

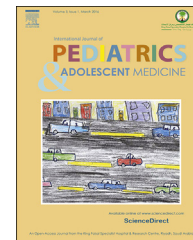
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Original Research Article

Prevalence of undernutrition and associated factors: A cross-sectional study among rural adolescents in West Bengal, India

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Q1 KEYWORDS

Adolescent;
Malnutrition;
Stunting;
Thinness;
Sociodemographic factors

Abstract *Background and objectives:* Malnutrition is a silent emergency. It is one of the most common causes of morbidity and mortality among children and adolescents throughout the world. The present study was undertaken to investigate the prevalence of malnutrition among 10- to 17-year-old adolescents and its association with socio-demographic factors.

Subjects and method: Anthropometric measures were measured using standard techniques in 560 adolescents from rural areas of West Bengal state, India. Different socio-demographic variables were studied by questionnaire method.

Results: In the present investigation, approximately 54% of adolescents had stunted growth, and 49% were thin. The adolescents who belonged to lower social classes were significantly more likely to have stunted growth (OR = 2.68) and be thin (OR = 2.44). Other variables such as father's occupation, mother's education, economic status and sanitation showed significant negative association with undernutrition. However, mother's working status showed significant positive association with undernutrition. Adolescents of working mothers were more likely to be stunted and thin than those with mothers who do not work outside of the home. The adolescents of women with higher education were less likely to be undernourished than adolescents of poor and uneducated women. Adolescents of nuclear families (family size <4) were more likely to be stunted and thin.

Conclusions: Poverty is found to be an important factor of undernutrition among the adolescents. Hence, there is a need to implement well-thought poverty reduction actions along

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with providing mass education regarding nutrition and health, with a special focus on economically and socially deprived sections of society.

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1. Introduction

Malnutrition is a silent emergency, and it continues to be a major public health problem worldwide, especially in South-East Asia and sub-Saharan Africa. It is an indicator of poor nutrition, having a major consequence on human health as well as for the social and economic development of a population [1]. It is one of the most common causes of morbidity and mortality among children and adolescents throughout the world [2]. Every year, more than 10 million children worldwide die from preventable and treatable illnesses. At least half of these deaths are caused by malnutrition [3]. The health consequences of a prolonged state of malnutrition among children and adolescents include delayed their physical growth and impair motor and cognitive development, diminished cognitive performance, lower intellectual quotient (IQ), poor social skills, greater behavioral problems and vulnerability to contracting diseases [3,4]. Moreover, malnutrition also leads to important consequences in adult life in terms of physical growth, work capacity, reproductive performances and risk of chronic diseases [5]. The global scope of malnutrition is still unacceptably high, and the progress to reduce it is slow [6]. Malnutrition continues to be one of India's major human development challenge. Despite enormous economic progress achieved in the past two to three decades, malnutrition among children and adolescents in both urban and rural India still claims many lives due to the immense population size, illiteracy, inadequate access to health facilities, and socioeconomic disparities in India. As a result, nutritional assessments among the adolescent and children play a potential role in formulating developmental strategies and programs in India.

The studies of malnutrition at national and local levels have focused predominantly on children under 5 years of age. There is little information available from adolescents, the age group, with the highest growth velocity after infancy. The adolescent period is a very important phase in the life span of an individual. It is defined as the transition period from childhood to adulthood and is characterized by an exceptionally rapid growth. During this stage of the life cycle, adolescents experience rapid growth and developmental changes such as physical growth, improved gross and fine motor skills and biological maturity. The nutritional status of adolescents requires close monitoring because they represent the next generation of parents. This heightened physical growth depends upon dieting behavior and socio-economic status. Several epidemiological studies have shown an association between physical developments in adolescent period with socio-economic status [7–15]. Such a database is lacking at the moment in India. These types of database will enable the

government and nongovernmental agencies to formulate policies for well-being of the adolescents.

There is little information available on the nutritional status of adolescents from West Bengal, although some important scientific papers are mentioned here [16–20]. West Bengal is a state in eastern India that stretches from the Himalayas in the North to the Bay of Bengal in the South and is the fourth-most populated state in the nation, with over 91 million inhabitants (7.55% of India's population) [21]. West Bengal's climate varies from tropical Savanna in the southern portions to humid subtropical in the north. The main seasons are summer, the rainy season, a short autumn, and winter. Monsoons bring rain to the whole state from June to September. The predominant occupation is agriculture.

The aim of the present study was to investigate the prevalence of malnutrition among adolescents in the rural areas of West Bengal and examine the possible association of different sociodemographic factors with malnutrition.

2. Materials and methods

2.1. Study participants

This cross-sectional descriptive study was conducted between May 2014 to April 2015 on 839 subjects, out of which 408 (48.63%) were boys and 431 were (51.37%) girls. Participants were selected from different villages of Howrah, Birbhum, and East and West Midnapore districts of West Bengal state, India. The eligibility criteria for recruitment of the participants for the present study were 10–17 years old; apparently, healthy and not suffering from any acute illness. Participants with background of acute (diarrhea, measles, mumps, chicken pox, etc.) or chronic (asthma, diabetes, cardio-vascular disease, epilepsy, tuberculosis, dermatitis, intestinal problems, etc.) diseases were excluded from the study. The authors disqualified 143 (17.04%) participants because they were not eligible based on these criteria. Among the 696 eligible participants, 79 were not interested to participate in the present study. Among the remaining 617 participants, 57 participants were excluded from the study due to missing or incomplete data. Thus, a total of 560 (80.46% of eligible) adolescents participated in the present survey.

2.2. Sample design

A stratified two-stage random cluster sampling was utilized for selecting participants. At first, fifteen clusters (village) were selected from each district. Then, a systematic random sampling method was used to identify 15

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