

Nutritional Status and Ageing among Car Nicobarese and Nolia Males of India

A.K. Kapoor^{*1}, Meenal Dhall² and Renu Tyagi²

¹Department of Anthropology, University of Delhi, Delhi-110007, Presently Vice Chancellor, Jiwaji University, Gwalior- 474011, M.P., India

²Department of Anthropology, University of Delhi, Delhi-110007, India

Abstract: The aim of the present study was to compare the changes in nutritional status with advancing age among two underprivileged population groups of India. The study was conducted on 165 Car Nicobarese, a primitive tribal group of Car Nicobar island and on 155 Nolias belonging to 'other backward classes' of Orissa in India. The subjects in both the population groups were in the age range of 20-80 years. Stature, weight, upper arm circumference, hand grip strength were taken on all the subjects. Their nutritional status was assessed using body mass index and upper arm circumference. Most of the Car Nicobarese were found to belong to normal weight category. On the other hand most of the Nolias belonged to underweight category with more than 25 percent of them being CED III. A decline in stature and grip strength with advancing age in both Car Nicobarese and Nolias was found. Significant differences ($p < 0.001$) were obtained for all the measurements between Car Nicobarese and Nolias. The strong hand grip strength among Nolias was directly related to their economic occupation.

Keywords PTG, Island, Nolia, CED, Ageing.

INTRODUCTION

In India under nutrition and over nutrition are the major problems faced by all age groups. Nutrition plays an important role in the maintenance of health and prevention of disease [1, 2]. Nutritional status is the state of body in relation to the consumption and utilization of nutrients. Adequate nourishment in terms of quantity and quality is necessary for sustainable life [3]. There are various parameters for assessment of nutritional status but anthropometry is considered as one of the most reliable and practical tool to assess nutritional status [4-6]. BMI is widely accepted as one of the best indicator of nutritional status in adults [7-12]. For the population with diverse ethnic group, BMI is best tool to assess nutritional status [13].

The government of India classifies some of its citizens based on their social and economic condition as scheduled caste (SC), scheduled tribes (ST) and other backward class (OBC). The OBC is a dynamic community which keeps changing from time to time depending on social, educational and economic factors Government of India [14]. ST's are the Indian population grouping that are explicitly recognized by the constitution of India, previously called the 'depressed classes' by the British and other wise known as 'Adivasi'. According to 2001 census [15] 8% of ST's comprises over the total population of India. According to National sample survey organization [NSSO, 1995-99] there was 40.94% of OBC and 8.63% of ST population in India. Similar survey

done in 1999-2000 had put OBC population at about 35% and it is hardly likely that the proportion has gone up by 6% in just 5 years.

Nolias

Nolias are constitutionally categorized under the other backward class (OBC). But they prefer to call themselves as sea tribes. They sustain themselves by fishing and related activities. They have no interest in agriculture. Almost all the households depend entirely on fishing for their livelihood. The men folk are engaged in fishing activities while women play an important role in the management of the household economy and also engaged in fishing trade. Among Nolias, household is the unit of production as well as consumption. Every member in Nolia household except small children contribute in production activities. Adult men go into the sea, women and children help them on the beach and old people does mending of the fishing net and training young ones for fishing. The role of women folk is vital in their economy. They dry the fish and go to market to sell it. Some women also work as wage laborers. Nolias are small scale fishermen who have a subsistence economy. Fish is the most important resource for them.

In spite of the development of technology (like use of motor boats, disco net etc.), they are still using traditional tools for fishing due to their poor economic status. One of the reasons for this is their heavy alcoholic consumption habits, which leads them to borrow money thereby creating a vicious circle. Majority of them are fisherman and some of them worked as daily wage labourers. The main season for fishing is from October-February. They have their own boats and nets and tradition way of fishing involves strenuous

*Address correspondence to this author at the Department of Anthropology, University of Delhi, Delhi-110007, Presently Vice Chancellor, Jiwaji University, Gwalior- 474011, M.P., India; Phone: 27667329. Fax: 27666614 E-mail: anupkapoor46@rediffmail.com

physical activity. They spend almost five months in a year, whole day, in the sea with their boats netting and fishing.

Car Nicobarese

The Andaman and nicobar group of islands is located in the bay of Bengal between longitude 92⁰ to 94⁰ east and latitude 6⁰ to 14⁰ north. The Andaman and Nicobar Islands are the homeland of the primitive communities of India belonging to the negrito and mongoloid racial stock. The Car Nicobarese are of mongoloid stock. The Nicobarese are in many ways the most significant tribal population in the Andaman and Nicobar islands both by virtue of their large numbers and the very wide area they occupy as compared to all the Andaman tribes puts together. The Nicobares have attained considerable individuality in each group. They have fully accepted the value of modern civilization and life and are in pursuit of acquiring modern technology and education. Economically and educationally they are most developed tribe in Andaman and Nicobar Islands.

