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WOMEN NUTRITION AND ITS CORRELATES IN RURAL HARYANA

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Abstract

Health status of population is a broader concept which encompasses longevity of life, absence of diseases and nutritional intake. Nutritional status of a person depends upon food consumption and not merely availability of food. Women nutrition occupies greater significance because of her role in child bearing and due to having central role in various household activities. In the present paper an attempt has been made to find out the nutritional status of women and extent of its socio-economic disparities in rural Haryana. The study is based on primary data collected through household survey from eight villages of eight districts in Haryana. A total of 620 women in 15-49 age groups from 487 households, selected by stratified random sampling method, have been surveyed. Nutritional status of women is measured by body mass index and their dietary intake in terms of consumption of milk and green vegetables. The analysis has been attempted in relation to socio-economic characteristics of the households. The paper also attempts to analyze various correlates of women nutrition.

Introduction

Women constitute almost half of the total population. Although adequate nutritional attainment is equally essential for men and women, yet its significance in the case of women is much more. In case of women health, the issues are more complex and its social roots are intricately linked with unequal power relations between men and women in different spaces including home, workplace and society. Women's nutrition is detrimental to her newborn survival and her capacity to nurse and nurture the child. Various studies have shown that poor health is largely associated with social factors such as poverty, hierarchical caste structure, inefficient health services and other inequities in the society (Banerji, 1982, 1986;

Qadeer, 1985). Likewise, Chatterjee (1990) highlighted that malnutrition is a serious health concern for Indian women and studied women's poor health in relation to education, low age at marriage, high fertility and poor reach to health facilities. The implications of women's malnutrition are multiple and cumulative; e.g. maternal malnutrition tends to increase the risk of maternal deaths (Jose and Navaneetham, 2008).

Successive national-level health surveys have shown that undernourishment is a major problem for Indian women in 15-49 age groups. The recent National Family Health Survey (NFHS) -III 2005-06, portrays that more than one-third (35.6 per cent) women are malnourished (IIPS, 2007). The situation is

worse in case of rural women, where 40.6 per cent are undernourished, with wide inter-state variations. It may also be noted that in economically developed state like Haryana one-third (31 per cent) women are thin i.e. having Body Mass Index (BMI) less than $18.5\text{kg}/\text{m}^2$ (IIPS 2007, p.88). Though lower than all India average, it is shockingly high from neighboring states of Punjab (18.9 per cent). In this context, it is interesting to study the correlates of women's nutrition in Haryana. It attempts to achieve the following objectives:

Objectives

- I. To assess the nutritional status of women in terms of body mass index and its spatial, social and economic dimensions.
- II. To study women nutrition in terms of dietary intake (i.e. consumption of milk and green vegetables) vis-à-vis socio-economic conditions of the households.
- III. To study the correlates of women's nutrition.

Database and Methodology

The paper is based on primary data collected from eight villages of Haryana during 2007-08. For this multi-stage sample design has been adopted. At the first stage, based on agricultural productivity (Sindhu, 2004), the districts of Haryana have been quartiled into four distinct agriculturally developed groups (Table 1). At the second stage, tahsils of each district were ranked on rural female literacy rate. At the third stage, from each district, two tahsils were chosen. The selection of tahsil was based on rural female literacy where one tahsil having highest rural female literacy rate and other having lowest literacy rate were selected. At the fourth stage, from these 8 tahsils, one village from each was selected randomly

considering these to be fairly homogeneous in socio-economic and cultural parameters in respective tahsils. In all eight villages (Fig.1) were chosen and 487 households were surveyed which were representative of socio-economic conditions of these villages. From these 487 households, a total of 620 women in 15-49 age-group were surveyed (excluding expectant mothers).

Women's health can be measured by various indicators but her nutritional levels are generally measured by two methods: (i) anthropometric measure i.e. body mass index, and (ii) food intake in terms of various micronutrients. The Body Mass Index (BMI) is defined as weight in kilograms divided by the height in metre square (kg/m^2). It is used to assess both thinness and obesity, and is helpful in detecting the risk of health and nutritional disorders. (Qamara et al. 1990; Rolland - Cachera, 1993; Rao, 1996; Reddy and Rao, 2000; Arnold et al., 2004).

