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Nutritional status in relation with age and place of residence among the adult Rongmei Naga of Manipur

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Abstract

Nutritional status is a physical expression of the relationship between the nutrient intake, or bio-availability of nutrients and the physiological requirements of an individual. The present study is based on a cross-sectional sample of 678 Rongmei adult of Manipur aged 18-60 years. The paper deals with association between nutritional status, through Body Mass Index (BMI), and age and place of residence (rural vs. urban) among the adult Rongmei Naga of Manipur. BMI was calculated and later classified following Asian cut-off value of World Health Organisation (WHO). The result shows that 3.4% of the study population fall under underweight category, while 24.3% fall under overweight and 28.5% fall under obese categories. The mean BMI is found to be 23.52 ± 3.20. The occurrence of overweight and obesity together are high which is to be considered as a matter of serious concern. It is observed that overweight and obesity are more prevalent among the urban Rongmei group than the rural Rongmei adult of Manipur.

Keywords: Rongmei Naga, Nutritional Status, Age group, Sex, Place of residence.

Introduction

Human health is a state of complete physical mental and social well-being, and not merely the absence of disease or infirmity (WHO, 1971). Adults are the major contributor to a population growth and development of any population, so study of adult health is very much in need of time and can be studied by looking into the health status. In order to alleviate the health status of adult, we should know the present conditions. Health is also closely interwoven with proper and adequate intake of food and nutrients. How well the body functions is a direct reflection of what we eat, how much we eat and the balance between the two. Thus the nutritional status of an individual is often the results of many inter-related factors, like food intake, quantity, ecological condition, socio-economic status and physical health (Wolanski and Malik, 1979). An adequate diet with the proper nutrients in the right amount as required by the body is considered to make an individual healthy while a poor diet characterised by intake of inadequate or excess nutrients in relation to the need can adversely affect the normal functioning of the body (National Institution of Nutrition, 2011). It is often the result of the complex interaction between

the food we eat, our overall state of health and the environment in which we live (WHO, 2000a). Therefore to understand the health status of any population, it is important to assess their nutritional status as it encompasses the whole and represents "the physical expression of the relationship between an individual's dietary intake, the bioavailability of the ingested nutrients and his or her physiological requirements" (Brown, 1984), which in turn helps to identify individuals at risk of belonging to malnourished or who are malnourished.

Nutritional status in different population has been assessed by various methods involving the anthropometric variables of height and weight (Deurenberg *et.al.*1991). Anthropometry proves to be a useful tool in this nutritional assessment and is generally considered as the most universal applicable, inexpensive and non-invasive method available to assess the size proportions and composition of human body (Keys *et.al.,* 1956; WHO, 1986, 2011a; Gorstein and Arke, 1988; James *et.al.,* 1988; Frisancho, 1990; Shetty and James 1994; Prista *et.al.,* 2003; Ulijaszek and Komlos, 2010; Sanchez- Garcia *et.al.,* 2011). Anthropometry or the science of measurements of the human body has been the longest used measure of human variation (Ulijaszek and Komlos, 2010) and in hindsight it may be considered as the backbone of physical (biological) anthropology. From its initial application for the racial classifications in the nineteenth century to its use as a measure of physiological and developmental plasticity in adaptability researches from the twentieth century onwards, (Ulijaszek and Komlos, 2010), the use of anthropometry in anthropology has changed overtime.

In anthropometry, BMI study is widely accepted as one of the best indicator of the nutritional status of adult individual and population (Gogoi *et al.,* 2002). Adult health constitutes one of the serious problems affecting the community and the most common one is obesity. Obesity is a complex, multi-factorial, chronic disease involving, behaviour, perinatal and environmental components. It is a key risk factor for a range of chronic illness (including hypertension, diabetes, cholesterol, heart disease, stroke, gall bladder disease, biliary calculus, narcolepsy, osteoarthritis, asthma, apnoea, dyslipidaemia, gout and certain cancers) that tend to reduce the quality of life and ultimately result in death (Mora *et al.,* 2015). Rural areas in low and middle income countries have seen shifts towards higher incomes, better infrastructure and increased vehicles use, all of which bring health benefits. But this shift also led to lower energy expenditure and a hike in expenses on food, which is processed and low quality when sufficient regulations are not in place. Added to this, a significant number of obese patients tend to suffer mental disorders and social rejection leading to loss of self esteem, a particularly sensitive issue in the case of child. All these factors contributed to a faster increase in BMI in rural areas (Mora *et al.,* 2015; Centres for Disease Control and Prevention, 2017).

A number of studies have also found evidence that overweight and obesity are associated with increased prevalence of cardiovascular risk factors such as hypertension, unfavourable blood lipid concentrations and diabetes mellitus but does not appear to be the major risk factors for stroke (WHO, 2004). Keeping all these in mind, the present

paper aims to understand the association of BMI with age and place of residence among the adult Rongmei Naga of Manipur.

