Nutritional Status among the Khasi Women of Saiden Village, Meghalaya

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ABSTRACT: Malnutrition is a major public health and economic problem of global significance. Good nutrition with an adequate, well balanced diet combined with regular physical activity is a corner stone of good health. Prevalence rates of either obesity or underweight are increasing in all parts of the world, both in affluent western countries and in poor nations. The data for the present study was collected from 157 Khasi females from Saiden village of Megahlaya aged between 14 to 60 years through random sampling method. The result shows that the frequency of overweight / obese (30.09%) was higher among the adult females. However, the frequency of underweight (29.54%) was higher among adolescent. The frequency of 15.04% underweight was found among adults females. The frequency of underweight among lower income group, middle income group and high income group was 20.27 per cent, 25.53 per cent 8.33 per cent respectively. It is observed that family income has a positive relationship with the prevalence of overweight / obese among the adult females. The study further indicates that lifestyle and physical activity are crucial in determining the nutritional status of the community.

INTRODUCTION

Nutritional status of the people is mainly influenced by the food they intake regularly. Taking improper amount of food results in malnutrition which ultimately affects physical well-being of people (Ahmed and Siwar, 2013). Good nutrition with an adequate, well balanced diet combined with regular physical activity is a corner stone of good health. Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development and reduced productivity (WHO, 2010). The term malnutrition refers to deficiency, excesses or imbalance intake of energy, protein and or other nutrients. It includes both under nutrition and over nutrition. Under nutrition results from insufficient dietary energy requirement, poor absorption and or poor biological use of nutrients consumed. On the other hand, over nutrition results from excessive dietary energy intake. Intake of a diet sufficient to meet or exceed the needs of the individual will keep the composition and function of the individuals within the normal range. When this equilibrium is disturbed, then loss of body tissue ensues. The lack of nutrients produce a series of metabolic change in relation to energy and protein metabolism within hours or day of reducing nutrients intake long before demonstrable anthropometric changes (Jeejeebhoy,'87). Malnutrition is a major public health and economic problem of global significance. Prevalence rates of either obesity or underweight are increasing in all parts of the world, both in affluent western countries and in poor nations. Men, women and children in different age groups are affected with the problem of over nutrition and under nutrition. Indeed, overweight,

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obesity and health problems associated with them are now so common that they are replacing the more traditional public health concerns. In 1995, the adult mortality attributable to over nutrition was estimated to be about 1 million, double the 0.5 million attributable to under nutrition (Bjorntorp, 2001). Several studies indicated that women with a body mass index below normal show a progressive increase in mortality rates as well as increased risk of illness. Women of the reproductive age are amongst the most vulnerable to malnutrition (Grima and Genebo, 2002).

Rates of overweight continue to rise across all regions. The increasing problems of overweight and obesity are occurring throughout the world effecting all ages. Health professionals around the world are concerned and trying to figure out why the problems of obesity are increasing (Stettler and Shelly, 2006). Normal and healthy food are best for the human body. The main link between our eating habits and obesity is how much food we eat. Earlier, when people were farmers or hunter gatherers, they didn't have easy access to food and so people eat small portions and few meals a day. However, within increasing modernization, urbanization and rapid socioeconomic development, it becomes easier to get food, and people began eating more meals a day and bigger portions (UNICEF, 2013). Generally, at household level, cultural norms and practices and socio-economic factors determines the extent of nutritional status (Rao, 2010). A study of DHS survey conducted in developing countries shows that women from low economic status households were most affected by malnutrition (Grima and Genebo, 2002). A lack of nutritional knowledge can also lead to misconceptions about food and negative food traditions that are passed on from generation to generation (Lange, 2010). The problem related to nutrition has serious public health significance impacting psychological, physical development, behavioral and work performance of pregnant women. Nutritional problems may be caused not only by deficiency of protein, calorie, iron, vitamin, but by other condition like malaria, worm infestation, adverse environmental and socio-demographic factor (Madhui and Singh, 2011).

MATERIALS AND METHODS

This study was conducted in Saiden village, Ri-Bhoi district of Meghalaya. Saiden village consists of mixed population but major dominant community are Khasi which follows the traditional governing system. The village governed by the headman, who is elected by the villagers. They enjoyed autonomy in organization and management of their own affairs and have exercised collective control over their natural and human resources. The collective control is exercised by the council of elders of the village called the village council or dorbar *shnong* (Lapang, 2010). Each village has its own dorbar. Christianity is the dominant religion followed by the majority of the population and important festival of the village is *Niangtaser* festival which is an insect that particularly emerge every after four-year. The main focus of this festival is to make people aware of the important for preservation of environment, forests and animals. Socio economic condition of the villagers of the of the study area depend on the agricultural activities, like cultivation of cash crops, broom plants, pineapple. Some are also engaged in poultry farming, waged laborer, carpenter, and shopkeeper. Some of them are well placed in government jobs. "The principle defining element in Khasi society is their matrilineality and democratic system in organizing their *Syeimship* and choosing their *Syiems*.