In the present paper, nutrition is measured by two methods: the first is the measurement of Body Mass Index (BMI). It is measured as weight (kg.) per (m^2). BMI is classified as (i) those having less than $18.5\text{kg}/\text{m}^2$ (Thin) (ii) BMI 18.51 to $23.0\text{kg}/\text{m}^2$ (Normal) (iii) BMI above $23.0\text{kg}/\text{m}^2$ (Obese). The second measure of nutritional status of women is dietary intake. It may be noted that total diet comprise of consumption of whole range of cereals, protein, and fat. It is presumed that a large part of energy is derived from cereal consumption and food allocation in terms of cereals is there in each household. The consumption of non-cereal items like milk, green vegetables and fruits is also considered because, these food items are rich sources of calcium and other micronutrients which are crucial for women's nutrition and health.

Table 1
Haryana: Details of Sample Villages, Households and Respondents

| Agriculturally Developed Districts* | Districts* | Sample Districts | Sample Villages | Total Sample Household | Total Women Surveyed (15-49 years) |
|-------------------------------------|---|-----------------------|-----------------|------------------------|------------------------------------|
| Highly Developed | Fathabad, Yamunanagar, Kaithal, Karnal, Kurukshetra | Fathabad, Kurukshetra | Baliyala | 71 | 94 |
| | | | Nagla | 46 | 52 |
| Developed | Jind, Panipat, Sirsa, Ambala, Hisar | Jind, Ambala | Khardwal | 67 | 87 |
| | | | Rajookheri | 45 | 56 |
| Moderately Developed | Faridabad, Sonipat, Mahendergarh, Rewari, Gurgaon | Gurgaon, Rewari | Mhd. Pur Ter | 63 | 76 |
| | | | Juddi | 71 | 107 |
| Low Developed | Rohtak, Jhajjar, Bhiwani, Panchkula | Bhiwani, Jhajjar | Budhsaeli | 43 | 54 |
| | | | Dabodha khurd | 81 | 94 |
| Total | | | All 8 villages | 487 | 620 |

(*)Sindhu, Rajeev (2004): "Determinants of agricultural productivity: A household level study in agro ecological regions of Haryana". Unpublished Ph.D Thesis, submitted to Department of Geography Kurukshetra University, Kurukshetra.

I. Women's Nutritional Status Based on BMI

In the sample villages, BMIs of 620 women in the age-group of 15-49 years were measured. The statistics show that in general almost one-fourth of women were thin having BMI less than 18.5, while, almost 62 per cent women had normal body mass index (Table 2). The statistics presented in table clearly indicate

that in all categories of districts, a significant proportion of women were thin (undernourished). It may be noted that the proportion of thin women was 17.1 per cent in high agriculturally developed districts and 21 per cent in the villages located in agriculturally developed districts. In the other two categories of agriculturally moderately developed and low developed villages about 29 per cent females

Table 2
Haryana: Women's Body Mass Index by Different Categories of Households

| Categories | Thin (BMI-<=18.5) (Women %) | Normal (BMI-18.51-23.0) (Women %) | Obese (BMI-Above23.0) (Women %) | Total Women | Chi Test |
|---|-----------------------------------|---|---------------------------------------|----------------|--|
| Agriculturally Developed Districts | | | | | |
| Highly Developed | 17.1 | 59.0 | 23.9 | 146 | $\chi^2=24.4$ $df=6$ $n=620$ $p < 0.01$ |
| Developed | 21.0 | 64.3 | 14.7 | 143 | |
| Moderately Developed | 29.0 | 61.2 | 9.8 | 183 | |
| Low Developed | 28.5 | 63.6 | 8.1 | 148 | |
| Caste groups | | | | | |
| Upper Caste | 20.4 | 61.5 | 17.9 | 39 | $\chi^2=8.9$ $df=6$ $n=620$ $p = 0.18$ |
| Intermediary Caste | 21.7 | 62.2 | 16.2 | 339 | |
| Artisan Caste | 28.1 | 64.7 | 7.0 | 85 | |
| Lower Caste | 27.9 | 60.5 | 11.5 | 157 | |
| Educational Level of the Head of the Household | | | | | |
| Illiterate | 30.1 | 57.6 | 13.3 | 220 | $\chi^2=24.5$ $df= 10$ $n=620$ $p < 0.01$ |
| Below Primary | 27.5 | 53.4 | 19.0 | 58 | |
| Primary | 37.3 | 57.7 | 5.0 | 59 | |
| Middle | 17.8 | 69.6 | 12.6 | 79 | |
| Matric | 18.4 | 67.8 | 13.8 | 152 | |
| SS and above | 11.5 | 65.3 | 23.0 | 52 | |
| Economic groups | | | | | |
| Landless Labourers | 38.4 | 53.4 | 8.0 | 112 | $\chi^2=22.3$ $df=6$ $n=620$ $p < 0.05$ |
| Cultivators | 17.4 | 64.4 | 18.2 | 253 | |
| <i>Small farmers</i> | 20.4 | 65.4 | 14.2 | 191 | |
| <i>Large farmers</i> | 8.1 | 61.3 | 30.6 | 62 | |
| Services | 23.6 | 63.6 | 12.7 | 165 | |
| Self-employed | 26.7 | 62.2 | 11.1 | 90 | |
| Total | 24.2 | 61.9 | 13.9 | 620 | |

