the present investigation. Following stages were involved in arriving at the required sample size.

**Stage 1:** The authority of Varanasi Corporation was contacted and the list of all wards including the names of Mohall's were obtained.

**Stage 2:** There were altogether 90 wards in the city. Out of which 9 wards (*i.e.*, 10 %) were selected randomly using random table.

**Stage 3:** Out of aforesaid 40 Mohall's, only 4 Mohall's (*i.e.*, 10 %) were taken randomly using random table.

**Stage 4:** Further, household selection was based on probability proportion to size as 310 households were to be selected from 1376, households in selected Mohall's were divided by 4.44 (*i.e.* 1376 / 310) to get the total number of selected households.

**Stage 5:** The survey was initiated in each selected Mohall. The first house selected randomly say 3<sup>rd</sup> house. Then, following the stratified sampling at the interval of 4, the next house was 3 + 4 = 7<sup>th</sup> house. This method was followed continuously.

**Stage 6:** The study of selected household family was taken from family information. In case of joint/extended family, only one family was selected through simple random techniques *i.e.*, by lottery number.

**Stage 7:** Lastly, for individual information, a female between 15-49 years of age from each family was selected randomly (*i.e.* by lottery number) for their interview and detailed investigation.

### Tools and techniques of the study :

The primary tools in this study were predesigned and pretested interview schedule for recording of family as well as individual information. Quantitative food intake of the study subjects was assessed by 24 hours recall oral questionnaire

method. Standardized utensils such as, bowls for measuring cooked rice, dal, curd, vegetables, milk etc., mini-weighing machine for chapatti and other cooked items were used for measuring the approximate intake of different food items. Dilution factor of liquid food, dal was also noted. The survey was conducted one day after any festival or special occasion.

Consumption pattern of the women was elicited by interview techniques using pre-designed and pre-tested performas to know qualitative value.

## ■ RESEARCH FINDINGS AND DISCUSSION

In any nutritional assessment diet survey has its own importance and helpful to determine and evaluate quantitative levels of food and nutrients with qualitative data for consumption pattern included food practices as well as food habits, which is to assess what people eat inadequacies in the existing food pattern. Dietary profiles enable comparison between deficiency arising from dietary intakes and malnutrition by anthropometry. In reality nutritional status is the mirror of nutrition and diet is one of the main determinants.

The food intake of various nutrients was assessed in terms of quantitatively of macro -(calorie, protein and fat); micro (calcium, iron and folic acid) and vitamins (thiamine, riboflavin, niacin, pyridoxine, cynocobalamine and ascorbic acid) nutrients by 24 hours recall method. There average intake of all nutrients in women was observed (Table 1) and compared with their estimated mean recommended dietary allowances (RDA). Average caloric intake per day ( $1512.15 \pm 227.86$  Kcal) of women was 76.01 per cent of the estimated RDA; corresponding values for protein and fat intake were 76.15 per cent and 162.25 per cent, respectively. Dietary deficiencies in women have been observed by several workers (Gopalan *et al.*, 2000; Bhatia *et al.*, 1981; Anjla *et al.*, 1983; Wahiawa, 1997; Atlanta, 1970; Pallavi and Antony, 2002). A contrary finding of energy inadequacy in the present study, Bhatia *et al.* (1981); and Bains and Mann (2000), reported adequate energy intake in women. But other side low intake quoted by Egtesade *et al.* (2001) 49 per cent and Atlanta (1970) 66 per cent. In contrast to the finding of excess fat intake in present study ( $36.07 \pm 13.10$  gm/day) was more than 100 per cent of RDA. While in the present study mean intake of protein was 40.57 gm/day which is significantly lower than the estimated critical difference was that average less intake 13.5 per cent and 26.1 per cent by Raj Kumar and Premkumari (2000), respectively, almost equal intake (44 g/day) and above intake quoted by Bains and Mann (2000) *i.e.* 94 per cent.

