

**NUTRITIONAL STATUS BASED ON BODY MASS INDEX
OF ADULT APATANIS: A TRIBAL POPULATION OF LOWER
SUBANSIRI DISTRICT, ARUNACHAL PRADESH, INDIA**

YOMBOM BAM & USHA MALAGI

Department of Food Science and Nutrition, College of Rural Home Science,
University of Agricultural Sciences, Dharwad, Karnataka, India

ABSTRACT

A cross-sectional study was undertaken to determine anthropometric profile and nutritional status based on body mass index (BMI) of adult *Apatanis*, a tribal population of Arunachal Pradesh, India. A total of 232 adult (> 18 years) *Apatanis* of five villages of Reru, Lempia, Tazang, Hong and Hiza from ziro valley of lower subansiri district were selected for the study. Anthropometric measurements including height, weight, and circumferences were measured. Overall, the extent of overweight was found to be 16 per cent (45) while very low number of subjects were found to be in the category of undernutrition (N = 4,1.4%). The study concluded that a greater percentage of individuals with normal status of nutrition were observed among the adults *Apatanis* tribe.

KEYWORDS: Tribes of India, *Apatani* Tribe, Anthropometric Measurements, BMI, WHR, Nutritional Status

INTRODUCTION

Tribals constitute 8.61 per cent of the total population of the country, numbering 104.28 million (2011 Census) and cover about 15 per cent of the country's area. North-East tribes constitutes a major part of Indian tribal community. It is considered as one of most culturally diverse regions of the world, is a land inhabited by more than 200 fascinating tribes. The region constitutes about 8 per cent of India's size; roughly 3/4th the size of the state of Maharashtra. Its population is approximately 40 million (2011 census), 3.1 per cent of the total Indian population. Northeast India is the eastern-most region of India. It is connected to East India via a narrow corridor squeezed between independent nations of Bhutan and Bangladesh. It comprises the contiguous Seven Sister States (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura), and the Himalayan state of Sikkim. Arunachal Pradesh, the land of rising sun, is situated in the Northeastern tip of India between 26°.28' and 29°.31' North latitude and 91°.30' E and 97°.30' E longitudes.

The state is home to aboriginal tribes that have different religious practices, however the main religion are Donyi polism, Buddhism, Hinduism and Christianity. The tribes also have a distinct dialect and as such the language of the state is highly influenced by these tribal people. The most common tribes of the states are Nyishi, Galo, Monpa, *Apatani*, etc., The people of *Apatani* tribe resides in the lofty peaks of Himalayas speaking *Apatani* language. The tribe resides in the Ziro valley in the Lower Subansiri, living in sustainable villages made from wood and bamboo. It has long been well established that the use of anthropometry is an efficient indicator of nutritional and health status of adults (WHO, 1995).

Nutrition research in anthropometric assessment of nutritional status in anthropology and biological subjects including health and medicine is therefore, gaining importance in the present days. Few investigations have reported the anthropometric characteristics and states of nutrition in some other endogamous populations of eastern India. These studies have dealt with Bathudis (Bose *et al.*, 2006; Bose and Chakraborty, 2005) and Savars (Bose *et al.*, 2006) of Keonjhar in Orissa, and Telagas (Datta, 2007) of Paschim Medinipur district in West Bengal; 12 population of northeast India (Khongsdier, 2001); Santals of Purulia District, West Bengal (Das and Bose 2010)

Like any other tribes the *Apatani* tribe represents a totally unique trend and living among the Indian tribal Community. There are scarce data on the nutritional status of various tribal populations of North East India. Hence, the present study was undertaken to report anthropometric characteristics and determine the nutritional status of adult *Apatanis*. According to our knowledge to the date, it is the first report on the anthropometric and nutritional profile of adult *Apatanis*.

METHODOLOGY

Study population was selected from five villages namely Reru, Lempia, Tazang, Hong and Hiza from ziro valley of lower subansiri district were selected for the study. These villages represent the *Apatani* tribe of Arunachal Pradesh.

