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Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

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Short Communication
Low Body Mass Index of Indigenous Andibila Community Residing at High Altitude in Oju, Nigeria: Who Cares?

[1]Daniel Ter Goon, [2]Vincent Oladele Adeniyi, [3]Simon Wuhe Akusu, [4]Benjamin Ijuo Ejeh and [4]Unogwu, O. Unogwu

[1]Faculty of Health Sciences, University of Fort Hare, East London, South Africa
[2]Department of Family Medicine, Faculty of Health Sciences, Walter Sisulu University/Cecilia Makiwane Hospital, East London Hospital Complex, East London, South Africa
[3]Department of Human Kinetics, Benue State University, Makurdi, Nigeria
[4]Department of Physical and Health Education, College of Education, Oju, Nigeria

Abstract

Background and Objective: Whilst information is available on the health status of high altitude populations in different regions elsewhere, none exist on the Andibila community, an indigenous population living at high altitude in Oju, Nigeria. This study was conducted to examine the body weight status of the Andibila adults using body mass index to screen for health risk in this population. **Materials and Methods:** This cross-sectional study involved a convenience sample of 121 Andibila adults residing at high mountain in Oju, Benue state, Nigeria. Anthropometric measurements include weight, height, waist and hip circumferences were determined. Body Mass Index (BMI) (kg m^{-2}) was calculated and utilized as a measure of nutritional status. **Results:** The mean age of the participants was 49.9±16.5 years. The mean values for BMI, waist circumference, waist-to-hip ratio and waist-to-height ratio were 22.05±11.6, 76.56±15.4, 0.91±0.28 and 0.49±0.1, respectively. The extent of undernutrition (BMI<18.5) was high (23.1%). The prevalence of overweight and obesity was 11.6 and 3.3%, respectively. **Conclusion:** The high prevalence of underweight among this indigenous, high altitude population requires serious government intervention.

Key words: Body mass index, underweight, nutritional status, indigenous population, high altitude, Andibila, Nigeria

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Corresponding Author: Daniel Ter Goon, Faculty of Health Sciences, University of Fort Hare, East London, South Africa

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

"Indigenous peoples' health-why are they behind everyone, everywhere?"[1]

Unlike other populations, indigenous communities living at high altitudes are generally not included in national surveys that monitor health status[2]. They face great social disadvantages and poor health compared with the general population[3]. In some regions, indigenous peoples are unrecognised and uncounted[4]. Indigenous peoples are defined as "Tribal peoples in independent countries whose social, cultural and economic conditions distinguish them from other sections of the national community and whose status is regulated wholly or partly by their own customs or traditions or by special laws or regulations..."[5]. According to Maybury-Lewis[6] "They are often considered to be tribal peoples in the sense that they belong to small scale pre-industrial societies that live in comparative isolation and manage their own affairs without the centralized authority of a state".

The Andibila are an indigenous group in Oju, Benue state, Nigeria. For ages, they have lived at the Andibila Mountain (above 1500 m) above sea level. The population of the inhabitants is estimated about 1,550[7]. Andibila is comparatively isolated, economically poor mountain settlement. The main economic activity of the people is subsistence farming. Tapping of palm wine for local consumption and selling are also practised. The Andibila are physically, commercially and culturally isolated within Oju LGA. There are no roads and all indigenous travel is on foot using established foot trails. Basic health and social amenities are non-existent. Over 70% of the people are illiterate[8]. The Andibila people relied mainly on the traditional knowledge they had of medicinal plants to treat their health ailments. Perhaps, due to the secluded nature of the Andibila, there is no published data on the health status of Andibila adults. Understanding the health status of this isolated population characterised by a primordial lifestyle provide important public health insights to guide interventions.

Notwithstanding the drawback of Body Mass Index (BMI) in differentiating between fat mass and fat-free mass, this anthropometric indicator has been widely used to screen for health risk in populations because it is inexpensive, non-invasive and suitable for large-scale surveys. Body mass index is used in public health and clinical nutrition to provide a quick evaluation of nutritional status in terms of obesity or malnutrition risk[9]. Increased BMI is associated with increased risk of mortality, cardiovascular disease and some cancers[10,11]; while lower BMI is associated with an increased risk of mortality, post-surgical complications, infection and length of hospital stay[12,13]. The aim of this study was to present data on the nutritional status of Andibila people, using the Body Mass Index (BMI, kg mG^2).