Materials and methods

Rongmei, locally pronounce as N-ruang-mei, are indigenous people found inhabiting in the North East Indian states of Assam, Manipur and Nagaland. In Manipur, they are found concentrated in Tamenglong District, with a large number of villages in the valley districts of Imphal East, Imphal West, Thoubal and Bishnupur."Racially the Rongmeis are one of the Southern Mongoloid decent and linguistically they belong to the Tibeto-Burman group of southern Mongoloid" (Pamei, 1996). They are also said to have migrated from China's Sinlung Province. Their physical features are by and large similar to the other tribes of North East India and people of the neighboring countries in South East Asia (Namthiubuiyang, 2001).

Height and weight were taken on 678 Rongmei adult individuals aged 18-60 from 338 households following door to door visit for collecting data. The 338 households were collectively from seven villages of Tamenglong district (rural) and Imphal East district (rural) of Manipur from both rural and urban places of residence. Weight was measured with minimal clothing with a standard weighing machine and height with Anthropometric rod. The subjects were asked to stand on the horizontal platform in the Frankfurt horizontal plane. Then the horizontal arm of the Anthropometer was brought down to touch the vertex lightly and the value was checked and taken. Ages of the individuals were taken by referring from their documents (Adhaar Card /EPIC/ Birth Certificate).

BMI (kg/m^2) was calculated following standard protocol (BMI = weight / height^2, kg/m^2). Age group was categorised as 18-28 years, 29-38 years, 39-48 years and 48years above till 60 years of age. Body Mass Index (BMI) was classified with Asia cut–off value as follows: Underweight = $\leq$18.5, Normal weight = 18.5-22.9, Over weight = 23-24.9 and Obese = $\geq$25 (WHO 2000). BMI values were calculated with different age groups in two studied places of residence (rural and urban) of Manipur. Descriptive statistics were analysed by using MS excel software (Microsoft company 2007 version).Statistical analyses like t-test, chi – square test and regression model were analysed using IBM Developed software SPSS version 23. $P<0.001$ is considered as significant for testing t-test and chi-square test in this paper.

Results

Table 1 shows the mean and standard deviation of the height, weight and BMI. Among all the adult Rongmei (male and female) interviewed, urban males mean height (158.22cm), weight (61.62kg) and BMI (24.66kg/m^2) are found to be the highest in both the places of residence. The rural females mean height (151.07cm) and weight (50.90kg) are found to be the lowest in the present studied population but BMI (22.43kg/m^2) is found to be lowest among the urban females. It is also observed from the results that the mean BMI, weight and height of the adult urban residents are higher than the adult rural

residents and the differences are statistically significant at 5% probability level (Table 1).

Table 1. Background characteristics of adult Rongmei Naga of Manipur

Parameters	Male		t-value	Female		t-value
	Rural	Urban		Rural	Urban	
	Mean±SD	Mean±SD		Mean±SD	Mean±SD	
Height	157.91±6.11	158.22±8.12	389.88*	151.07±5.94	152.92±5.56	503.24*
Weight	57.17±5.88	61.62±8.03	142.17*	50.90±6.89	57.16±8.54	125.08*
BMI	22.96±2.31	24.66±3.10	146.81*	24.16±3.77	22.43±2.86	129.70*

BMI= Body Mass Index; SD = Standard Deviation;*p-value < 0.001.

The BMI categories in relation to place of residence (rural and urban) and sex (male and female) are shown in Table 2.

Table 2. Nutritional status in relation with sex difference and place of residence among Rongmei Naga, Manipur

BMI Categories	Urban (N=314)				Rural (N=364)			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
Under weight	6	4.35	3	1.70	5	2.99	9	4.57
Normal weight	39	28.26	58	32.95	78	46.71	122	61.93
Over Weight	33	23.91	40	22.73	56	33.53	36	18.27
Obese	60	43.48	75	42.61	28	16.77	30	15.23

χ^2 value for urban vs rural male = 28.17* df=3 p<0.001
χ^2 value for urban vs rural female =44.21* df=3 p<0.001

Obese are relatively higher in urban males (43.48%) and urban females (42.61%) than their rural counterpart males (16.77%) and females (15.23%) respectively (Figure 1 and 2) From table 3, it is observed that, rural population are mostly with normal BMI (54.95%) out of 364 individual interviewed and in urban population normal BMI is found to be 30.89% out of 314 individual.

Table 3. Descriptive statistics of nutritional status in relation with place of residence among the Rongmei Adult of Manipur

BMI categories	Urban (N= 314)		Rural (N=364)	
	N	%	N	%
Under weight	9	2.87	14	3.85
Normal	97	30.89	200	54.95
Over weight	73	23.25	92	25.27
Obese	135	42.99	58	15.93

$\chi^2 = 66.39^*$, df=3p<0.001

Here, obese (42.99%) are also found to be relatively higher among the urban residence comparing with the rural counterpart among the adult Rongmei of Manipur.

Table 4 shows the regression model of place of residence and age group on BMI in the Rongmei Naga of Manipur. Regression result suggests that 'place of residence' but not 'age group' has a significant effect on BMI in this population.

