Relationship Between Under Nutrition, Obesity and Chronic Diseases among Two Rural Caste Populations of Lakhimpur District, Assam

***Jyoti Hazarika**
****Dr. S. Sengupta**

Abstract

The objective of the present study is to assess the relationship between nutritional status and chronic diseases among the adult females of two rural caste population of Lakhimpur District, Assam. A total of 311 (Kaibarta = 211 and Koch = 100) women belonging to 18-60 years of age were selected for purpose. Four anthropometric measurements like height, weight, waist circumference, and hip circumference were taken from each subject and two indices - Body Mass Index and Waist Hip Ratio were calculated to evaluate the nutritional status of the subjects. The study demonstrated that Kaibarta women were found to be more under nourished than Koch women. Obesity among them is conspicuous by their absence, while only one obese female is recorded among the Koch. The incidence of under nutrition although quite high; however, the risk of overweight and obesity is also emerging. Consequently, the double burden of under and over nutrition exerts its impact on the health status in the populations under study.

Key words : Under nutrition, Obesity, Chronic disease, Body mass index, Waist hip ratio, Kaibarta, Koch, Assam.

Introduction :

Under nutrition is an outcome of numerous factors, including insufficient food, poverty, repeated illness, scant access to health services, deficient macro

* Research Scholar, Department of Anthropology, Dibrugarh University, Dibrugarh
** Professor & Head, Department of Anthropology, Dibrugarh University, Dibrugarh

and micro-nutrient ingestion, death-defying water and lack of access to improved sanitation. It includes cases of stunted, wasted and micro-nutrient malnutrition. Under-nutrition is most common in low-income group mostly living in developing countries. The majority of these people survive on diets that include stumpy amounts of protein, soaring amounts of carbohydrates and are largely vegetarian, with wheat, rice and corn as large staples in the diet.

In the present day context, obesity on the other hand has appeared as the most widespread, grave public health challenge in prosperous communities and is the result of an incorrect energy balance leading to an increased storage of energy mainly as fat. It is a complex disorder, which is detrimental to good health and well being. Therefore, obesity can be defined as a disease in which surplus body fat has accumulated in adipose tissue such that health may be negatively affected (Kopelman, 2000). The most fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expanded (Hill and Peter, 1998). Recent epidemiological leaning in obesity indicate that the primary cause of the global obesity problem lies in environment and behavioral changes and inversely associated with the level of education and physical activity. There are certain other factors such as age, sex, socio-economic status etc., that play a significant role in obesity. In developed countries, the levels of obesity are higher in lower socio-economic groups, but in developing countries, this relationship is reversed (Sobol and Stunkard, 1989; Randrianjohany *et al,* 1993). It may be noted that this phenomenon is more intense among the urban populations in comparison to the rural ones (Venkatramana and Chagall Reddy, 2002).

Under nutrition and obesity is reported to be associated with a number of health risks. They cause many health problems, both independently and in association with other diseases. Obesity is associated with the development of Type^2 diabetes, respiratory complication, hypertension, coronary heart diseases, gall bladder diseases, orthopedic problems, osteoarthritis, joint pain, sleep apnoea and several other social and psychological problems. Interestingly, obesity is now so common within the world's populations that it is beginning to replace under nutrition and infectious diseases as the most significant contributor to ill health.

The coexistence of overweight / obesity and underweight to a great extent,

is common in developing countries and prevalence of underweight is relatively higher in rural areas compared to urban areas. India has one of the highest underweight burdens in the world, and of late also starts to experience the up-and-coming predicament of overweight and obesity. Contemporary studies reveal the existence of a double burden of underweight and overweight in many population groups. Parallel to unrelenting rates of under nutrition, obesity rates are also increasing rapidly in several population groups that in the past had a very low prevalence. In North East India, the prevalence of under nutrition is quite high among school-aged children particularly in Assam and Meghalaya. However, very little research on this aspect has yet been undertaking on the population groups in the North East India.

Objectives :

The main aim of this paper is to assess the prevalence of under nutrition and obesity among the two rural caste populations namely Kaibarta and Koch of Lakhimpur district of Assam and to analyze the relationship between under nutrition and obesity and a group of chronic diseases such as diabetes, hypertension, joint pain, sleep apnoea etc. An attempt has also been made to compare the findings of the present study with the published data from other population groups to observe if there exists any variation in this regard.