MATERIALS AND METHODS

Study setting: The study was carried out at Andibila Mountain in Oju, Benue state, Nigeria. Andibila occupies the highland which is a long range that transverse the Southern part of Oju. The highland stretches from Owo on the eastern part, across Andibila, Uwokwu and terminates at the Oyongo and Enyim river valley. Andibila is located at about 6°58' N and 8°27' E. It has an altitude above 1500 m above sea level and is very distant from other rural centres.

Design, sample and sampling: This was a cross-sectional, community-based study involving a convenience sample of 121 participants. Participants were included in this study if they were 18 years and above and residing at Andibila Mountain. Acutely ill, psychotic, debilitated, pregnant or with physical disability were excluded.

Ethical considerations: The community leaders of Andibila people were approached and the aim/purpose of this study explained to them as this tradition demands. With this customary approach, this study received wide publicity and cooperation from the people. The study details were explained and data were subsequently collected from those, providing their verbal consent.

Anthropometric measures: Participants were weighed on electronic scales to the nearest 0.1 kg wearing light clothing and no shoes. Standing height was measured with a stadiometer in barefoot condition with head in the Frankfurt plane. The BMI (kg m^{-2}) was calculated as weight in kilograms divided by the square of height in meters. Girths (waist and hip) were measured with a Lufkin non-extensible flexible anthropometric tape (W606PM, Rosscraft, Canada,) and recorded to the nearest 0.1 cm. Waist circumference was taken with the participant standing, by wrapping the tape at the level of the narrowest point between the lower costal (10th rib) border and the iliac crest. Hip circumference was measured at the widest diameter of the buttocks, at the level of the greater trochanter. Waist-to-hip ratio was derived by dividing the waist circumference by hip circumference. Waist-to-stature ratio was calculated by dividing the waist circumference by height.

Definition of nutritional status: Nutritional status was evaluated using internationally accepted World Health

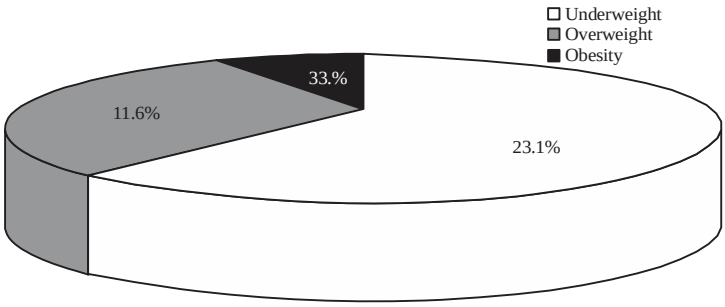

Fig. 1: Body weight disorders of the participants according to BMI classifications

Table 1: Anthropometric characteristics of the participants

Variables	Total (n = 121)	Male (n = 53)	Female (n = 68)
	(Mean±SD)		
Age (years)	49.90±16.5	51.90±19.2	48.40±14.0
Weight (kg)	53.60±9.60	53.00±7.30	54.18±11.1
Height (cm)	158.80±12.0	161.60±16.0	156.60±7.00
Body mass index (kg m^{-2})	22.10±11.6	22.10±17.0	22.00±14.0
Waist circumference (cm)	76.60±15.4	76.20±16.7	76.80±14.4
Waist-to-hip ratio	0.91±0.28	0.90±0.12	0.91±0.36
Waist-to-height ratio	0.49±0.12	0.48±0.14	0.49±0.09

Organisation (WHO) BMI guidelines[14]. The following cut-off points were used: Undernutrition = BMI<18.5, Normal = 18.5≤ BMI<25.0, Overweight = BMI≥25.0 and Obesity = ≥30.00.

Data analysis: Descriptive data were presented as mean and Standard Deviation (SD). All statistical analysis was performed using SPSS 21.0 Statistical Software Program (SPSS, Inc., IBM, Chicago, Illinois, USA).

RESULTS

Of the 121 participants, 53(43.8 %) and 68(56.2 %) were males and females, respectively. Table 1 presents the Mean±SD values of anthropometric variables and body composition of the participants. Mean values of participants was 50.0±16.5, 53.6±9.6 kg, 158.8±12.0 cm and 22.05±11.6 kg m^{-2} for age, weight, height and BMI, respectively. The mean values for waist circumference, waist-to-hip ratio and waist-to-height ratio were 76.6±15.4, 0.91±0.28 and 0.49±0.1, respectively.