Unlike the other 5 scheduled tribes- the Great Andamanese, Onge, Jarawa and Sentinelese (Andaman group), and the Shompen (Nicobar group)- whose population range roughly between 29 and 200, the Nicobarese are a very large population. According to the 1991 census Government of India, the total population of Nicobar Island was 19,252 and out of these, the tribal Car Nicobarese population was 15,781. Car Nicobarese were classified as the primitive tribal group (PTG) Government of India.

They have had the benefit of good and able leadership from British days. Most of them have been converted to Christianity since 1945. Now 95% of them are christians and 5% are Muslims [16]. They also get benefits from Christian missionaries. Traditionally they are gardeners (mainly coconut) and live in settled villages [16]. Now they started getting jobs in government sector. They are economically well-off, as they can feed themselves and sell the surplus coconuts and areca nuts in the market. They are availing the benefits of welfare measures in the areas of education, health and cooperative movements. A number of studies have already focused on both the positive and negative aspects of development of the primitive tribes in Andaman and Nicobar islands over the years. Some opine that the tribes of these islands are gradually responding to the development process, while others find that the tribes are continuing to resist the development process [16,17]. They are physically quite active but Nolias do more physical work as compared to them.

The nutritional status of the tribal population is reported to be poor [18,19]. However the advancing age pose an additional impact contributing to poorer nutritional status of aged tribals [20]. The nutritional status of underprivileged communities viz tribal population and OBC of India is not well documented and further the nutritional studies on the aged tribals are still less attempted. The present study is an attempt in this direction. The two population groups viz Car Nicobarese and Nolias were compared as both are fishing communities of island and coastal region respectively.

MATERIALS AND METHODOLOGY

In order to assess and compare the nutritional status of PTG and OBC population in India, a cross sectional study was conducted on 165 Car Nicobarese and 155 Nolia males

from Car Nicobar (Andman and Nicobar islands) and Orissa respectively. All the subjects belonged to 20-80 years of age. The total sample was further sub divided into different age groups namely 20-25 years, 50-60 years, 61-70 years and 71-80 years for both the groups under study. 20-25 years age group was taken as the control group (young adult group) and the age groups above 50 years were taken as test groups (older groups) for understanding changes in nutritional status with age. By 20 years of age all the body's attributes attain mature or adult status which is consolidated and maintained during the third decade. That is why the subjects aged 20 years to 25 years are taken as one group. It is also well established that the physical and physiological functions starts declining from 5th decade onwards, keeping this phenomenon in mind the subjects aged 50 years onwards were grouped with an interval of ten years each.

A pilot survey was conducted before the main study to standardize the techniques to be used. The distributions of the subjects have been displayed in Table 1. All the subjects were measured prior to their lunch. All of them were personally interviewed with the help of a pre-designed proforma by AKK for their personal information and life style. Height, weight, mid upper arm circumference and average hand grip strength were recorded. The measurements were taken by using standard techniques of Weiner and Lourie [21]. Body mass index (BMI) was computed as weight (kg)/height (m²). Nutritional status was evaluated on the basis of internationally accepted cut off points of BMI [22].

Table 1. Distribution of Subjects in different Age Groups

Age Group (Years)	Nolia	Car Nicobarese
20-25	28	30
50-60	48	48
61-70	50	48
71-80	29	39
Total	155	165

BMI value Nutritional status category (WHO)

< 16.0 CED III

16- 16.9 CED II

17- 18.4 CED I

18.5- 24.9 Normal

> 24.9 Overweight

Nutritional status was also assessed on the basis of upper arm circumference standards recommended by James et al. [7].

UAC (cm) Nutritional status

≥ 22 Normal

< 22 Under nourished

Nine Nolia villages were covered for the present study viz. Nua Boxipalli, Venkatraipur, New Venkatraipur, Boxi-

palli, Hatipada, Narainpur, Alipur, Mansulkota and Parvatipur.

Car Nicobarese were studied from the Niocobar island of Andman and Nicobar islands.

All the subjects were explained about the nature of research in advance before starting up the actual study. Informed consent was obtained from each subject who volunteered for the same with the help of local interpreter.

The statistical analysis was carried out using SPSS for windows 13.0 version. Mean, standard deviation and t-test were used to analyse the data.

RESULTS

Table 2 presents distribution of subjects in all the age groups according to BMI. Only 6.6% of Car Nicobarese in youngest age group was found to be underweight as compared to normal category (93.4%). However among young adult Nolias, 60.7% males were found to be underweight and 39.3% belonged to the normal weight category. Among Nolia older age groups, the percentage of underweight increased with an increase in age. However none of the Car Nicobarese elderly was found to be underweight. Most of the elderly Car Nicobarese were found to be classified as normal weight except 2.1% who were overweight.

