



The Anthropological Approach to Undernutrition

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Abstract: This research paper delves into the anthropological perspective on undernutrition, which has evolved since the 1930s, focusing on the intricate interplay between nutrition, culture, and adaptation. Anthropologists have contributed significantly to the study of undernutrition by identifying cultural practices as key factors leading to a heightened likelihood of undernutrition. However, the paper highlights the need for a more nuanced approach to understanding and measuring undernutrition. Traditional anthropometric indicators, such as weight, height, and upper-arm circumference, have long been used to assess undernutrition. These symptom-based measures are essential but may not provide a comprehensive picture. The paper introduces the concept of the adaptation hypothesis, which suggests that an individual's ability to adapt to a lower nutritional intake, even to the point of a lower body weight, should be considered when classifying undernutrition. This hypothesis challenges the conventional understanding of undernutrition based solely on physical symptoms.

The paper emphasises the importance of considering energy balance and dietary intake alongside anthropometric measures to better understand undernutrition. It discusses the energy balance equation, which highlights the intricate relationship between energy expenditure, intake, and changes in body fat reserves. Moreover, it explores the adaptation process within individuals, suggesting that individuals can adjust their weight while maintaining their physical activity level, even below the typical threshold for nutritional adequacy. In conclusion, the paper calls for a more comprehensive and dynamic approach to measuring undernutrition, considering not only symptom-based indicators but also energy balance and adaptation. Such an approach is crucial for a more accurate assessment

Received : 30 October 2023

Revised : 26 November 2023

Accepted : 05 December 2023

Published : 26 December 2023

TO CITE THIS ARTICLE:

Saugato, S. (2023). The Anthropological Approach to Undernutrition, *Indian Journal of Anthropological Research*, 2: 2, pp. 205-214. <https://DOI:10.47509/IJAR.2023.v02i02.07>

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of nutritional status, particularly among adults. This expanded perspective has implications for designing effective interventions and addressing undernutrition in a more holistic manner, with the potential to make a significant impact on public health and policy development. The paper encourages further research and scrutiny in this direction, seeking to refine the measurement methods and address issues of energy balance and adaptation in the context of undernutrition.

Keywords: Anthropological Approach, Undernutrition, Adaptation Hypothesis, Energy Balance, Measurement

Introduction

Social Scientists have studied and documented human poverty, hunger and deprivation. Almost every social science has investigated the issues of hunger, starvation and undernutrition. An important part of the focus on undernutrition has been on the assessment of undernutrition. The anthropological approach to the study of nutrition, or broadly the area of 'Anthropology and Food' can be said to have taken off only in the 1930s. Richards and Widdowson (1936) helped to create a 'dialogue' between anthropologists and nutritionists. Audrey Richards can well be considered to be the first anthropologist to focus on the anthropology of food (Richards, 1932, 1939). As the topic of nutrition has been studied by scholars of various disciplines, like nutrition science, anthropology, economics and so on, each discipline has brought its own perspective to bear on studying undernutrition and documenting certain episodes of undernutrition among certain populations.

Anthropologists have also turned their gaze on the problem of food inadequacy and food insecurity in individuals and populations. They have attempted to approach food and nutrition from cultural, social and biological perspectives and to study nutrition at the individual and populations level. In the study specifically of undernutrition, one of the biggest contribution of the discipline has been to identify cultural habits and practices as factors that lead to heightened probability of undernutrition.

When we speak of undernutrition, it appears to be clear that in the background is an idea of a benchmark or threshold level of nutritional adequacy. This in turn begs the question as to what is 'nutrition' and what does 'adequacy' mean in this context. Once nutritional adequacy has been defined, the next issue in this context is to identify the undernourished, and to look at the geographical spread, this is relevant in the case of population undernutrition. We may of course, measure

nutritional level of an individual and try to see whether the nutritional intake of this person is below the threshold level. The standards of nutritional adequacy, to be kept in mind, are defined for a population or subpopulation, and a measure of the mean is generally taken as the benchmark. Anthropological studies on undernutrition have typically explored various indicators. Other than the questions of nutritional adequacy and the identification of the undernourished, there is the question of whether undernutrition is chronic or short run. Finally a very important area of research is to enquire into the determinants and factors that influence the level of undernutrition.

The focus is on bringing out the relationship between indicators of undernutrition, and devising an appropriate threshold level of nutritional adequacy. The paper also discusses the auto-regulatory and adaptive mechanisms in individuals that allow them to maintain their nutritional status in the very short run. The paper presents a plea for acknowledging, if not incorporating, the auto-regulatory and adaptation hypothesis in the anthropological perspective on undernutrition.

