Nutritional Status of the People of Sonowal Kachari Tribe: A Case Study in Dibrugarh, Assam (India)

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Abstract—*Cross- sectional study was carried out among the people of Sonowal Kachari Tribe in Dibrugarh District, Assam (India). It was a door to door investigation covering 240 adult people of the age group 18 years and above in the Hatimora Village. BMI, Waist Circumference and Waist-to-hip ratio were used to assess nutritional status. The mean BMI was found to be higher among the females than the males while the waist circumference and waist-to-hip ratio were found to be higher among the males than the females. The prevalence of underweight people was found to be 11.59 % and 13.73% in females and males respectively. Prevalence of obese people found to be 15.22% and 9.80% in female and male respectively. It was found that 55.88% of the males and 74.64 % of the females were at increased risk of metabolic syndrome. Further, 81.88% females and 27.45% males were found to be obese on the basis of WHR. Thus high prevalence of overweight and obesity is observed among the individuals of the population.*

1. INTRODUCTION

One of the basic human necessities and a prerequisite for a healthy life is nutrition; the quality and quantity of food consumed determines the health and nutritional status of a population [1]. Nutritional status can be defined as the physical expression of the relationship between the nutrient intake, or bio-availability of nutrients, and the physiological requirement of an individual [2]. Anthropometry is one of the widely accepted tools used for the assessment of nutritional status of populations [3-5]. Such measurements are relatively simple and inexpensive than other existing methods [6].Various measurements can be used to measure the nutritional status of adults [7]. These include Body Mass Index (BMI), Waist Circumference (WC), Waist-to-hip Ratio (WHR), Waist-to-height Ratio (WHtR) etc. BMI is considered as a good indicator of current nutritional status [5] while Waist Circumference (WC) and Waist-to-hip Ratio (WHR) are considered as good indicator of abdominal obesity or central obesity. Malnutrition in the form of overweight and obesity is faced throughout the world today. There has been rapid increase in the worldwide prevalence of overweight and obesity over the last few decades and has nearly tripled between 1975 and 2016; 39% of adults aged 18 years and over were overweight in 2016 and 13% were obese [8] According

to National Family Health Survey 3- 13% of women and 9 % of men are overweight or obese in 2005-2006 [9, 10].

In this present investigation an attempt has been made to assess the nutritional status of the adult Sonowal Kachari individuals on the basis of Anthropometry. From a part of the collected data Aassociation between Obesity and Hypertension among the individuals of the population have already been analyzed [11].

2. MATERIALS AND METHODS

Investigation was carried out to understand the nutritional status of the adults of the Sonowal Kachari Tribe of Hatimora Village of Dibrugarh District, Assam (India). The cross-sectional field study was carried out among the individuals of the Village from 27th Dec 2018 to 4th Jan 2019. It was a through and door to door investigation to cover 240 adult individuals of the age group 18 years and above in the whole village. Body Mass Index, Waist Circumference and Waist-to-hip ratio were used to assess nutritional status. BMI was calculated as weight in kilograms divided by the square of height in meters. Classification of BMI was done according to cut offs given by World Health Organization for Asian Population [12]. Waist circumference and waist-to-hip ratio were used for the assessment of central/abdominal obesity. Increased obesity-related health risks are associated with a waist circumference greater or equal to 90 cm in men and 80 cm in women [13] On the basis of WHR health risk can be classified into low risk, moderate risk and high risk [14]. WHR < 0.95 and < 0.80 is considered to be low risk for men and women respectively whereas WHR of .96-1.00 in men and 0.81-0.85 in women is considered to be at moderate risk. A WHR of > 1 in men and > .85 in women is considered to be at high risk [13] For the measurement of height, waist circumference, hip circumference and weight the protocols of New Zealand Health Monitor (NZHM) Surveys [15] were followed. A portable stadiometer was used for the measurement of stature. Weight was measured using a Digital Body Weighing Scale (PS 126) (100 gm precision) with 5-

180kg capacity. A standard anthropometric measuring tape was used for the measurement of waist and hip circumference.

Statistical Package for Social Science (SPSS) version 16.0 software was used for the analysis of data. Statistical significance was set at p less than 0.05.

Table 1: BMI Classification according to W.H.O. for the Asian population.