The mean intake of micro nutrients *viz.*, calcium, iron and folic acid (Table 1), corresponding per cent was maximum (94.22%) and minimum (53.13%) according to estimated mean RDA of calcium and folic acid, respectively. Some studies on micro nutrient were done separately and found that high iron, calcium intake was quoted by Bhatia *et al.* (1981) and Bains and Mann (2000). Lower consuming intake of these nutrients

**Table 1 : Quantitatively nutrient Intake of study subjects (n = 310)**

| Nutrient                      | Nutrient intake Mean $\pm$ SD | Estimated mean RDA | % of RDA |
|-------------------------------|-------------------------------|--------------------|----------|
| Calorie (kcal/day)            | 1512.15 $\pm$ 227.86          | 2011.61            | 76.01    |
| Protein (gram/day)            | 40.57 $\pm$ 3.98              | 54.47              | 76.15    |
| Fat (gram/day)                | 36.07 $\pm$ 13.10             | 24.24              | 162.25   |
| Calcium (mg/day)              | 429.82 $\pm$ 11.85            | 518.06             | 94.22    |
| Iron (mg/day)                 | 23.30 $\pm$ 11.85             | 30.36              | 76.87    |
| Folic acid (mg/day)           | 57.89 $\pm$ 10.11             | 121.13             | 53.13    |
| Ascorbic acid (mg/day)        | 29.42 $\pm$ 3.72              | 46.06              | 68.13    |
| Thiamine (mg/day)             | 0.84 $\pm$ 0.36               | 0.98               | 87.17    |
| Riboflavin (mg/day)           | 1.02 $\pm$ 0.29               | 1.18               | 87.37    |
| Niacin (mg/day)               | 12.40 $\pm$ 2.10              | 12.95              | 96.83    |
| Pyridoxine (mg/day)           | 1.66 $\pm$ 0.67               | 2.10               | 79.70    |
| Cynocobalamine ( $\mu$ g/day) | 0.68 $\pm$ 0.22               | 1.08               | 64.79    |

quoted by Wahiwawa (1997); ICMR (1994); Pao (1980); Bains and Mann (2000) and Rajkumar and Premkumari (2000).

In the present study distributions of women according to their vitamins intake *viz.*, ascorbic acid, thiamine, riboflavin, niacin, pyridoxine and cynocobalamine were 68.13 per cent, 87.17 per cent, 87.37 per cent, 96.83 per cent, 79.70 per cent and 64.79 per cent, respectively which are all lower than the percentage of estimated mean RDA. Inadequacy of nutrient have also been reported by several other workers to various extent (Bhatia *et al.* (1981); Wahiwawa (1997); Gupta (1996); Rao (1980); Bains and Mann (2000); and Rajkumar and Premkumari (2000).

According to dietary nature of the women, 20.65 per cent, 47.74 per cent, 21.93 per cent and 09.68 per cent subjects were non-vegetarian, eggetarian, vegetarian and occasional non-vegetarian; respectively. Timing of meals was practiced by 259 (83.55%) as a fixed diet for their meals (Table 2) has been quoted by Graham, 1992 and Jain and Singh, 2003 in their research. They were not revealed in the present study.

Table 3 shows the mean intake level of various food stuffs, demonstrating the pattern of variation in the intake of different food stuffs among women. Over all, mean intake levels of various food stuffs were observed to be very low in meat/egg groups. However, grossly differing patterns of food consumption were observed between oils/fats and sugar/

jaggery as well as pulses and other vegetables. The estimated mean of RDA was showed similar percentage but percentages of RDA were different *viz.*, 127.75 per cent, 90.23 per cent, 75.18 per cent and 89.73 per cent, respectively. Similar findings have also been reported by many other workers (NFHS-2, 1998-99; Ready *et al.*, 1994; Meena *et al.*, 2000; and Graham, 1992).