The next section presents a discussion on the concept of nutritional adequacy and balance. Indicators of undernutrition have been discussed. Anthropometric and other measures to quantify individual and group undernutrition are presented. It is argued that indicators of undernutrition can be seen as capturing outcomes of underlying undernutrition. These indicators show what the symptoms, so to speak, are of acute or chronic undernutrition. This section points out that the indicators by themselves cannot suggest, or directly follow from, the nutritional adequacy threshold or cut-off levels. The third section begins from this observation and presents a discussion on the calorie requirement. It shows how and why primacy is given to energy over other nutritive elements in devising nutritional standards. The section discusses the energy balance equation and also discusses the role of minimum calorie requirements in the devising of poverty lines in several countries. The subsequent section describes the proposition that a person's nutritional requirements are not fixed, but rather, there is a range such that if nutritional intakes lie within this the range the person need not be considered undernourished. Usually interpersonal variation in nutritional requirements and intakes are attributed to effects such as sanitation, availability of clean drinking water, presence or absence of disease, genetic makeup, other physiological considerations and so on. The adaptation and auto regulation hypothesis posits about nutritional adequacy at the intrapersonal level. The section builds a case to suggest that anthropological approach should look

at intrapersonal distribution of nutritional status as well as interpersonal distribution of nutrients and energy.

Measuring Undernutrition

Traditionally, malnutrition has been the term used to denote what is now called undernutrition. It took some time for experts to realise that obesity and overweight are also serious nutritional imbalance issues. Hence, over time, the term malnutrition came to be associated with any imbalanced nutritional status and intake. To show that nutritional status and intake is below the minimum stipulated or required norms, the term undernutrition is used.

The next question is how to measure undernutrition. The anthropometric approach- which is by and large the approach followed in the anthropological approach to undernutrition—assumes that individuals' physical appearance reflects their nutrition status. This means that if energy balances with a level below the minimum required level, this will be reflected in the constitution of individuals' bodies. Anthropologists typically use four methods to test nutritional adequacy at the individual level: anthropometric method, clinical method, biochemical method, and dietary intake method. The anthropometric method involves looking at height, weight, mid-upper arm circumference, and head and chest circumference. Of course, not all measures are used together, and sometimes a few may be combined. Common ones are weight for age, height for age and weight for height. Especially for children, low height for age denotes stunting, low weight for age (weight in terms of the weight of a reference child) shows the child is underweight and low height for weight shows wasting. A common measure combining height and weight is the Body Mass Index, or BMI, which is weight in kg, by square of the height in metres. BMI is used mainly for adults. A score of less than 18.5 Kg/m² indicates undernutrition. Dietary intake method aims at intake of nutrients and observes whether the levels of protein and energy is below a certain level recommended for different categories of the population by some nutrition agency or organisation.

Coming back to the three measures of weight for age, height for age and weight for height, the three are not so distinct from each other, or one is not the sum of the other two. If we denote weight for age by W/A , height for age by H/A and weight for height as W/H , it is obvious that weight for age is a product of the other two:

$$W/A = H/A \times W/H$$

In the anthropological approach to undernutrition, these anthropometric indicators are sometimes combined in a particular way to compute a composite

index of anthropometric failure. Suppose we consider the deviation in weight-for-age; the deviation in height-for-age; and the deviation (from the mean or median) in weight-for-height. These deviations can be positive or negative. We compute the sum of all the negative indicators, and subtract it from one (1). The figure arrived at is the composite index. In a single measure, this composite index provides a comprehensive understanding about an individual's or a population's nutritional status by capturing the combined effects of deviations in weight-for-age, height-for-age, and weight-for-height.

The anthropometric measures, thus, rely on observing body parameters like weight, height and so on. A related approach as was alluded to earlier focuses on the dietary intake of individuals and determining if it is adequate. Chief among the nutrients are the number of calories (energy units). Since the extension to the usual measurement of undernutrition relies on energy intake and expenditure as a parameter, we need to provide a short discussion on the energy equation.

Energy Balance and Energy Requirement

The energy balance is usually depicted by an equation that is derived from the Second Law of Thermodynamics. Basically it says that energy expended is equal to energy (calorie) intake plus (or minus) change in the fat component. If we denote energy by E , food intake by I and change in fat reserves in the body by dF then for the i^{th} individual, we have

$$E_i = I_i - dF_i$$

If for an individual, her energy expenditure E equals her nutrient intake then she is in energy balance, and dF equals zero.

Of course, it is to be understood that nutritional status is also influenced by other factors like disease, sanitation, as well as genetic factors. But controlling these, we get the energy balance equation.

Sometimes the energy expended is broken down in terms of different purposes and activities for which energy is expended. There is the Basal Metabolic Rate (BMR), which is the basic energy expended for mere survival. Then there is energy expended for internal body activities. The Food and Agricultural Organisation (FAO) and the WHO label this as baseline expenditure. Finally there is energy spent for social activities and work. The baseline expenditure and expenditure of energy for external physical work are called Physical Activity Level (PAL). This is expressed as a multiple of the BMR.