Materials and Method :

Two distinct rural caste populations of Assam – the Kaibarta and the Koch were chosen for the present study. For the present investigation, a population based survey has been carried out. Only females were taken into consideration whose age group ranges in-between 18-60 years. The samples were drawn from the Lakhimpur district of Assam. The total sample was 311 individuals, which includes 211 Kaibarta subjects, data collected from Sutimukh Gaon, and 100 Koch subjects drawn from Bhurtal Gaon, Lakhimpur district, Assam.

In Assam the Kaibartas are one of the populous Scheduled Caste communities. They are of Dravidian origin. On other hand the Koch is one of the largest heterogeneous caste populations of Assam, which is formed by

detribalization process within the Hindu social order. As far as the social and economic status is concerned, the Kaibartas are poor both socially and economically whereas the Koch population has relatively a better socio-economic status.

For the present study required information regarding socio-demographic profile was collected by interview method. Socio-demographic and behavioral data for each subject included age, sex, family size, marital status, educational background etc. Four metric measurements were taken from each subject, which includes height, weight, waist circumference, hip circumference and two derived variables – Body Mass Index and Waist Hip Ratio were calculated. All anthropometric measurements were taken following standard anthropometric techniques as proposed by Lehman *et al.,* (1988). Height was measured with anthropometric rod to the nearest 0.1 cm while the weight was recorded nearest to the 0.1 kg using portable weighting machine with minimum cloths and without shoes. A standard non –elastic tape was used to measure the waist and hip circumference and measured nearest to the 0.1 cm. Waist circumference was taken at the minimum circumference between *umbilicus* and *xiphisternum* while hip circumference was measured at the maximum width of the greater *trochanter*. Body Mass Index (BMI) and Waist Hip Ratio (WHR) were computed using standard equations (WHO, 1995).

The measurement on blood pressure were determined by following the ausculatory method described by Weiner and Laurie (1981) using Sphygmomanometer with standard cuff and Stethoscope. The subjects were categorized into three groups according to the Sixth Joint National Committee on Prevention, Detection, Evaluation and Treatment of Hypertension, JNC-VI (1997).

Results :

The descriptive statistics for anthropometric variables is presented in the Table-1. The table shows that the mean value of all the anthropometric variables except waist hip ratio is greater among the Koch population and that Koch women are taller and heavier than the Kaibarta women.

Depending on BMI, waist circumference, and waist hip ratio the prevalence of underweight, overweight and obesity among the population under

study is assessed and presented in the Table-2. It is apparent from the table that the prevalence of chronic energy deficiency (CED) is higher in the Kaibarta women. When the central obesity is measured in terms of waist circumference, the Koch women are relatively more obese than the Kaibarta women.

It is apparent from the Table-3 that the risk of hypertension is associated more in overweight category. Among the Koch females incidence of hypertension are found to be higher in overweight category. On the other hand, the symptoms of disturbed sleep and thirsty feelings at night are more associated in case of underweight category.

Mean values of BMI in Kaibarta, Koch and the data available on other population groups of North-East India are given in the Table-4. Mean values of BMI in Kaibarta population is relatively lower than the other population groups whereas the mean values of BMI in Koch population has close approximation with other population groups of the region.

It is apparent from the analysis that the mean values of stature of both the population groups (i. e., Kaibarta and Koch) belongs to the below medium category. The frequency of the chronic energy deficiency is quite high among Kaibarta females than Koch, but the prevalence of overweight is relatively high among Koch females. No subject is found as obese in Kaibarta whereas, only one subject is categorized as obese in Koch population.

The prevalence of some ailments like hypertension, disturbed sleep, increase of urinate tendency, increase of thirsty feeling etc., are also analyzed. A very high prevalence of disturbed sleep and increase of thirsty feelings have been observed among Kaibarta females than Koch. The risk of hypertensive blood pressure is also associated more in overweight category in both population groups. However, the risk of overweight and obesity is also emerging in them.