Almost one fourth of the Nolia population was found to be CED III (25.8%), and more than half population suffered from either CED II(20%) or CED I (37.4%),Table 3. Only 16.8% of Nolias were in normal weight category. On the other hand majority of Car Nicobarese subjects were found to be in normal weight category (98.2%) Most of the Nolias were found to be CED, while Car Nicobarese were in normal nutritional status category as per the BMI classification.

Table 4 displayed distribution of subjects according to upper arm circumference standards among two populations

in different age groups. Car Nicobarese in all age groups were found to belong to the normal weight category. On the other hand among Nolias the percentage of undernourished subjects increased with age.

Car Nicobarese were found to be significantly taller and heavier than Nolias in underweight category of adult group (Table 5). The value of upper arm circumference was less among Nolias as compared to Car Nicobarese. The value of average hand grip strength on the other hand was more among young but under weight Nolias as compared to their counterpart Car Nicobarese but the difference was not statistically significant. Among Nolias height, weight, upper arm circumference, average grip strength and body mass index were found to decline with age.

In normal weight category of subjects (Table 6), height and average grip strength showed a continuous decline with advancing age. However, the weight, upper arm circumference and BMI declined with age among Nolias but not so among Car Nicobarese. Statistically significant differences were found for all the measurements except height for the age group 61-70 years between the two populations groups in normal weight category.

The measurements for overweight Car Nicobarese of 50-60 years (only one subject) was displayed in Table 7. None of the Nolia males were found in over weight category.

DISCUSSION

There is an increase in prevalence of underweight with advancing age among Nolias in the present study. A similar trend with age was reported by Kapoor *et al.* [19]. However among Car Nicobarese none of the elderly was found to be underweight. This characteristic disparity among the two groups studied could be due to a better socio economic status, food habits and awareness among the Car Nicobarese

Table 2. Distribution of Subjects According to BMI

Population	Underweight				Normal				Overweight			
	20-25 years	50-60 years	61-70 years	71-80 years	20-25 years	50-60 years	61-70 years	71-80 years	20-25 years	50-60 years	61-70 years	71-80 years
Nolia	60.7%	77.1%	92%	100%	39.3%	22.9%	8%	-	-	-	-	-
Car Nicobarese	6.6%	-	-	-	93.4%	97.9%	100%	100%	-	2.1%	-	-

Table 3. Distribution of Subjects According to Nutritional Status Based on BMI

Population	CED III	CED II	CED I	Normal	Overweight
Nolia	25.8%	20%	37.4%	16.8%	-
Car Nicobarese	-	0.6%	0.6%	98.2%	0.6%

Table 4. Distribution of Subjects According to Nutritional Status Based on Upper Arm Circumference

Population	20-25 years		50-60 years		61-70 years		71-80 years	
	Normal	Under-nourished	Normal	Under-nourished	Normal	Under-nourished	Normal	Under-nourished
Car Nicobarese	100%	-	100%	-	100%	-	100%	-
Nolias	96.4%	3.6%	83.3%	16.7%	30%	70%	-	100%

Table 5. Body Measurements of Underweight Subjects: A Comparison between Nolias and Car Nicobarese

Age Group	Population	Height (cm)	Weight (kg)	Upper arm circumference (cm)	Average Grip strength (kg)	Body mass index (kg/m ²)
20-25 years	Car Nicobarese	180.6±4.38	54.5±0.71	25.2±0.28	42.37±0.53	16.7±0.59
	Nolia	163.2±2.00	47.7±0.64	24.2±1.50	46.35±1.24	17.9±0.42
	t value	18.4***	13.08***	0.89	4.23***	3.43***
50-60 years	Car Nicobarese	-	-	-	-	-
	Nolia	160.9±1.81	44.9±2.10	23.2±1.71	42.9±1.78	17.4±0.71
61-70 years	Car Nicobarese	-	-	-	-	-
	Nolia	158.2±2.4	40.9±3.19	21.31±2.45	40.88±2.35	16.3±1.12
71-80 years	Car Nicobarese	-	-	-	-	-
	Nolia	157.3±2.02	38.6±1.98	19.71±0.85	35.23±3.22	15.63±0.95

***p < 0.001.

Table 6. Body Measurements of Normal weight Subjects: A Comparison between Nolias and Car Nicobarese