Thus for an individual I or for an individual in some category I , the energy balance equation is:

$$E_i = I_i - dF_i - PAL_i \times BMR(F_i)$$

Autoregulation and the Adaptation Hypothesis

Since the late seventies and particularly the early 1980s, a new paradigm has appeared which aims to suggest that merely a drop in the weight of the individual should not be taken to indicate a drop in the nutritional status of the individual. To extend the argument, if a person has a weight that is, in relation to his age or height, above the threshold level of nutritional adequacy, and if due to reduction of nutritional intakes, the individual's weight falls, it should not be taken to mean that the individual is now undernourished. The adaptation hypothesis suggests that the body is capable up to a point to adapt to the lower intake by a reduction of weight, but this in no way affects the individual's ability to carry out the same physical activities as before. The adaptation hypothesis basically suggests that merely considering symptoms as indicators of undernutrition may be misleading. There is a certain range below the average minimum norm (often taken to be two standard deviations below the mean), till which point the individual can permanently adapt her body weight with no impairment or reduction in physical activity. The controversial part about the adaptation hypothesis is its claim that the person can permanently adapt her weight at the lower point without any difficulty in carrying out her usual physical activities. Also some critics of this hypothesis have confounded between intrapersonal and interpersonal adaptation.

Extending the Traditional Approach

Historically, the problem of nutritional adequacy was measured in terms of protein requirement only. For this, the general availability of food was studied and it was examined as to whether food availability was adequate. If so, within this the diet was examined to see whether there was adequate protein available. Subsequently energy requirements came to acquire pride of place among nutrients. But nutritionists began to talk of protein-energy malnutrition (PEM). Here it may be mentioned that malnutrition is being referred to in the sense of undernutrition, because till recently, in the context of developing nations, malnutrition and undernutrition were used synonymously as the problem of obesity was not considered widespread or acute in developing nations. Moreover, recently being nourished has meant having an adequate amount of micronutrients.

In the context of our discussion, the anthropological approach has focussed on bodily indicators of undernutrition like weight, height, upper-arm circumference. These as has been mentioned are 'symptoms' based. But even where this approach has utilised dietary intakes, the idea has been to

look at some cut-off level and anything lower than this denotes undernutrition. However the adaptation hypothesis suggests that greater care be taken to classify undernutrition and adequately nourished, since there is the danger of overestimation of the undernourished. Many of those classified as undernourished may just be adapting by burning off fat and adjusting their weights. Thus a nuanced approach is to be taken in terms of measurement aspect.

The fundamental idea is that identifying the undernourished, particularly adults, should not merely stop at symptom-based measures like weight and height, but must also look at dietary intake, and particularly energy accounting. Moreover, that the individual can adapt, even permanently, and adjust to a lower weight, must be taken into consideration. Thus measures should ideally be in the form of time-series and inferences should be drawn from the analysis of such data. Researchers must not limit themselves to data at single point but must think in terms of distribution of the data.

Conclusion

Several disciplines like nutrition science, anthropology and economics have evinced a keen interest in the conceptualisation and measurement of undernutrition. In several developing countries, poverty lines have been constructed using threshold levels of nutrition and seeing whether an individual has enough income to afford a basket of food that yields that level of nutrition.

Each discipline has its own measurement methods, as well as issues. The anthropological approach has focussed on measures regarding the body like weight and height, yielding BMI. Also, composite index of anthropometric failure has been constructed. However there is much need in this approach to contend with, subject to scrutiny, and generally to make a part of the measurement methods, issues regarding energy balance, as well as the adaptation process in individuals.

This research paper has shed light on the need for a more nuanced and comprehensive approach to understanding and measuring undernutrition. While traditional anthropometric indicators like weight, height, and upper-arm circumference remain crucial for assessing undernutrition, they alone may not provide a complete picture. The introduction of the adaptation hypothesis has challenged the conventional understanding of undernutrition, suggesting that an individual's ability to adapt to lower nutritional intake and even reduce body weight without compromising their physical activity level should be considered when classifying undernutrition. This shift in perspective calls for

the inclusion of energy balance and dietary intake, alongside anthropometric measures, highlighting the intricate relationship between energy expenditure, intake, and changes in body fat reserves.

This expanded approach to measuring undernutrition has important implications for assessing nutritional status in adults and designing effective interventions to combat undernutrition. By considering both symptom-based indicators and energy balance, we can gain a more accurate understanding of undernutrition, which, in turn, can inform more holistic public health policies. However, it is essential to acknowledge the need for further research and refinement of measurement methods to account for the complex interplay of energy balance and adaptation in the context of undernutrition.

Incorporating these insights into the anthropological approach to undernutrition not only broadens our understanding but also addresses the limitations of traditional measurements, ultimately contributing to more effective strategies for tackling undernutrition in diverse populations and improving the well-being of individuals and communities. As we move forward, it is imperative to continue exploring these concepts, expanding our knowledge base, and working towards a comprehensive approach to addressing undernutrition in a changing world.

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