Discussion :

Earlier, the WHO and other health related National / International organizations have focused on tackling the issues like infection and under nutrition. However, in recent years there has been a shift towards the management of chronic non-communicable diseases such as cardiovascular disease (CVD), cancer

and diabetes mellitus. WHO (1998) estimated that 40 per cent of death in developing countries and 75 per cent death in the developed countries are due to Non Communicable Diseases (NCD). Of the several risk factors for the CHD, obesity particularly the abdominal obesity has been playing a major role (Paffenberger *et al.,* 1993; Gopalan, 1988). The result of the present study conducted on the rural caste populations of Lakhimpur district Assam shows that the prevalence of abdominal obesity is not very high among the populations. High prevalence of chronic energy deficiency is found among Kaibarta females. The overall obesity based on BMI among the Kaibartas is conspicuous by their absence however one obese female is detected among the Koch. The incidence of overweight is quite frequent among Koch in comparison to that of the Kaibarta females and the risk of hypertensive blood pressure and disturbed sleep associated more in females having overweight.

In most of the rural populations despite the increasing prevalence of overweight and obesity, underweight continues to be a major problem. The populations of the present study are no exception to this chronic energy deficiency. The study shows that the underweight is a major problem in the low socio-economic populations (Kaibarta) in comparison to the relatively high socio-economic populations (Koch). The result of the present study supports the inference of Naidu and Rao (1994) and Nirmala Reddy (1998) that in Indian rural populations, still CED is of primary significance rather than obesity and overweight unlike the western populations. However, of late, the risk of overweight and obesity is also gaining momentum in them.

References :

- Gopalan, C.(1998): 'Obesity in the Indian urban middle class'. *Bulletin of the Nutrition Foundation of India*, 19: 1- 15.
- Hill. J. O. and Peters, J. C.(1998) : 'Environmental contributions to the obesity epidemic'. *Science*, 280: 1371-1374.
- Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure, (1997) : The sixth report of the Joint National Committee on prevention, detection, evaluation and treatment of

high blood pressure, JNC – VI, *Arch. Intern. Med*., 157: 2413 – 2446.

- Kopelman, P. G. (2000): 'Obesity as a medical problem'. *Nature,* 404: 635 – 643.
- Lohman, T.G., Roche, A.F. and Mortorell, A. R. (1988): *Anthropometric Standardization Reference Manual*. Human Kinetics Books, Champaign.
- Naidu, A. N. and Rao, N.P. (1994): 'Body mass index: A measure of the nutritional situation in Indian population'. *Eur. J. Clin. Nutr.,* 48 (Suppl. 3) : 131-140.
- Nirmala Reddy, B. (1998): 'Body mass index and its association with socio-economic and behavioral variables among socio-economically heterogeneous populations of Andhra Pradesh, India'. *Hum. Biol.* 70: 901-917.
- Paffenberger, R.S.; Hyde, R. T.; Wing, A. L.; I. M., Jung, D. L. and Kampert, J. B.(1993): 'The association of changes in physical activity level and other life style characteristics with mortality among men'. *N. Eng. Jr. Med.,* 328: 538-543.
- Randrianjohany, A., Balkau, B. and Cubeau, J. (1993): 'The relationship between behavioral pattern, overall, and central adiposity in a population of healthy French men'. *Int. Jr. Obes*, 17: 651-655.
- Sobol, J. and Stunkard, A. J. (1989): 'Socio-economic status and obesity: A review of the literature'. *Psychol Bull*., 105: 260-275.
- Venkatramana, P. and Chengal Reddy, P. (2002): 'Prevalence of chronic energy deficiency among two tribal populations of Andhra Pradesh'. *Tribal Research Bulletin.* 25: 5-10.
- Weiner, J. S. and Lourie. J. A. (1981): *Practical Human Biology.* Academic Press Inc. Pvt. Ltd. London.
- World Health Organization (1995): *Physical Status: The Use and Interpretation of Anthropometry* . Report of a WHO Expert Committee, WHO, Geneva, Technical Report Series, No. 854.
- World Health Organization. (1998): *Obesity, Preventing and Managing the Global Epidemic*. World Health Organization, Geneva.