Prevalence of underweight, overweight and obesity of the population is shown in Fig. 1. Out of 121 participants, 23.1% (n = 28), 11.6% (n = 14) and 3.3% (n = 4) were underweight, overweight and obese, respectively.

DISCUSSION

For the first time, a health indicator (BMI) of a tribal, secluded mountainous dwelling Andibila community is reported. Notably, the mean BMI of adult Andibila was below the WHO[14] cut-off point (BMI<18.5) for undernutrition. The high prevalence of undernutrition among this tribal population residing on a high altitude could have serious health implications. From the public health standpoint, immediate nutritional intervention programmes need to be implemented for this indigenous group. Undernutrition has several underlying causes. The majority of the Andibila people are illiterate and very low-income earning manual labourer. They belong to a low-socio-economic class. Perhaps, due to poverty or cultural underpinnings and environmental deprivation, the Andibila generally consumed less proteins, fat, milk and milk products. However, the consumption of alcoholic beverages and smoking of local tobacco among them is traditional practice and is very common. Smokers, it is postulated are less likely overweight[15]; however, other health conditions associated with smoking like cancer should be considered. Anecdotal as these might seems, it should not be ignored as providing probable reasons for the poor nutrition status among the Andibila community living at high altitude. Besides, it is not known whether altitudinal variables such as hypoxia, cold, rough terrain and low vapour tension had effect on the metabolic processes and nutritional requirements of the Andibila. Previous studies have reported low body weight and BMI among rural high altitude populations[16]. Many indigenous populations live in poverty with poor infrastructure and their health problems might reasonably be linked to an absence of local resources, although evidence indicates more specific interplay of social forces[17]. The African

Commission on Human and Peoples Right (ACHPR) and International Working Group on Indigenous Affairs (IWGIA)[18] aptly describes the condition of Indigenous peoples' thus.

"The infrastructure in most areas occupied by Indigenous peoples is either lacking or is inadequate. Social services such as schools and health facilities are few and far between, while the roads and other physical infrastructure is equally poor. This has had a negative impact on the staffing levels and quality of services offered. As a result, illiteracy levels and mortality rates in such areas are higher than national averages". This situation mirrors the Andibila situation. They have no roads; the only primary school built for them is located at the base of the mountain, where the children daily descend and ascend to attend school. Health and social facilities are completely absent. Research on the environmental, socio-economic and genetic factors affecting the nutritional status of Andibila is needed, as this will aid our understanding of, not just the low BMI among this secluded, high altitude population but other health indicators as well.

Obesity was rared among the Andibila population. Obesity is known to be inversely associated with elevation[19] and decreases with an increasing level of altitude[20]. A previous study among the Andibila school children living at high altitudes showed scarcity of obesity and only 2.1% overweight compared with children living at sea level[8]. Reduced temperature at increased elevation may lead to weight loss through catabolic effects[20]; as metabolic expenditures are required to cope with extreme temperatures[21]. In this regards, the lower prevalence of overweight among Andibila community could be attributed to cold temperature and poverty-related factors. The Andibila community are economically poor. They relied on subsistence farming for their income, with basically no assistance from the government. Access to health care is also poor, partly due to their physical isolation and of course, perhaps due to their weak position within national priority-setting. This resonant with the question: "Indigenous peoples' health-why are they behind everyone, everywhere?"[1].

The sample size of the study was small and the results may not represent the whole population. The limited size of this sample does not allow us to apply any kind of statistical analyses (for instance age/sex adjustment). Notwithstanding, the study provide an insight on the health status of an isolated, tribal, high altitude Andibila's population which is under-studied.

CONCLUSION

The high prevalence of underweight among the Andibila people is a serious health condition that requires urgent intervention by the government. Improving living socio-economic conditions to this population is advocated. They demand attention, not neglect to improve their health conditions as a people living in a wider community.

SIGNIFICANT STATEMENTS

This is the first study to assess the health status of Andibila people, a secluded community living at high altitude in Oju, Nigeria. The study revealed that the majority of the people are underweight. The undernutrition status of the population requires serious government attention.

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