Table 4. Effect of place of residence and age on BMI on Rongmei adult of Manipur

Parameters	Coefficient		t-value	Significance level
	β	SD		
Age group	-0.014	0.030	-0.469	p>0.05
Place of Residence	-0.530	0.066	-7.975*	p<0.001

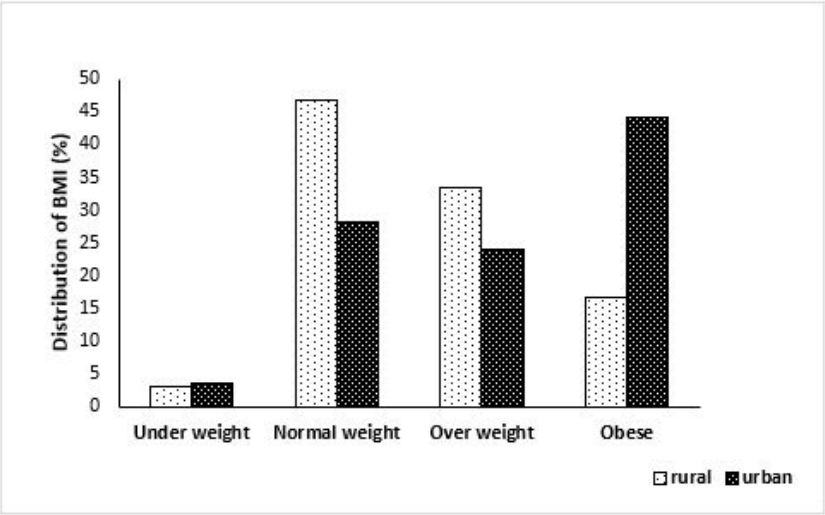
Dependent variable: BMI

It is also observed from the model that BMI is negatively influenced by age group, indicating the fact that with age there is tendency to decline in BMI, especially in elderly Rongmei. Similarly, the negative β coefficient of place of residence on BMI suggests that urban residents are significantly more susceptible to develop obesity as compared to their rural counterparts (Table 4).

Discussion

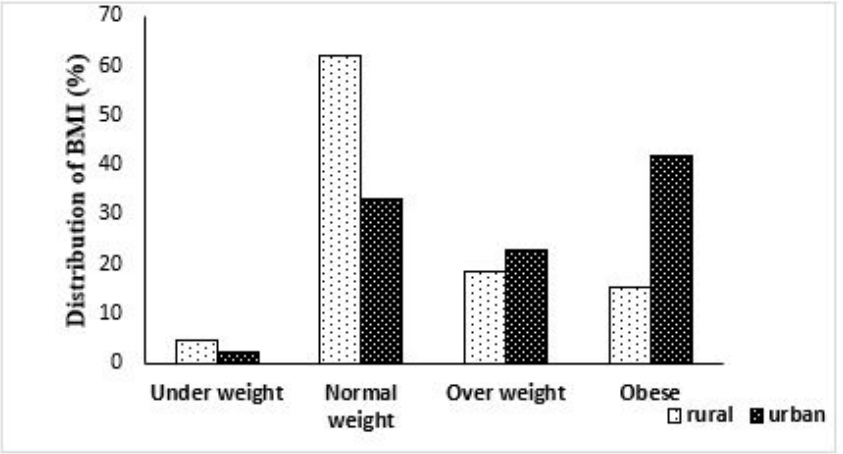
Among the Rengma Naga of Nagaland also, mean BMI, height and weight are higher among males (mean BMI = 22.66, mean height= 162.15cm and mean weight= 59.53kg), and lower among females (mean BMI = 22.30, mean height=156.08, mean weight= 54.37 (Seb Rengma et al. 2015), which is also the case with the present study.

Figure 1. Distribution of Nutritional Status according to the place of residence among the Rongmei male



Higher prevalence of obesity is also observed among the Rengma Naga of Nagaland (Seb *et al.,* 2015). In contrast to the present studied area (Manipur) researchers had come to conclusion that mean BMI are found to be higher in rural than in urban residence after an extensive study on 112 million people from 200 countries, including India over a period of 30 years. (Ezzati, 2016). Among the adult males of War Khasi of Meghalaya, age is negatively associated with weight and BMI (Khongsdier, 2002) which is the same among the present studied population.

Figure 2. Distribution of Nutritional Status according to the place of residence among the Rongmei female



Study by Mungreiphy among the Tangkhul males shows that the mean value (164.0±6.16) was found to be highest in the youngest age group (20 to 29 years). Mean

height decrease in each decade in the successive age group and lowest mean height (156.9±5.35) was found among the oldest age group (60 to 70 years), whereas among the rest of the age group, the difference are statistically not significant. Among the Tangkhul males, the mean BMI is 22.3kg/m²whereas among the Rongmei males of Manipur, the mean BMI is observed to be higher (23.7kg/m²).

Conclusion

In nutshell, greater percentages of obese individuals are found among the urban Rongmei than their rural counterparts, irrespective of gender. In other words, it is observed that nutritional status is highly significant with place of residence but not with age group among the Rongmei of Manipur. The reason could be sedentary life style with easily available calorie rich food in the urban areas in Manipur as compared to the rural areas. However, detail study on physical activity with dietary intake is required before concluding anything substantially.

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