Source: Tabulated from household data, 2007-08.

were found undernourished (Table 2). The chi square value (24.4) is significant at .01 per cent level of significance, meaning thereby that women's BMI varies significantly across agriculturally developed and less developed districts. Across various social caste groups (Caste groups (Table 2) have been made by taking into account the local social hierarchy of each village. Sinha and Rajeshwari, 1994) it may be noted that though proportion of normal

stature does not show much variations but in case of lower and artisan caste groups, there is significant proportion of women which are having BMI less than normal. The difference is 8 per cent points in thinness when one compares upper and intermediary caste groups with artisan and lower caste groups (Table 2). National Family Health Survey of Haryana state of 2005-06 also shows that there is little variations in thinness of women across caste

groups, while its proportion is little higher among lower caste groups (36.4 per cent) classified as scheduled caste. (IIPS, 2007).

Women's BMI vis-à-vis educational status of the head of the household has also been presented in Table 2. It reveals that across various education levels, women malnutrition was 30 per cent among illiterate head of households while it was 27 per cent among below primary educated headmen. Among middle and matric educated head of households, almost 18 per cent females were reported to be thin while among senior secondary and above 11 per cent females were reported to be thin. Again the value of χ^2 is very high and suggests that BMI is significantly different across educational categories of head of households.

Across various economic groups it is found that almost 38 per cent women among landless labourers were having BMI less than normal. Among cultivators, this proportion is 17 per cent. When cultivators are further classified it is found that percentage of thin women among large farmers is reported to be very low (8 per cent) as compared to small farmers (20 per cent). Among services and self employed economic groups it is found that almost one-fourth of women were reported to be thin (Table 2). It suggests that women's nutrition has an association with economic status of the head of the household. The chi-square value of 22.3 being significant at 99.95 per cent level further support this observation. The findings of this analysis also fall in line with other studies on the same issue (Dhurandhar and Kulkarni, 1992; Reddy, 1998; and Shukla et.al. 2002). Even NFHS III for Haryana shows that half of the women (49.3 per cent) in lowest wealth index were malnourished compared to 17.2 per cent in highest wealth index (IIPS, 2007, p.89).

II. Women's Nutrition Status Based on Dietary Intake

A wide range of nutrients are essential to lead a healthy life. Proteins are one of the most important nutrients required by the body and should be available in adequate amount in the diet. Some foods contain high amount of protein and can be classified as protein rich foods. Milk also can be classified under this category if due allowance is made for large amount of water in it. (Gopalan, et al. 1993; NSSO, 2007). Similarly, leafy vegetables provide various other micronutrients essential for health.

Milk is an easily available source of nutrition in rural areas but its consumption pattern shows wide variations among the respondents. The intake of milk and green vegetables has been studied in terms of its daily, weekly and occasional consumption. It is surprising to find that only in two-third households, women consume milk daily. The spatial variations are there which shows that in highly developed districts, its consumption is 76 per cent while in moderately developed, it is 60 per cent (Table 3). Across various social caste groups, it is found that among upper caste and intermediary caste groups, women in more than 80 per cent households consume milk daily. Among artisan caste group women in almost 59 per cent households consumes milk daily while among lower caste groups its daily consumption is only among the 34 per cent respondents (Table 3).