Age Group	Population	Height (cm)	Weight (kg)	Upper arm circumference (cm)	Average Grip strength (kg)	Body mass index (kg/m ²)
20-25 years	Car Nicobarese	160.1±1.73	55.5±1.46	25.5±0.46	43.87±2.07	21.73±0.87
	Nolia	162.3±1.84	50.2±1.40	23.4±0.92	46.31±1.27	19.04±0.48
	t-value	3.59***	10.6***	9.50***	3.75***	9.96***
50-60 years	Car Nicobarese	158.1±3.72	57.0±2.29	26.05±0.93	38.77±3.38	22.83±0.97
	Nolia	160.0±2.12	48.36±1.61	23.22±1.47	43.61±1.16	18.87±0.27
	t-value	1.64*	11.8***	8.08***	4.65***	13.65***
61-70 years	Car Nicobarese	158.4±3.42	55.8±3.01	25.95±0.76	29.25±3.54	22.25±1.3
	Nolia	155.5±3.02	45.4±1.65	20.3±1.29	40.00±2.27	18.77±0.15
	t-value	1.62	6.71***	13.14***	5.87***	5.27***
71-80 years	Car Nicobarese	157.8±3.27	52.01±3.19	25.28±0.89	20.13±2.12	20.89±1.15
	Nolia	-	-	-	-	-

* p<0.01; ***p < 0.001.

Table 7. Body Measurements among Overweight Car Nicobarese*

Age Group	Population	Height (cm)	Weight (kg)	Upper arm circumference (cm)	Average Grip strength (kg)	Body mass index
20-25 years	Car Nicobarese	-	-	-	-	-
	Nolia	-	-	-	-	-
50-60 years	Car Nicobarese	158.3±00	70.00±00	24.70±00	40.00±00	27.93±00
	Nolia	-	-	-	-	-
61-70 years	Car Nicobarese	-	-	-	-	-
	Nolia	-	-	-	-	-
71-80 years	Car Nicobarese	-	-	-	-	-
	Nolia	-	-	-	-	-

*Only one overweight subject was found among Car Nicobarese.

elderly as compared to Noliars elderly. Two percent of Car Nicobarese were found to be overweight with majority of them being normal weight unlike Noliars further strengthen the better nutritional status of the former group. Whatever index to assess nutritional status was taken Noliars were found to be CED that conveys an alarming situation with respect to their nutritional status.

A decline in stature with advancing age in both males and females is a well established fact reported by many researchers [23-26]. One of the reasons for this reduction in stature with age is compression of intervertebral discs that accounts for a decrease in sitting height hence stature. The Car Nicobarese were found to be significantly taller than the Noliars in underweight category. However in normal weight category the Noliars were found to be taller among adult males. The weight of Noliars was found to be significantly lower than that of Car Nicobarese for both normal weight and underweight category.

There is a decline in muscular strength as depicted from average hand grip strength with age among both the population under study. An obvious decline in muscular strength with age in tribal and other communities was reported by earlier researchers [27-29]. The muscular strength of Noliars was found to be higher than the Car Nicobarese. The higher muscular strength among Noliars could be due to their higher physical activity level. A vast majority of the Nolis could be put in a PAL>1.4 based on their physical activity pattern [7] which may be responsible for their higher level of muscular grip strength as compared to relatively less active Car Nicobarese and it could be said that the Noliars had lean BMI, like Raji males, a tribal community living at medium altitude in Indian Himalayas [19].

The better nutritional status of Car Nicobarese as compared to Nolia has been further confirmed by a higher value of upper arm circumference among Car Nicobarese. The Car Nicobarese were reported to have a better nutritional status as confirmed by BMI standards as well as the upper arm circumference cut off values than the Noliars however, the later group has better musculature owing to their involvement in fishing net making, boat making and rigorous boat rowing unlike Car Nicobarese.

Better nutritional status of Car Nicobarese could be explained on the basis of improved socio-economic status of Car Nicobarese as compared to the Noliars. The basic subsistence economy of Car Nicobarese was agriculture followed by government jobs and by fishing activities. More development programmes for the PTG like Car Nicobarese by the government of India contributed significantly to their development. However the Noliars were mainly a fishing community and they also worked as daily labourers to supplement their family income. As they are not classified as Scheduled Tribe, they are not being benefited by various schemes of Government of India. The association of socio-economic status with nutritional status was reported among growing children in Bharia, a primitive tribe of Madhya Pradesh, India [30]. According to the authors most of the Bharia population live in forest tract without modern health care facilities, in poverty and illiteracy. It seems that the combination of these life style indicators which is quite common among many tribal groups is a decisive force in determining nutritional status irrespective of age.

CONCLUSION

The Car Nicobarese were found to have a better nutritional status than the Noliars however the Noliars showed a better muscular strength than the Car Nicobarese pointing towards having lean BMI. The findings of the present study enforces need for some development schemes for the other backward classes like Noliars.

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