The average consumption of cereals was 420.68 per day per women which is 72.57 per cent of the estimated RDA. There was no any specified RDA given by ICMR for fruits and meat/egg. So, this group was not compared in Table 3. Others like milk, green leafy vegetables and roots and tubers were 53.72 per cent, 79.50 per cent and 93.40 per cent; corresponding with estimated mean of RDA were 121.77, 100.00 and 50.00; respectively. The various food stuffs in the present study were also presented in the form of figure as per cent of RDA and their quantity of food stuffs.

The consumption level of various foodstuffs by the reproductive women has also been discussed. It is an accepted fact that variation do occur within the individual during different seasons of the years and even in the same season daily variation may occur for change in the taste or work performed during the day or other reasons. The responses were mainly precoded with alternatives as daily, once or twice, weekly, once or twice monthly, occasionally/seasonally and never. The results are presented in Table 4. Chapati and rice were consumed by more than 90 per cent women daily. Consumption of green vegetables once or twice per week was to the extent of 43.55 per cent supporting to our findings. Root and tuber vegetables, pulses, beverage, other vegetables and fast food were consumed maximally either daily or showed seasonal pattern. Fermented food were once or twice per month used maximum in percentage (*i.e.* 81.29 %). Common food related practices of study subjects were measured in terms of salt consumed, oil used and flour consumption showed in Table 5. Iodized and mixed (Iodized + Non-iodized) salt were

**Table 2 : Dietary habits of the study subjects (n=310)**

| Parameters                | Number | Percentage |
|---------------------------|--------|------------|
| <b>Nature of diet</b>     |        |            |
| Non-vegetarian            | 64     | 20.65      |
| Eggetarian                | 148    | 47.74      |
| Vegetarian                | 68     | 21.93      |
| Occasional non-vegetarian | 30     | 09.68      |
| <b>Timing of meals</b>    |        |            |
| Fixed                     | 259    | 83.55      |
| Irregular                 | 51     | 16.45      |

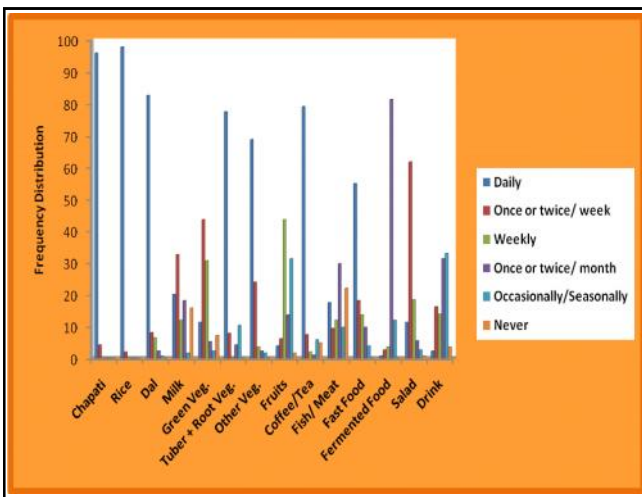
**Table 3 : As per quantitative food stuffs intake by the study subjects**

| Food stuffs                      | Food Stuffs intake (Mean ± SD) | Estimated mean (RDA) | % of RDA |
|----------------------------------|--------------------------------|----------------------|----------|
| Cereal (gram/day)                | 305.30±118.5                   | 420.68               | 72.57    |
| Pulses (gram/day)                | 34.60±24.50                    | 46.02                | 75.18    |
| Green leafy vegetable (gram/day) | 79.50±66.50                    | 100.00               | 79.50    |
| Roots and tubers (gram/day)      | 46.70±30.02                    | 50.00                | 93.40    |
| Other vegetables (gram/day)      | 35.89±14.12                    | 40.00                | 89.73    |
| Fruits (gram/day)                | 28.2±14.4                      | -                    | -        |
| Milk (ml/day)                    | 64.20±52.00                    | 121.77               | 53.72    |
| Oils/Fats (ml/day)               | 27.30±8.30                     | 21.37                | 127.75   |
| Sugar/Jaggery (gram/day)         | 19.30±08.95                    | 21.39                | 90.23    |
| Meat/Egg (gram/day)              | 06.5±16.8                      | -                    | -        |