Dietary intake has also been studied in relation to educational levels of the head of the household. The pattern as presented in Table 3 shows a clear cut association of women's milk consumption with the level of education of the head of the household. As the levels of education increases, there is an increase in the proportion of households where women consume milk daily. Across various economic

Table 3
Haryana: Frequency of Milk Consumption among Women by Household Categories
(Per cent households)

| Categories | Daily | Weekly | Occasionally | Never | Total Households | Chi Test |
|---|-------|--------|--------------|-------|------------------|---|
| Agriculturally Developed Districts | | | | | | |
| Highly Developed | 76.2 | 6.8 | 8.5 | 8.5 | 117 | $\chi^2=8.2$ $df=6$ $n=487$ $p=0.17$ |
| Developed | 67.9 | 6.3 | 16.9 | 8.9 | 112 | |
| Moderately Developed | 60.4 | 7.5 | 20.2 | 11.9 | 134 | |
| Low Developed | 64.5 | 7.2 | 18.5 | 5.8 | 124 | |
| Caste Groups | | | | | | |
| Upper Caste | 80.0 | 6.7 | 13.3 | Nil | 30 | $\chi^2=78.3$ $df=6$ $n=487$ $p<0.01$ |
| Intermediary Caste | 84.0 | 5.8 | 8.6 | 1.5 | 257 | |
| Artisan Caste | 59.4 | 4.3 | 23.2 | 13.0 | 69 | |
| Lower Caste | 34.3 | 10.7 | 28.2 | 26.7 | 131 | |
| Educational Level of the Head of the Household | | | | | | |
| Illiterate | 55.9 | 7.7 | 19.0 | 17.2 | 168 | $\chi^2=45.2$ $df=10$ $n=487$ $p<0.01$ |
| Below Primary | 50.0 | 7.1 | 21.4 | 21.4 | 14 | |
| Primary | 52.6 | 10.5 | 21.1 | 15.8 | 76 | |
| Middle | 71.6 | 7.5 | 16.4 | 4.5 | 67 | |
| Matric | 82.0 | 4.3 | 12.8 | 0.8 | 117 | |
| SS and above | 91.1 | 4.4 | 4.4 | Nil | 45 | |
| Economic groups | | | | | | |
| Landless labourers | 38.0 | 13.0 | 26.2 | 22.8 | 92 | $\chi^2=73.4$ $df=6$ $n=487$ $p<0.01$ |
| Cultivators | 86.4 | 5.1 | 8.5 | Nil | 177 | |
| <i>Small farmers</i> | 82.9 | 6.5 | 10.6 | Nil | 141 | |
| <i>Large farmers</i> | 100.0 | Nil | Nil | Nil | 36 | |
| Services | 68.3 | 5.0 | 16.5 | 10.2 | 139 | |
| Self-employed | 54.4 | 7.6 | 21.5 | 16.5 | 79 | |
| Total | 66.9 | 6.9 | 16.3 | 9.9 | 487 | |

Source: Tabulated from household data, 2007-08

groups, it is found that women of 38 per cent landless labourer's households consume milk daily. Among cultivators, it was found that women in almost 86 per cent household intake milk daily. Further, it can be seen that among small farmers women in almost 83 per cent

households intake milk daily while among large farmers women in 100 per cent households do so (Table 3).

Green vegetables are the rich source of micronutrients, therefore, their consumption helps in improving women health and

nutritional status. Consumption of green vegetables does not show any pattern with agriculture development categories. It may also be noted that on an average, women of only in 40 per cent households consume green vegetables daily which is very low as far as the requirement and consumption of micro-nutrients is concerned. Among the households of various caste groups, it is found that among upper caste and intermediary caste group women in almost half of the households take green vegetables daily while among lower caste, vegetables consumption among the women is reduced to only 20 per cent household (Table 4).

Data of frequency of green vegetables intake vis-a-vis the education level of the head of the household show that among illiterate households, 32 per cent households were such where green vegetables form a part of women's diet daily. This percentage increases as there is increase in level of education of the head of household meaning thereby that education has a role in dietary intake of women. Across the households of various economic groups, it is found that women of only 12 per cent landless labourer's households consume vegetables daily. Among cultivators and services economic groups women among half of the total households intake milk daily. The data show that daily intake of green vegetables by women reported to be high among large farmers households while it is very low among the women of landless labour households (Table 4).