Underweight	<18.5
Normal	18.5-22.9
Overweight	23-24.9
Preobese	25-29.9
Obese	≥30
Obese type 1 (obese)	30-40
Obese type 2 (morbid obese)	40.1-50
Obese type 3 (super obese)	≥50

3. RESULT

Table 2: Body Mass Index, Waist-to-Hip Ratio and Waist Circumference of the Sonowal Kachari individuals in different age categories.

Age Group	N	BMI		WHR		WC	
		$\overline{x}$	sd	$\overline{x}$	sd	$\overline{x}$	sd
18-30	46	23.55	4.59	0.88	0.06	82.17	9.86
31-40	59	23.78	4.47	0.93	0.08	86.35	12.21
41-50	54	26.28	4.17	0.97	0.07	95.60	10.95
51-60	32	25.12	3.97	1.00	0.10	94.97	11.98
61-70	28	23.55	4.94	0.97	0.12	89.15	15.54
71-80	17	23.21	5.38	0.99	0.13	89.49	12.21
81-90	2	27.13	4.59	1.00	0.06	103.50	7.78
91-100	2	24.43	9.59	0.93	0.10	89.00	29.70

In table 2 the body mass index, waist-to-hip ratio and waist circumference of the Sonowal Kachari individuals are given in different age categories. It was found that the mean body mass index was highest in the age category 81-90 years while it was lowest in the age category 71-80 years. Thus body mass index was found to vary among the different age categories. The mean waist circumference was also found to be highest in the age category 81-90 years. Waist circumference was found to be lowest in the lowest age category i.e. 18-30 years. The mean waist-to-hip ratio was found to be highest in the age categories 51-60 years and 81-90 years and lowest in the age group 18-30 years. Thus the overall waist-to-hip ratio and waist circumference increased with age with slight variations in certain age groups.

Table 3: Distribution of the participants on the basis of body mass index.

BMI Category	Female		Male	
	N	%	N	%
Under Weight	16	11.59	14	13.73
Normal	37	26.81	27	26.47
Overweight	20	14.49	19	18.63
Pre Obese	44	31.88	32	31.37
Obese	21	15.22	10	9.80
Total	138	100.00	102	100.00

Table 3 shows the distribution of the participants on the basis of body mass index. It was observed that 11.59 % of the female individuals and 13.73% of the male individuals were underweight while 15.22% of the female individuals and 9.80% of the male individuals were obese. The percentages of pre obese individuals were found to be quite high with 31.88 % of the female individuals and 31.37% of the male individuals being pre obese. However the difference in body mass index between the genders was found to be non-significant (X^2= 21, d.f= 4, p> .05)

Table 4: Distribution of the participants on the basis of waist circumference.

Waist Circumference Category	Female		Male	
	N	%	N	%
Normal	35	25.36	45	44.12
Obese/ At risk	103	74.64	57	55.88
Total	138	100	102	100

Table 3 shows the distribution of the participants on the basis of waist circumference. Significantly high frequencies of female as well as male individuals were found to be at risk of various obesity related health issues. The frequency of female individuals at risk (74.64%) was higher than that of the males at risk (55.88%). This was found to be statistically significant (X^2= 9.28, d.f= 1, p< .01)

Table 5: Distribution of the participants on the basis of waist-to-hip ratio.

Waist-to-hip ratio category	Female		Male	
	N	%	N	%
Low risk	14	10.14	50	49.02
Moderate Risk	11	7.97	24	23.53
High risk	113	81.88	28	27.45
Total	138	100	102	100

In table 5 the distribution of participants on the basis of waist-to-hip ratio is shown. Significantly high frequency of female (81.88%) is seen to fall in the category high risk on the basis of waist-to-hip ratio. 27.45% of the male individuals were

found to be at high risk on the basis of waist-to-hip ratio (X^2= 72.56, d.f= 2, p<.001).

4. DISCUSSION

Now a days, in both developed and developing countries overweight and obesity have become a major health issue [16]. Overweight and obesity has a negative impact on an individual's overall health. With age the metabolic rate of individuals slows down and a comparatively fewer amount of calorie is required to maintain ones weight. [17]. Thus one might gain weight even though the activity level and nutritional intake of the individual might remain the same as it had been in younger age [18].