The data was collected from 157 Khasi females aged between 14 to 60 years through random sampling method following a house to house visit. The subjects were divided as adolescents (14-19 years) and adults (20+years). An anthropometric rod and a weighing scale to the nearest of 0.1 cm and 0.5 kg respectively was used to measure height and weight with subjects wearing light clothes following the standard technique of Lohman *et al.* ('98). Prevalence of overweight/obesity has been evaluated using Asian cut-off points (WHO, 2000). According to Asian cut-off points, BMI $\geq 27.5 kg/m^2$ has been considered as obese, BMI between 23.5-27.4 kg/m^2, considered as overweight, BMI between 18.5-23.4kg/m^2 indicates normal and BMI below 18.5kg/m^2 considered as underweight. Data on various socio-economic conditions like family income, education, occupation, etc were collected from subject or head of the household. Data

on physical activity and food habits were also collected from each subject. The per capita monthly income of the households was classified as follows:

Above 75th percentile (> ₹ 5000) = High income group (HIG)

50th to 75th percentile (₹ 2100-5000) = Middle income group (MIG)

Below 50th percentile (< ₹ 21000) = Low income group (LIG)

Data on educational attainment of individuals were classified into four categories, namely, primary, secondary, higher secondary and graduate and above. Data on occupation of each subject were classified into five categories such as government employee, private, student and housewife. Information on physical activity, television watching and food habits were collected from each subject following a recalled method of one week period. The data on television time and physical activity were divided into two categories: less than or equal to one hour and two hours and above. Data on food habits, especially non-vegetables intake were divided into one-two times a week, three-four times a week and five times and above. The data was analysed using MS-Excel software. The parameters taken were analysed statistically to find out the mean and standard error for the anthropometric measurements. In order to test the level of significance, both t-test and chi-square have been used in this study.

RESULTS

Table1 shows basic data on mean height, weight and BMI with standard deviation of Khasi females of Saiden village. The table shows that mean height (150.68±4.45) was found higher among adults. The mean height (147.57±6.68) was found among adolescents. The differences were statistically significant (p<0.05). Similarly, the mean weight (49.29±8.13) was found higher among adult females than adolescent girls (42.56±5.05). The differences in the mean weight were significant (t = p<0.05). The same result was also found for BMI. The mean BMI value was higher among adult females (21.71±3.49)

than adolescent girls (19.49±1.64). The distributions of mean BMI in different age-groups were statistically significant (p<0.05).

TABLE 1

Basic data on mean height, weight and BMI among adolescents and adult Khasi females of Saiden village

Age-groups Years	No. 44 113	Mean Height (cm) ± SD	Mean weight (kg) ±SD	Mean BMI ±SD
14-19		147.57±6.68	42.56±5.05	19.49±1.64
20+		150.68±4.45	49.29±8.13	21.71±3.49
		t=2.85 df =57 p<0.05	t=6.17 df=120 p<0.05	t=3.33 df=146 p<0.5

The Table 2 shows the nutritional status among adolescents and adult Khasi females of Saiden village. The table shows that the frequency of overweight/obese (30.09%) was higher among the adult females. However, the frequency of underweight (29.54%) was higher among adolescent. The frequency of underweight (15.04%) was found among adults females. The differences in the distributions of different BMI values in different age groups were statistically significant (χ^2=18.023; df=2; p<0.05).

TABLE 2

Distribution of different BMI values among adolescents and adult Khasi females of Saiden village

Age -groups	No.	Underweight	Normal	Overweight /obese
14-19	44	13(29.54%)*	31(70.46%)	–
20+	113	17(15.04%)	62(54.87%)	34(30.09%)

χ^2=18.023; df= 2; p<0.05;

* Figures in parenthesis indicate percentage

The higher frequency of overweight/obesity (41.67%) was found among higher income group (see Table 3). This was followed by frequency of overweight/obesity among middle income group (19.15%) and lower income group (13.52%). The frequency of underweight among lower income group, middle income group and high income group was 20.27 per cent, 25.53 per cent 8.33 per cent respectively. The differences in the distribution of BMI values in relation with income were statistically significant (χ^2=13.56; df=4; p<0.05).