Correlates of Women's Health

In the present paper correlates of women nutrition and health has been studied with the help of 20 variables applying Spearman's rank correlation. BMI has been taken as dependent variable and 19 other variables as explanatory variables. The BMI of all 620 women were

ranked where by women with standard BMI (within the range of 18.5 to 23.0) were given the 1 rank, less than 18.5 rank 2, and obese is ranked as 0.5. Obesity was not given higher rank, because this is also a form of malnutrition. However, it may be noted that obesity was very low in the sample population. Similarly, all explanatory variables were defined, e.g. for the variable of house type *Pucca* was given 1 rank, mixed ranked as 2 and *kuccha* as 3. All the 19 variables were ranked in similar fashion and rank correlation was attempted. These variables are:

X1 = Body Mass Index

X2 = Women educational levels

X3 = Caste groups

X4 = Exposure to mass media

X5 = Availability of milch cattle in the household

X6 = Daily consumption of milk

X7 = Safe fuel

X8 = Safe drinking water

X9 = Availability of toilet in households

X10 = Safe garbage disposal

X11 = Water disposal

X12 = Ventilation conditions

X13 = Separate kitchen

X14 = Separate animal space (a proxy of hygiene)

X15 = House type

X16 = Family type and

X17 = Main occupation of the head of household (a proxy of economic status)

The facts behind selecting these variables are:

1. Economic Status: The conventional wisdom is that malnutrition is largely a reflection of poverty. Until recently, most analysts and policy makers believed that increasing the income of the household was the most effective way to improve the health and nutrition status. Some other studies however argue that it is the allocation of food/resources

Table 4
Haryana: Frequency of Green Vegetable Consumption among
Women by Household Categories (Women in Per cent).

| Categories | Daily | Weekly | Occasionally | Never | Total Households | Chi Test |
|---|-------|--------|--------------|-------|------------------|---|
| Agriculturally Developed Districts | | | | | | |
| Highly Developed | 57.2 | 37.6 | 5.1 | 0.8 | 117 | $\chi^2=32.7$ $df=6$ $n=487$ $p < 0.01$ |
| Developed | 36.6 | 58.9 | 4.5 | Nil | 112 | |
| Moderately Developed | 27.6 | 57.6 | 11.9 | 2.9 | 134 | |
| Low Developed | 40.3 | 52.4 | 6.4 | 0.8 | 124 | |
| Caste groups | | | | | | |
| Upper Caste | 46.7 | 45.3 | 10.0 | Nil | 30 | $\chi^2=35.2$ $df=6$ $n=487$ $p < 0.01$ |
| Intermediary Caste | 49.4 | 45.1 | 5.0 | 0.39 | 257 | |
| Artisan Caste | 39.1 | 55.1 | 4.3 | 1.4 | 69 | |
| Lower Caste | 20.6 | 64.1 | 12.2 | 3.1 | 131 | |
| Educational Level of the Head of the Household | | | | | | |
| Illiterate | 32.1 | 55.3 | 9.5 | 2.9 | 168 | $\chi^2=49.8$ $df=10$ $n=487$ $p < 0.01$ |
| Below Primary | 14.3 | 85.7 | Nil | Nil | 14 | |
| Primary | 34.2 | 52.6 | 11.8 | 1.3 | 76 | |
| Middle | 29.8 | 68.6 | 1.5 | Nil | 67 | |
| Matric | 51.3 | 43.6 | 5.1 | | 117 | |
| SS and above | 73.3 | 20.0 | 6.7 | Nil | 45 | |
| Economic groups | | | | | | |
| Landless labourers | 11.9 | 70.6 | 13.0 | 4.4 | 92 | $\chi^2=53.5$ $df=10$ $n=487$ $p < 0.01$ |
| Cultivators | 48.0 | 48.6 | 3.4 | Nil | 177 | |
| <i>Small farmers</i> | 37.6 | 58.1 | 4.2 | Nil | 141 | |
| <i>Large farmers</i> | 88.9 | 11.1 | Nil | Nil | 36 | |
| Services | 50.3 | 39.6 | 10.1 | Nil | 139 | |
| Self-employed | 36.7 | 56.9 | 3.8 | 2.5 | 79 | |
| Total | 40.0 | 51.5 | 7.2 | 1.2 | 487 | |

within household that affects women's health rather than total income of the household. Studies have shown that women health in terms of body mass index (BMI) were lower among landless agricultural labourers than other economic groups (Naidu and Rao, 1994).