In the present study it was found that the frequency of obese individuals in both sexes was quite high. High frequency of the individuals was found to be at risk of various metabolic disorders related to central obesity. This differed from the observation made by Sonowal and Choudhury among the Sonowal Kachari population of Lakhimpur District, Assam [19] where they observed that the prevalence of under nutrition was high in both the genders. This shows geographic variation of health status among the Sonowal Kachari tribe. This might also be due to the impact of urbanization on the individuals as Hatimora village lies close to Dibrugarh main town.

CONCLUSION

Thus, the present investigation indicates that the prevalence of overweight and obesity among the individuals of the population is quite high. Therefore proper nutritional intervention is required in order to make the individuals of the population aware of the importance of balanced diet as well as weight management.

5. ACKNOWLEDGEMENT

REFERENCES

[1] Anon., *Dietary Guidelines for Indians-A Manual*: National Institute of Nutrition, Hyderabad, India, 2011, Pp. 1-2.
[2] Brown, K.H. "Measurements of dietary intake", *Population Development Review* (Suppl.), 10, 1984, pp. 69-91.
[3] Gorstein, J., Akre, J., "The use of anthropometry to assess nutritional status", *World Health Stat. Q.* 41, 1988, pp. 48-58.
[4] Ruff, C., "Variation in human body size and shape". *Ann. Rev. Anthropology*. 31, 2002, pp. 211-232.
[5] Singh J. and Sengupta S., "Nutritional Status of Sonowal Kachari Children of Dibrugarh District, Assam", *Anthropologist,* 9,3, 2007, Pp. 233-235.
[6] Anon., Food and Agriculture Organization (FAO), 1996. Sixth World Food Survey. Food and Agriculture Organization, Rome,1996, pp.6-7.
[7] Lohman, T.G., Roche, A.F., *Martorell, R., Anthropometric Standardization Reference Manual*, Human Kinetics Books, Chicago. 1988.
[8] Anon,.World Health Organization. Obesity and overweight, 2018, Retrieved from https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight accessed on 18/3/19.
[9] Anon., National Nutrition Monitoring Bureau. NNMB Reports 1979-2002: http://www.nnmbindia.org/NNMBREPORT -web.pdf, accessed on 4/01/11.
[10 Zahid., (2016) Obesity. National Health Portal of India. (2019) Retrieved from https://www.nhp.gov.in/disease/non-communicable-disease/obesity accessed on 21/03/19.
[11] Gogoi A. J.,"Obesity and Hypertension: a cross-sectional study among individuals of Sonowal Kachari Tribe of Hatimora Village, Assam (India)". *Studies of Tribes and Tribals*, 2019, (accepted).
[12] Llido L O and Mirasol R. **"Comparison of Body Mass Index based nutritional status using WHO criteria versus "Asian" criteria: report from the Philippines".** *POJ.;* **2012:1-8.**
[13] Anon,.VirtualMedicalCentre. Assessing Central Obesity: Waist Circumference, 2018, Retrieved from https://www.myvmc.com/investigations/assessing-central-obesity-waist-circumference/ accessed on 18/3/19.
[14] Bhurosy T and Jeewon R. 'Pitfalls of using body mass index in the assessment of obesity risk". *Curr Res Nutr Food Sci*.;1(1): 2013, 71–76. http://dx.doi.org/10.12944/CRNFSJ.1.1.07.
[15] Anon. Protocol for Collecting Height, Weight and Waist Measurements in New Zealand Health Monitor (NZHM) Surveys. Ministry of Health. Wellington, New Zealand. pp.1-7. www.moh.govt.nz/.../protocols- 2008, Retrieved on 11.2.2019.
[16] Kaur S, Walia I., "Body mass index, Waist circumference and waist hip ratio among nursing students", *Nursing & Midwifery Research Journal*, 13, 2007, pp. 2692-2700.
[17] Kaur J and Walia I., "Body mass index among nursing students", *Nursing and Midwifery Research Journal*, 4,3, July 2008, pp.102-106.
[18] Smith,T. (Editor)*The British Medical Association Complete Family Health Encyclopedia* ,BMA, London, 20 Feb. 2002, p. 742.
[19] Sonowal S.R. and Choudhury B., "Age related changes in nutritional status of the aged Sonowal Kacharis of Lakhimpur district, Assam", *Asian Journal of Multidisciplinary Studies*, 5,4, April, 2017. Pp. 59-65.