Body mass index (BMI) is most widely used method used to evaluate the nutritional status of population for large scale surveys. All anthropometric measurements were obtained using the standard techniques given by Jelliff (1966). Height, weight, and circumferences were recorded to the nearest 0.1cm, 0.5kg and 0.1 cm, respectively. Height of the respondent was measured by anthropometer. A portable weighing balance of 120 kg capacity was used to measure the weight of the subjects. Circumferences were measured using measuring tape. Body mass index (BMI) and waist hip ratio (WHR) were computed using the following standard equations:

$$\text{BMI (kg/m}^2\text{)} = \text{Weight (kg)} / \text{height (m}^2\text{)}$$

$$\text{WHR} = \text{Waist circumference (cm)} / \text{hip circumference (cm)}$$

Nutritional status was evaluated using internationally accepted World Health Organization (WHO). BMI was classified as:

Undernutrition: BMI < 18.5

Normal: 18.5 ≤ BMI < 25.0

Overweight: BMI ≥ 25.0.

Means and standard deviations of all anthropometric variables and indices were computed for both male and female subjects. Chi-square test (Fischer's exact test) was used to compute differences in nutritional status. All statistical analyses were done using SPSS software (version 16.0).

RESULTS AND DISCUSSIONS

Data from India with respect to anthropometric characteristics and nutritional status among the adults are quite few, especially from rural sectors. The reports in the perspectives of tribal populations are still scanty in India. In such a context, the present study contributes some new series of data and results of anthropometric characteristics of *Apatanis*; a

tribal community and a very less known endogamous caste group of Arunachal Pradesh.

Table 1 depicts the data on age and anthropometric measurements of study population. The mean ages of both sexes were observed as, men = 38.16 years, SD = 11.42 and women: 33.46, SD = 9.50. The mean height and weight of the *Apatanis* male subjects under study was found to be 164.31cm and 64.13 kg respectively. However women subjects had mean height and weight of 157.74 cm and 56.64 kg respectively. Mean BMI of the subjects was found to be 23.54 and 22.79 for male and female respectively. The male subjects had mean minimum waist circumference of 94.82 cm and for female it was found 88.34cm. The mean maximum hip values were observed to be 100.76 and 97.74cm for male and female respectively. The computed WHR was 1.06 for male subjects. However, female subjects had 0.90 WHR which was found to be slightly greater than the standard value of 0.88 (Srilakshmi 2005).

The data on nutritional status based on BMI among adult *Apatani* is given in Table 2. According to WHO (1995) classification of public health problem of low BMI, based on adult populations worldwide, it was observed that the rates of undernutrition in these communities of eastern India were remarkably low (N = 4,1.4%). Similarly, Gogoi and Sengupta (2002) found that BMI in majority of *Deori* adults is relatively better compared to northeast Indian population showing low prevalence of chronic energy deficiency in them. Overall, the extent of overweight was found to be 16.0 per cent (45) with a significant ($\chi^2 = 0.99^*$) difference in the prevalence of overweight between men (22.7) and women (10.1). Higher percentage of *Apatanis* tribe both male (99, 75.0%) and female (133, 89.3%) were found to be in the normal category of nutritional status. This may be due to the reason that their diet includes a large proportion of foodstuffs viz., rice (sticky), non vegetarian as the main course and forest resources like roots, shoots, green leafy vegetables, berries, seeds, tender bamboo sticks, mushrooms, flowers, fruits, nuts etc., which are the sources of all the essential nutrients.

CONCLUSIONS

The results of the present study indicated that according to WHO classification the adult *Apatani* tribe of Arunachal Pradesh is under normal category showing very less prevalence of undernutrition and overweight. Similar studies should also be undertaken among other tribal populations in the states and North East India since they constitute a sizeable portion of India's population.