Hence, in the present paper, economic status of the household has been correlated with

women's nutrition. The proxy of household income here is taken as the main occupation of the head of household, where landless agricultural labourers are at the lowest rung. The large farmers have been kept at the highest level of economic status along with the households having assured income through services.

2. Variables of Living Conditions: Women's health gets affected adversely due to unhealthy living conditions which include unsafe fuel, less living space in terms of less number of rooms, lack of separate kitchen and animal space in the house, unhygienic conditions and lack of ventilation. Various diseases such as bronchitis, asthma, tuberculosis (TB) and chest infection are caused among women due to unsafe fuel. Similarly, lack of space in the house also affects women health adversely due to indoor air pollution. Many studies observed that cooking fuels in the rural areas of India are predominantly unprocessed bio-fuels, such as fuel-wood, crop residues and animal dung (Barnes and Sen, 2000). The use of these bio-fuels causes much hardships in terms of diseases and work associated in collecting these type of fuels (Parikh and Vijay Laxmi, 2000). Cooking with traditional methods without proper ventilation has adverse impact on human health. Hence, the correlation of BMI with variables of living conditions has been calculated.

3. Household Conditions: People in poor housing suffer so many deprivations that assessment of any one risk is almost impossible. Nonetheless, studies indicate that poor living conditions will lead to poor health of the rural population. Respiratory diseases are mainly due to unfavourable and poor housing and living conditions. It is also revealed that many respiratory diseases such as bronchitis, asthma, T.B may be attributed to poor housing conditions with poor ventilation which increases indoor pollution and poor sanitary conditions. (Choudhary and Thatte, 2003).

4. Social Caste Groups: Social status in terms of caste affiliations which suggests that certain privileges to certain sections of society also affect the health of population or members of

households to which they belong. Studies indicated that women from lower castes and other backward castes reported a higher prevalence of poor health than the women of upper castes (Mohindra et al., 2006, Subramanian and Smith, 2006).

5. Women's Education: Education is an important parameter which reflects women's health as female literacy status is related to fertility, mortality and access to health care (Murthi *et al.*, 1995). Studies revealed that low level of literacy among females is the basic cause of poor women's health and it is found that education improves the status of women, increases her age at marriage and utilization of maternal wealth is more among educated females (Rahman, 2007)

6. Exposure to Mass Media: It is generally considered that women who are exposed to mass media have better health status. Studies revealed that women who are generally exposed to mass media have more knowledge about the use of prenatal services (Ghosh, 2006). It helps in promoting institutional deliveries, reducing fertility rate, utilization of maternal and child health care services and increases awareness about the use of oral dehydration therapy for their children (Rao et al., 1998).

7. Availability of Sanitation Facilities: Researchers have reported that the basic causes of under nutrition and infection in developing countries are poverty and poor hygienic conditions (WHO, 1990). The total burden of diseases can be attributed to domestic environmental problems including crowding, lack of sanitation and drinking water, garbage disposal and indoor air pollution. Poor domestic environment leads to poor women health. Studies revealed that parasitic and

Table 5
Correlates of Women Nutrition (Correlation Matrix)