Note: RDA for fruits and meat/egg are not specified

**Table 4 : Qualitative value of food items of consumption pattern among reproductive age group women**

| Food items        | Daily |       | Once or twice/week |       | Weekly |       | Once or twice/ month |       | Occasionally/ seasonally |       | Never |       | Total |     |
|-------------------|-------|-------|--------------------|-------|--------|-------|----------------------|-------|--------------------------|-------|-------|-------|-------|-----|
|                   | No.   | %     | No.                | %     | No.    | %     | No.                  | %     | No.                      | %     | No.   | %     | No.   | %   |
| Chapati           | 297   | 95.81 | 13                 | 04.19 | -      | -     | -                    | -     | -                        | -     | -     | -     | 310   | 100 |
| Rice              | 303   | 97.74 | 06                 | 01.94 | 01     | 00.32 | -                    | -     | -                        | -     | -     | -     | 310   | 100 |
| Dal               | 256   | 82.56 | 25                 | 08.06 | 20     | 06.45 | 07                   | 02.26 | 02                       | 00.65 | -     | -     | 310   | 100 |
| Milk              | 62    | 20.00 | 101                | 32.58 | 37     | 11.94 | 56                   | 18.06 | 05                       | 01.61 | 49    | 15.81 | 310   | 100 |
| Green Veg.        | 35    | 11.29 | 135                | 43.55 | 95     | 30.65 | 16                   | 05.16 | 07                       | 02.26 | 22    | 07.10 | 310   | 100 |
| Tuber + Root Veg. | 240   | 77.42 | 24                 | 07.74 | 01     | 00.32 | 13                   | 04.19 | 32                       | 10.32 | -     | -     | 310   | 100 |
| Other Veg.        | 213   | 68.71 | 74                 | 23.87 | 11     | 03.55 | 07                   | 02.26 | 05                       | 01.61 | -     | -     | 310   | 100 |
| Fruits            | 12    | 03.87 | 19                 | 06.13 | 135    | 43.55 | 42                   | 13.55 | 97                       | 31.29 | 05    | 01.61 | 310   | 100 |
| Coffee/Tea        | 245   | 79.03 | 23                 | 07.42 | 06     | 01.94 | 03                   | 00.96 | 18                       | 05.81 | 15    | 04.84 | 310   | 100 |
| Fish/Meat         | 54    | 17.42 | 29                 | 09.35 | 37     | 11.94 | 92                   | 29.68 | 30                       | 09.68 | 68    | 21.94 | 310   | 100 |
| Fast food         | 170   | 54.84 | 56                 | 18.06 | 42     | 13.55 | 30                   | 09.68 | 12                       | 03.87 | -     | -     | 310   | 100 |
| Fermented food    | 02    | 00.64 | 08                 | 02.58 | 11     | 03.55 | 252                  | 81.29 | 37                       | 11.94 | -     | -     | 310   | 100 |
| Salad             | 35    | 11.29 | 191                | 61.61 | 57     | 18.39 | 17                   | 05.48 | 08                       | 02.58 | 02    | 00.65 | 310   | 100 |
| Drink             | 07    | 02.26 | 50                 | 16.13 | 43     | 13.87 | 97                   | 31.29 | 102                      | 32.90 | 11    | 03.55 | 310   | 100 |



**Fig. 1 : Qualitative value of food items of consumption pattern**

**Table 5 : Common food related practices of study subjects (n=310)**

| Particulars                   | Number | Percentage |
|-------------------------------|--------|------------|
| <b>Type of salt concerned</b> |        |            |
| Iodised                       | 282    | 90.97      |
| Non-Iodised                   | -      | -          |
| Mixed                         | 28     | 09.03      |
| <b>Type of oil used</b>       |        |            |
| Mustard                       | 27     | 08.71      |
| Refined                       | 46     | 14.84      |
| Vanaspati                     | 21     | 06.77      |
| Desi ghee                     | 15     | 04.84      |
| Mixed                         | 201    | 67.74      |
| <b>Type of flour used</b>     |        |            |
| With chocker                  | 47     | 15.16      |
| Without chocker               | 223    | 71.94      |
| Fortified flour               | 40     | 12.90      |

used by 90.97 per cent and 9.03 per cent, respectively. In case of type of oil used, majority have adopted mixed pattern of using different types of oils (*viz.*, mustard, refined, vanaspathi and desi ghee) which was 67.74 per cent. Approximately, three fourth (71.94%) of women used flour without choker (Fig. 1).