TABLE 3

Distribution of different BMI values in relation with income group among Khasi females of Saiden village

Income group	No.	Underweight	Normal	Overweight/ obese
Lower income	74	15 (20.27)*	49 (66.21)	10 (13.52)
Middle income	47	12 (25.53)	26 (55.32)	09 (19.15)
High income	36	03 (8.33)	18 (50.00)	15 (41.67)

χ^2= 13.56; df= 4; p <0.05;

*Figures in parenthesis indicate percentage

The distributions of overweight/obese and underweight in relation with educational levels among Khasi females of Saiden village are given in Table 4. The table shows that the frequency of overweight/ obesity 28.12 per cent was found higher among females who attained graduate and above level of education. Whereas, the frequency of overweight/ obesity 20.83 per cent, 21.74 per cent and 15.62 per cent was found among primary, secondary and higher secondary level of education. However, the frequency of underweight 25.00 per cent was found higher among primary level of education. The frequency of underweight 21.74 per cent, 18.75 per cent and 9.37 per cent was found among secondary, higher secondary and graduate and above level of education respectively.

TABLE 4

Distribution of BMI values in relation with educational levels among Khasi females of Saiden village

Education	No.	Underweight	Normal	Overweight / obese
Primary	24	6(25.00)*	13(54.17)	5(20.83)
Secondary	69	15(21.74)	39(56.52)	15(21.74)
Higher Secondary	32	6(18.75)	21(65.62)	5(15.62)
Graduate+	32	3(9.37)	20(62.50)	9(28.12)

χ^2=12.68,df=6,p<0.0;

*Figures in parenthesis indicate percentage

Table 5 shows the distribution of BMI values in relation with occupation among adult females. The frequency of overweight/obesity was found higher among the government employee (50.00%) followed by housewife (31.25%), private employee (12.50%) and students (1.49%). The frequency of underweight 25.00 per cent was observed higher among house wife. The frequency of underweight among student and government employee was 22.39 per cent and 8.82

per cent respectively. The differences in the distribution were statistically significant ($\div^2$=40.755; df= 6; p<0.05).

TABLE 5

Distribution of BMI values in relation with occupation among Khasi females of Saiden village

Occupation	No.	Underweight	Normal	Overweight/ obese
Student	67	15(22.39)*	51(76.12)	1(1.49)
Govt. employee	34	3(8.82)	14(41.17)	17(50.00)
House wife	48	12(25.00)	21(43.75)	15(31.25)
Private	8	–	7(87.50)	1(12.50)

χ^2=40.755; df= 6; p<0.05;

*Figures in parenthesis indicate percentage

Table 6 shows that the frequency of overweight 30.86 percent was higher among those who spent one hour and below on television watching than two hours and above (11.84%). The frequency of underweight among females who spent two hours on television watching was 19.74 per cent whereas it was 18.52 per cent among those who spent one hour and below on watching television.

TABLE 6

Overall distribution of BMI values in relation with television watching among Khasi females of Saiden village

Television watching time per day	N0.	Underweight	Normal	Overweight /obese
≤1hrs.	81	15 (18.52)*	41 -50.62	25 -30.86
2+hrs.	76	15 -19.74	52 -68.42	9 -11.84

χ^2= 8.68; df=2; p<0.05;

*Figures in parenthesis indicate percentage

The frequency of overweight/obesity frequency 27.42 per cent was found higher among females who exercised for one hour and below.

TABLE 7

Distribution of different BMI values in relation with physical activity among females of Saiden village

Physical activity per week	No.	Underweight	Normal	Overweight /obese
≤1hr.	124	22(17.17)*	68(54.84)	34(27.42)
2+hrs.	33	8(22.24)	25(75.75)	–

$\chi^2$11.55; df=2; p<0.05;

*Figures in parenthesis indicate percentage

The frequency of underweight among females who exercised for two hours and above was 22.24 per cent. This was higher than those who exercised one hour and below (17.17%).

Study on nutritional status in relation with the intake of non-vegetables shows that the higher frequency of overweight/obesity 31.70 per cent was found among females who eat non-vegetables over five times a week (see Table 8). The frequency of overweight/obese 18.31 per cent and 17.78 per cent was found more or less the same among females who eat non-vegetables between three to four times and between one to two times. The frequencies of underweight 35.55 per cent, 14.08 per cent and 9.76 per cent were reported among women who eat non-vegetables between one to two times, three to four times and over five times respectively.