| | X1 | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | X10 | X11 | X | X13 | X14 | X15 | X16 | X17 | X18 |
|-----|----|------|--------|--------|--------|---------|---------|--------|---------|--------|--------|--------|--------|---------|---------|---------|---------|--------|
| X1 | 1 | .077 | .093* | .157** | .064 | .220*** | .222*** | .030 | .227*** | .219** | .190** | .249** | .241** | .189** | .183 | .005 | .165** | .247** |
| X2 | | 1 | .198** | .621** | .014 | .341*** | .180** | -.050 | .278** | .060 | .314** | .281** | .229** | .323** | 0.333** | -.1.6** | .220** | .172** |
| X3 | | | 1 | .162** | .162** | .133** | .340** | -.006* | .181** | .003* | .255** | .242** | .313** | .301** | .413** | -.159** | .580** | .615** |
| X4 | | | | 1 | -.012 | .252*** | .153** | .033 | .199** | .023 | .223** | .267** | .189** | .245** | .306** | -.004 | .187** | .198** |
| X5 | | | | | 1 | .297** | .136 | -.171 | .074 | .083 | .151** | .168** | .187** | .213** | .154** | -.102** | .350** | .393** |
| X6 | | | | | | 1 | .241** | -.059 | .308** | .134** | .300** | .246** | .241** | .360** | .365** | -.110** | .373** | .427** |
| X7 | | | | | | | 1 | .117 | .206** | .138** | .193** | .238** | .325** | .268** | .353** | .093** | .270** | .321** |
| X8 | | | | | | | | 1 | .018 | .012 | -.081 | -.052 | -.076 | -.150** | -.054 | .124** | -.143** | -.075 |
| X9 | | | | | | | | | 1 | .141** | .222** | .427** | .219** | .240** | .381** | -.016 | .241** | .172** |
| X10 | | | | | | | | | | 1 | .074 | .193** | .193** | .150** | .100* | -.0155 | .138** | .138** |
| X11 | | | | | | | | | | | 1 | .343** | .268** | .365** | .264** | -.102** | .277** | .236** |
| X12 | | | | | | | | | | | | 1 | .373** | .393** | .368** | -.097* | .322** | .267** |
| X13 | | | | | | | | | | | | | 1 | .216** | .313** | -.108** | .308** | .283** |
| X14 | | | | | | | | | | | | | | 1 | .427** | -.101* | .292** | .293** |
| X15 | | | | | | | | | | | | | | | 1 | -.178** | .396** | .378** |
| X16 | | | | | | | | | | | | | | | | 1 | .175** | .131** |
| X17 | | | | | | | | | | | | | | | | | 1 | .602** |
| X18 | | | | | | | | | | | | | | | | | | 1 |

* Correlation is significant at the 0.05 level (two-tailed)
** Correlation is significant at the 0.01 level (two-tailed)

infectious diseases causing poor health are due to lack of toilet facilities and improper storing of garbage in the households (Rajeshwari, 2010). Many diseases can be eradicated by providing cleanliness. Satyamala (1989) noted that the availability of adequate amount of safe drinking water can reduce the cases of poliomyelitis.

In this context, the correlation matrix of BMI and above specified variables has been presented in Table 5. It shows that BMI has strong positive association with economic status of the household. Similarly, exposure to print media, daily consumption of milk, and sanitation facility (availability of toilets in households) show positive association with women's health. With these variables, BMI of women is significant at .01 level of significance. It may also be noted that BMI has a positive association with women's education but the association is very weak.