Table - 1
Anthropometric Variable among the Populations under Study

Variables	KAIBARTA (N= 211)	KOCH (N= 100)	t- value
	Mean ± S.E	Mean ± S. E	Koch x Kaibarta
Height	152.35 ± 0.33	152.56 ± 0.37	1.24
Weight	44.79 ±0.52	47.90 ± 0.9	4.26*
Waist Circumference	72.65 ± 0.58	74.37 ± 1.03	2.02*
Hip Circumference	88.06 ± 0.48	91.23 ± 0.75	5.56*
Body Mass Index	19.25 ± 0.19	20.53 ± 0.35	4.57*
Waist Hip Ratio	0.83 ± 0.008	0.81 ± 0.006	3.77*

*indicates statistically significant at 5.0 % level of probability

Table - 2
Prevalence of Obesity Among the Population under Study

Variables	KAIBARTA	KOCH
Under weight (CDE) < 18.50	92 (43.60)	32 (32.00)
Normal weight 18.50 – 24.99	110 (52.13)	58 (58 .00)
Over weight 25.00 -29.99	9 (4.27)	9 (9 .00)
Obese ≥ 30	--	1 (1 .00)
Waist Circumference ≥72.00	98 (46.45)	52 (52.00)
Waist Hip Ratio ≥ 0.85	50 (23.70)	21 (21.00)

Figures within parentheses indicates percentages

Table - 3
Prevalence of some syndrome in relation to BMI

BMI Groups	No	Blood Pressure				Feels thirst at night
		Normotensive BP< 120-129 DBP< 80- 84	High Normal Blood Pressure SBP< 130-139 DBP<85-89	Hypertensive SBP140≥180 DBP 90≥110	Disturbed sleep	
KAIBARTA (N= 211)						
Under- weight < 18.50	92	89 (96.74)	1 (1.09)	2 (2.17)	75 (81.52)	49 (53.26)
Normal weight 18.50-24.99	110	103 (93.64)	4 (3.64)	3 (2.73)	66 (60.00)	43 (39.09)
0verweight 25.00-29.99	9	8 (88.89)	-	1 (11.11)	5 (55.55)	3 (33.33)
KOCH (N= 100)						
Under-weight < 18.50	32	30 (93.75)	2 (6.25)	-	22 (68.00)	11 (34.37)
Normal weight 18.50-24.99	58	54 (93.10)	2 (3.45)	2 (3.45)	33 (66.00)	18 (31.03)
0ver-weight 25.00-29.99	9	5 (55.55)	3 (33.33)	1 (11.11)	7 (77.78)	2 (22.22)
Obese ≥ 30	1	1 (100.00)	-	-		

Figures within parentheses indicates percentages

Table - 4
Mean Body Mass Index in some population groups of Assam

Population	Number	Mean	S.D	Reference
Kaibarta	211	19.25	2.74	Present study
Koch	100	20.53	3.50	do
Boro Kachari	--	20.67	2.17	Basu, and Gajbheye,1999
Ahom	164	20.63	2.72	Baruah, 2007
Sonowal Kachari	185	21.24	3.03	do
Mishing	165	21.94	2.42	do
Mishing	--	21.30	1.64	Basu, 2003
Dimasa	--	22.02	3.56	Basu , 2006
Tengapaniya Deori	79	20.95	2.63	Gogoi , 2006
Borgonya Deori	90	20.05	1.61	do
Dibongiya Deori	103	20.20	2.30	do
Zemi Naga	--	21.31	1.63	Basu ,2005

Table - 5
Body Mass Index in some population groups of Assam

Population	Number	Underweight (%)	Normal (%)	Overweight (%)	Obese (%)	Source
Kaibarta	211	43.60	52.13	4.27	--	Present study
Koch	100	32	58	9	1	do
Mishing	101	23.76	67.33	8.91	0.99	Sengupta and Dutta, 2008
Dibongiya Deori	103	23.30	76.70	--	--	Gogoi, 2006
Tengaponiya Deori	79	15.19	84.81	--	--	do
Ahom	164	23.78	68.29	7.93	--	Baruah, 2007
Mishing	165	5.46	85.45	9.09	--	do
Sonowal Kachari	185	18.37	69.19	12.43	--	do
Karbi	--	37.20	58.45	4.35	--	Kulkarni and Sharma, 2002
Dimasa	--	7.55	77.36	9.13	--	Basu, 2006
Zemi	--	1.96	96.08	1.96	--	do

Table - 6
Waist Hip Ratio in some population groups of Assam

Population	Total Number	Mean	S.E	Reference
Kaibarta	211	0.83	0.008	Present study
Koch	100	0.81	0.006	do
Kalita	100	0.87	0.005	Sengupta and Dutta, 2008
Sonowal Kachari	104	0.88	0.003	do
Mishing	101	0.89	0.005	do

❑❑❑