TABLE 8

Distribution of different BMI values in relation with non-vegetables food intake among Khasi females of Saiden village

Non-vegemtables per week	No.	Underweight	Normal	Overweight /obese
1-2 times	45	16 (35.55)*	21 (46.67)	8 (17.78)
3-4 times	71	10 (14.08)	48 (67.6)	13 (18.31)
5+ times	41	4 (9.76)	24 (58.54)	13 (31.70)

χ^2=13.82 df=4, p<0.05;

*Figures in parenthesis indicate percentage

DISCUSSION

The Khasi society is matrilineal, and women play a major role in the work force in this tribal community. The health and nutrition of the entire family rests on their shoulders as tribal women make all decisions related to family nutrition. For this purpose, it is essential to know about the existing food habits, beliefs, and trends that contribute to the nutrition and health of these women. The present research provides the socio economic factors influences on nutritional status among the Khasi women of Saiden village, Ri-Bhoi district of Meghalaya. The mean height, mean weight and mean BMI values are found higher among the adult females. The study further indicates that the adult females show the higher frequency of overweight/obese. However, the prevalence of underweight is significantly higher among the adolescent. People of low socioeconomic status are most vulnerable to insecurity since purchasing power serves as a main determinant of the ability to afford nutritional food sources. Households which cannot attain nutritious foods due to income poverty are most associated with the inadequate diet and diseases leading to malnutrition (Black *et al*., 2008).

The prevalence of overweight/obesity is significantly higher among the higher income family. The study further indicates that the frequency of overweight/obesity tends to increase with increasing level of income. However, the prevalence of underweight shows fluctuation in the different income levels. Higher income family can afford and get easy access to food, better lifestyles and better health facilities as compared to the lower income family. Overweight was more prevalent in urban and high socio-economic status groups (Wang *et al.*, 2009). The frequency of overweight/obesity was found significantly higher among the higher educated females. Mother's education is closely linked to the nutritional status of children. Children of non educated mothers were more likely to be underweight than those of secondary educated mothers which are consistent with numerous studies, showing the importance of maternal education for child health and nutrition (Grima and Genebo, 2002). The frequency of underweight is recorded higher among the primary level of education. The prevalence of underweight was seen to decrease with increasing level of education. The higher educated people spent more of their time on reading, writing, and in front of computer, which is more of a sedentary lifestyle. They are also more aware about good nutrition and better health care. Maternal education had a significant influence on the nutritional status. Several studies indicate that malnutrition is a serious health concern that the Indian women face (Chatterjee,'90).

The distribution of overweight/obesity is higher among the government employees followed by housewives. A study by Ulijaszek and Lofink (2006) shows that people who work in the farm had low BMI values as compared to those who work elsewhere. The higher frequency of overweight is found among the Khasi females, who spent fewer hours on television. The prevalence of underweight is found slightly

higher among women spending more hours on television. Television viewing may not only facilitate low energy expenditure but also increases the energy intake and hence may play an important role in the current obesity epidemic (Bowman, 2006). The prevalence of overweight/obesity increases with decreasing the level of physical activity. Sedentary life style is the cause of lower physical activity and for this there is a less chance for body movement which may result in the deposition of extra energy as a fatty acid in adipose tissues. Many studies have investigated the role of low physical activity, and have found that it is one of the causes of increasing prevalence of obesity (Jeffery *et al.*,'91). Regular physical activity reduces risks of health problems and provides therapeutic benefits for people suffering from heart attack and it also help to control weight (CDC, 2008).

Most of the families in the study population were non-vegetarian. The frequent consumption of non-vegetables is positively associated with increasing prevalence of overweight/obesity. In recent studies, it has been found that females who take non-vegetable foods more than two days a week tend to be overweight or obese because of accumulation of fatty acid in their adipose tissues (Rautiainen *et al.*, 2015). The frequency of underweight was seen to increase with reduction in the consumption of non-vegetables per week. Therefore, the study indicates that those who consume more non-vegetable food are more associated with overweight/obese compared to those who consume less non-vegetable foods. Unhealthy dietary intake may inverse the risk of nutrient inadequacy and weight gain among nutritionally vulnerable Indian adolescents (Rathi *et al.*, 2017).

CONCLUSION

This study provides the prevalence of nutritional status among the adolescent and adult females of Saiden village, Ri- Bhoi district of Meghalaya. It is observed that family income has a positive relationship with prevalence of overweight /obese among the adult females. The study further indicates that lifestyle and physical activity are crucial in determining the nutritional status of the community. The consumption of non vegetables was seen to be one of the important factors that determine the nutritional status of the

adolescent and adult females. The present finding reveals that the prevalence of underweight and overweight is not an uncommon issue and further studies are required in this regard. The effort should be initiated to generate more awareness and to give proper knowledge of all socio-economic forces which affect the well being or nutritional status of the individual as well as whole population. There is also a need for proper nutritional education for those who do not have any basic knowledge about the dietary routine or about nutritional education.

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