#### Conclusion:

The dietary pattern of the study subjects was predominantly cereal and pulse based with heavy amount of visible fat intake in terms of qualitative value

With the exception of fat, whose intake was above to the RDA, the consumptions of other nutrients (*viz.*, calorie, protein, calcium, iron, folic acid, vit. B1, B2, B5, B6 and B12 as well as vitamin C) were below the RDA on quantitative scale.

Only protein and ascorbic acid significantly made difference with age other than nutrient calculated value.

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#### ■ REFERENCES

- Anjla, P.**, Nigiani, S.S. and Singh, A.J. (1983). A comparative study of the nutrient intake among different income, occupation and family size categories in rural areas of Punjab. *Indian J. Nut. Dietet.*, **20** : 17.
- Atlanta, G.A.** (1970). Ten-State Nutrition Survey, V-dietary DHEW NO (HSM) - 72 - 8133, Centre for Disease Control.
- Baines, K.** and Mann, S.K. (2000). Sub-clinical iron deficiency - A major factor in reducing physical fitness of young women. *Indian J. Nut. Dietet.*, **37** : 296-298.
- Bhatia, B.D.**, Banerjee, D. and Agrawaal, K.N. (1981). Dietary intake of urban and rural pregnant, lactating and non-pregnant, non-lactating vegetarian women of Varanasi. *Indian J. Med Res.*, **74**; 680.
- Gopalan, C.**, Rama, S. and Balasubramanian, B.V. (2000). Nutritive Value of Indian Foods. National Institute of Nutrition, ICMR, Hyderabad, 1-94.
- Gupta, A.** (1996). Osteoporosis in India. The nutritional hypothesis, *Natl. Med. J. India*, **9** : 268.
- Graham, H.N.** (1992). Green tea consumption and polyphenol Chemistry *prev. Med.*, **21** : 334-350.
- Indian Council of Medical Research (1994). National Institute of Nutrition, Hyderabad.
- Jain, H.** and Singh, N. (2003). A study on the nutritional status of women in the age group of 25-50 years working in secondary job in Jaipur city. *Indian J. Nut. Dietetic*, **40** : 91-97.
- Mena, J.**, Vijay, N. and Reddy, S.N. (2007). Food and nutrient intake, anthropometric measurements and haemoglobin status of lactating women in urban and rural areas of parbhani district. *Indian J. Nut. Dietet.*, **37** : 288.
- NFHS-2 (National Family Health Survey) International Institute for population Sciences. "Nutrition and the prevalence of anaemia". 1998-99. 2; 163.
- Pahlavi, P.K.** and Antony, U. (2002). Nutritional status and outcome of pregnancy in young and older mothers in Mumbai. *Indian J. Nut. Dietet.*, **39** : 26-30.
- Pao, E.M.** (1980). Nutrient Consumption Patterns of Individuals, 1977 and 1965. *Family Econ. Rev.*, **16**.
- Rao, N.S.N.** (1980). Elements of health statistics. Reprint of first ed, Rattan Pub.
- Rajkumar, H.** and Premkumari, S. (2000). Health and nutritional status of working women in Coimbatore and their exposure to occupational Hazards. *Indian J. Nut. Dietet*, **37** : 350.
- Reddy, N.S.**, Sahan, M.J. and Pandey, V.A. (1994). Longitudinal study on the food and nutrient intake. *J. Nut. & Dietetics*, **31** (8) : 234-240.
- Wahiawa, A.** (1997). Nutritional status of women, *Indian J. Med. Res.*, **106** : 340.

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