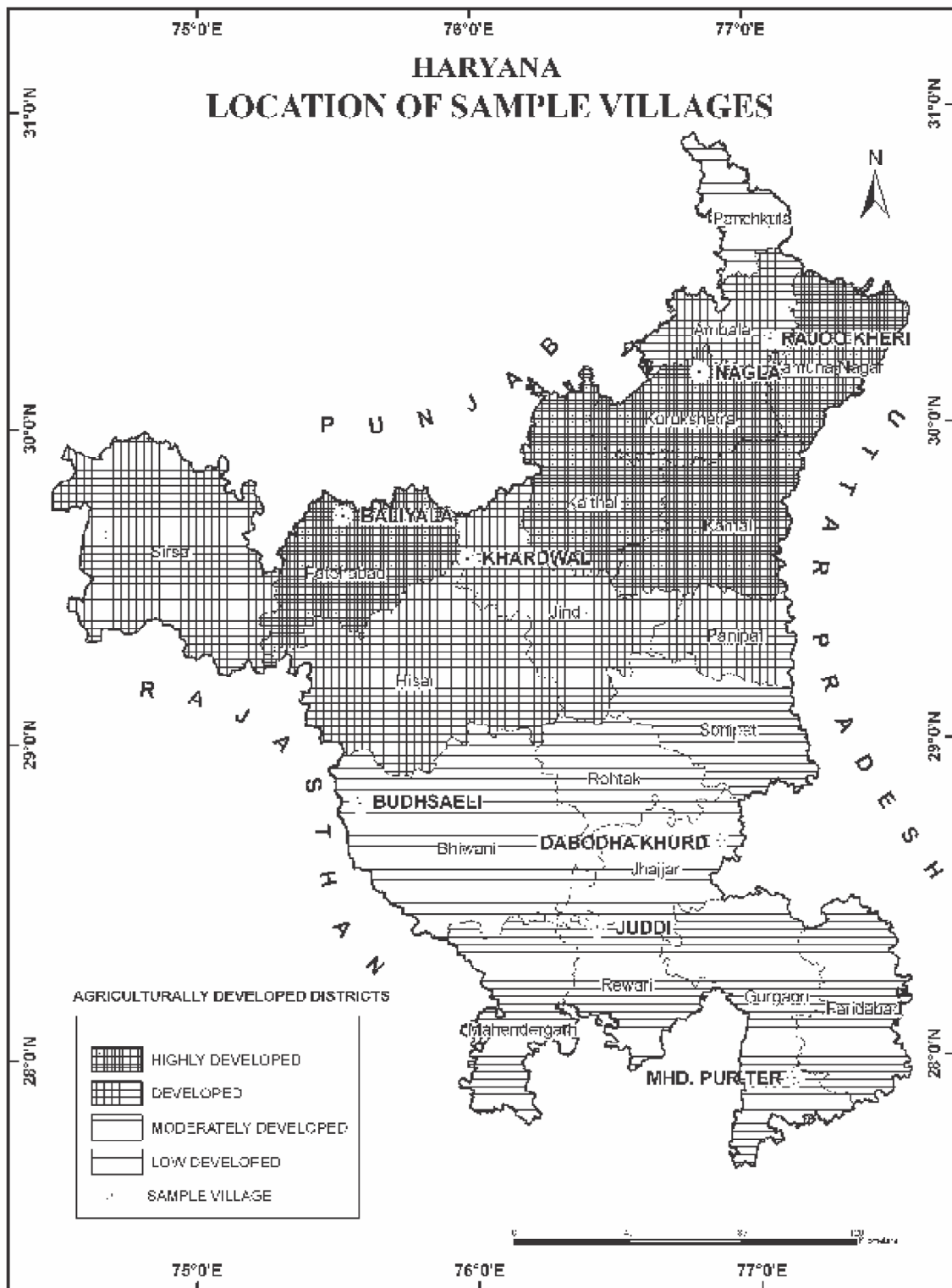
Availability of milch cattle in the household does not make much difference in women nutritional standards though it is positively associated but statistically insignificant. The reason for this is the fact that mere keeping of milch animal does not ensure its milk consumption. The fact is that in marginal and small cultivator households, milch cattle are being reared in the household for additional and as an alternate source of income. Hence, availability of milch cattle does not indicate significant relation with women nutritional status. However, daily consumption of milk (X6) shows an association with BMI.

The practice of safe fuel does show a positive and significant association with women health status (BMI). It may be noted that safe drinking water and BMI have positive correlation, but statistically it is not significant. House type which means pucca, mixed or kucha house are positively associated with women body mass index but statistically, this

relationship is insignificant. Family type has negative correlation with women body mass index. It indicates towards the fact that women who live in joint families had better nutritional status, which might be due to better resources in joint families as compared to nuclear ones in rural settings. The same may be different in urban setting which need further probe.

Conclusion

The study shows that in rural Haryana malnutrition among females in terms of thinness of body is an area of concern rather than obesity. Further, it is all pervasive means prevalent in all villages with little variations. The pattern of body mass index of women shows its association with agricultural productivity and also in relation to education and economic conditions of the households. It may be noted that it is indifferent to caste status. The analysis on consumption of milk and green vegetables shows while daily consumption of milk is in 67 per cent households, the consumption of leafy vegetables is far less (40 per cent) Table 4. It shows wide spatial and socio-economic disparity. Women residing in 26 per cent households either does not take milk or take it occasionally, which reflect their poor care in meeting daily body requirement. The situation is more alarming in landless labourer households where whooping 50 per cent women consumed it occasionally. Similar is the situation among artisan and lower caste household women. The intake of green vegetable among women is also low in Haryana. Its intake is more frequent in a week rather than on daily basis. The analysis on correlates of women health suggest that economic status and better awareness i.e. exposure to print media, use of safe fuel and sanitation facility at home etc have a role in explaining health status of women in Haryana.



Source: Sindhu, Rajeev (2004): "Determinants of agricultural productivity: A household level study in agro ecological regions of Haryana. An unpublished thesis submitted to Department of Geography Kurukshetra University, Kurukshetra.

(Fig. 1)

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