REFERENCES

1. Adak, D.K., Gautam, R.K. and Gharami, A.K., 2006, Assessment of Nutritional Status through Body Mass Index among Adult Males of 7 Tribal Populations of Maharashtra, India. *Mal. J. Nutr.*, 12(1): 23-31.
2. Banik, S.D., 2009, Health and nutritional status of three adult male populations of Eastern India: an anthropometric appraisal. *Italian Journal of Public Health*, 6(4):294-302.
3. Bose, K. and Chakraborty, F., 2005, anthropometric characteristics and nutritional status based on body mass index of adult Bathudis: a tribal population of keonjhar district, Orissa, India. *Asia Pac. J. Clin.Nutr.*, 14(1): 80-82.
4. Bose K, Bisai S, Chakraborty F. Age variations in anthropometric and body composition characteristics and underweight among male Bathudis: a tribal population of Keonjhar District, Orissa, India. *Coll Antropol* 2006d; 30 (4) :771-5.

5. Bose K, Chakraborty F, Bisai S, Khatun A, Bauri H. Body mass index and nutritional status of adult Savar tribals of Keonjhar District, Orissa, India. *Asia Pac J Publ Health* 2006b; 18 (3): 3-7.
6. Datta Banik S. Age-Sex and Diurnal Variation of Blood Pressure in Different Nutritional States among the Adult Telegas of Kharagpur in West Bengal, India. *Collegium Antropologicum* 2007; 31(3) : 717-22.
7. Gogoi, G. and Sengupta, S., 2002, Body mass index among the dibongiya deoris of assam, India. *J. Hum. Ecol.*, 1(4):271-273.
8. Jelliffe, D. B. (1966). The assessment of nutritional status of the community Geneva, WHO, Monograph Series, 53:236-254.
9. Khongsdier, R., 2001, Body mass index of adults males in 12 populations of Northeast India. *Annals of Human Biology*, 28(4): 374-383.
10. Khongsdier, R., Varte, R. and Mukherjee, N., 2005, Excess male chronic energy deficiency among adolescent: a cross-sectional study in the context of patrilineal and matrilineal societies in northeast India. *European J. Clinical Nutr.*, 59: 1007-1014.
11. Lalaxmaiah, A., Rao, K.M., Kumar, H., Arlappa, N., Venkaiah, K. and Brahman, G.N.V., 2007, diet and nutritional status of tribal population in ITDA project Areas of Khamnam district, Andhra Pradesh. *J. Hum. Ecol.*, 21(2): 79-86.
12. Subal Das, S. and Bose, K., 2010, Body Mass Index and Chronic Energy Deficiency among Adult Santals of Purulia District, West Bengal, India. *International Journal of Human Sciences*, 7(2):488-503.
13. Srilaxmi, B., 2006, Food Science, Third Edition, New Age International (P) Ltd. Publishers, pp. 1-66.
14. Tungdim, M.G. and Kapoor, S., 2008, Tuberculosis treatment and nutritional status among the tribals of Northeast India. *Acta Biol Szeged*, 52(2):323-327.
15. World Health Organization (WHO). Physical Status: the Use and Interpretation of Anthropometry. Technical Report Series no. 854. Geneva: World Health Organization, 1995.
16. www.censusindia.gov.in.

APPENDICES

Table 1: Age and Anthropometric Characteristics of Adult Apatani

Variable	Men N=132	Women N=149
Age	38.16 (11.42)	33.46 (9.50)
Height (cm)	164.31 (10.64)	157.74 (6.22)
Weight (kg)	64.13 (7.24)	56.64 (5.79)
Circumferences (cm)		
Minimum waist	94.82 (11.05)	88.34 (11.31)
Maximum hip	100.76 (16.20)	97.74 (11.48)
Mid upper arm	31.78 (4.23)	31.37 (2.22)
BMI (kg/m ²)	23.54 (2.44)	22.79 (2.28)
WHR	1.06 (1.02)	0.90 (0.05)

Standard deviations are presented in parentheses

Table 2: Nutritional Status Based on BMI among Adult Apatani

Gender	BMI			Modified χ^2
	Undernutrition	Normal	Overweight	
Male	3 (2.3)	99 (75.0)	30 (22.7)	9.99*
Female	1 (0.7)	133 (89.3)	15 (10.1)	
Total	4 (1.4)	232 (82.6)	45 (16.0)	

Percentages are shown in parentheses

