

The Current Status and Influencing Factors of Malnutrition in Children and Adolescents

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Abstract. By looking at the present situation of malnutrition among children and adolescents around the world and in China, the paper analyzed the principal elements that led to adolescent malnutrition and existing research had shown that diseases brought about by malnutrition like stunted growth and obesity were common among adolescents all over the world and among them, "hidden hunger" deserved special attention because it was present in various physical issues resulting from malnutrition and the elements affecting malnutrition mainly covered five areas: eating habits, living style, physical well - being, social surroundings, and mental state and the study would explain these five aspects and suggest efficient ways to intervene in adolescent malnutrition at the family, school, and social levels according to these elements and the findings showed that the malnutrition issue among children and adolescents in China had complicated features such as the coexistence of nutritional shortages and overweight/obesity as well as widespread lack of trace elements and the chief influencing elements included diet structure, living pattern, physical health condition, social environment, and mental health which also differed among different age groups and interacted with one another and based on this knowledge, interventions should be coordinated at multiple levels including family, school, society, and the public health system to deal with malnutrition issues in diverse situations.

Keywords: Malnutrition, Children, Adolescents, Hidden Hunger.

1. Introduction

Childhood and adolescence represent crucial phases in human development and the efficient uptake of nutrients plays a vital role during these periods as they directly impact the physical growth, cognitive ability, and long - term well - being of children and adolescents. Although the social economy in China has developed rapidly and the nutritional state of children and adolescents has improved considerably, the issue of malnutrition still exists. Research indicates that 4.8% of Chinese children and adolescents aged 6 - 17 experience growth delays (with a high of 7.8% in rural areas compared to 2.3% in cities) and the prevalence of overweight and obesity among them has reached 19.0% (with an obesity rate of 6.8%), with the obesity growth rate in rural areas surpassing that in urban areas. Globally, around 157 million children under five are affected by growth delays and in many low - income nations, families often cannot afford good daily nutrition, resulting in widespread malnutrition among children. Obesity and overweight in childhood also occur and in most countries, malnutrition and obesity coexist. At present, China is at a crucial juncture in implementing the Healthy China initiative and the healthy development of children and adolescents forms a fundamental part of constructing a Healthy China. Examining the current features of malnutrition among children and adolescents and delving into the main factors influencing it could offer a scientific foundation for precisely formulating nutritional intervention strategies and enhancing the nutritional security system for children and adolescents, which would be of great significance both theoretically and practically for elevating China's population health quality and strengthening the social development base. Previous domestic research was too superficial, so this study aimed to thoroughly understand the malnutrition situation and its influencing factors among Chinese children and adolescents and investigate feasible intervention strategies to provide theoretical and practical support for formulating scientific nutritional intervention measures.

2. Current Status and Influencing Factors

2.1. Current Situation of Malnutrition in Children and Adolescents

Among the health disorders brought about by poor nutrition in children and teenagers, retarded growth is the most characteristic sign and based on relevant figures, the prevalence of growth retardation among kids under six years old in China was 4.8% and that among children and adolescents between six and seventeen years old was 1.7%, and although there had been some improvement in this matter over the past few years, the situation of sluggish growth resulting from inadequate nutrient consumption still prevailed widely in both rural and urban areas with rural zones having much higher rates than urban ones; another significant public health problem triggered by malnutrition - childhood obesity which was also quite common in China and relevant statistics showed that the obesity rate among children under six years old was 3.6% and that among children and adolescents aged six to seventeen was 7.9%, and these overweight and obese children were not only more likely to suffer from metabolic issues like high blood pressure and high blood sugar [1,2] but also had a greater likelihood of experiencing hidden hunger which was yet another common nutritional problem among children and adolescents and in recent years, high - calorie and high - sugar foods had become popular in the market causing excessive calorie intake while there was insufficient intake of vitamins, minerals, dietary fiber, and other trace elements.

2.2. Main Types and Concepts of Malnutrition

Child and adolescent malnutrition is a syndrome that occurs during the crucial growth and development phase from birth up to 18 years old, arises due to either not having enough, having too much, or having an unbalanced diet, or because of factors like diseases and poor absorption, leads to a divergence from the normal nutritional state which can result in visible or potential damage to health and development; based on the World Health Organization (WHO) standards, the key diagnostic factor is an abnormal variation in growth indicators - for example, height, weight, and body mass index - or in biomarkers such as serum nutrient levels when compared to reference groups of the same age and sex; in clinical and public health work, malnutrition among children and adolescents is usually divided into three main kinds, the first being undernutrition which encompasses protein - energy malnutrition - mainly showing up as stunted growth and emaciation and still rather common in rural and less developed parts of China - as well as deficiencies in trace nutrients, both mostly caused by insufficient intake or nutrient loss related to diseases, the second kind being overnutrition which happens when there is a long - term imbalance with energy taken in surpassing what is expended, this type is strongly linked to lifestyle elements such as high - fat, high - sugar diets and lack of physical exercise and its incidence is now increasing very fast among urban children and adolescents in China, reflecting bad diet quality it presents one of the major obstacles in present - day nutritional intervention attempts.

2.3. Influencing Factors of Malnutrition in Children and Adolescents

2.3.1 Dietary Patterns of Children and Adolescents

Dietary behavior plays a direct and crucial role in child malnutrition and diverse adverse nutritional states such as under - nutrition, being overweight or obese, and having hidden hunger are all strongly associated with dietary habits; nowadays, many children consume too much of processed foods rich in oil, sugar, and salt (for instance, potato chips and sugary drinks) which are full of energy and often go beyond what children truly need, and excessive intake of sugary foods raises blood sugar levels and promotes more insulin secretion after which extra glucose is turned into triglycerides by insulin and stored in fat cells while too much saturated and trans - fatty acid from the diet are directly put into fat tissue, thus increasing fat production and storage which directly pushes the development of being overweight or obese; relevant surveys showed that even though 95.4% of those surveyed knew how important food nutrition was, only 41.5% gave priority to nutritional value over things like taste and cost, so not enough vegetables, fruits, whole grains, and high - quality proteins (like fish, shrimp,

and soy products) were consumed leading to energy excess and insufficient micronutrient intake which caused hidden hunger and even people with normal body weight might suffer from malnutrition [3]. Also, children and teenagers often miss breakfast and have irregular eating times, long - term irregular eating patterns could result in not getting enough energy and essential nutrients which would harm children's cognitive abilities and moreover, lacking sufficient morning energy might make teenagers pick high - fat, high - sugar foods for lunch and dinner worsening a bad cycle.

2.3.2 Lifestyle of Children and Adolescents

Contemporary adolescents show overly much reliance on electronic apparatuses, causing most young individuals to have not enough outdoor activities and unregulated sleep routines, and these circumstances together brought about a decrease in total energy expenditure (TEE), making there be an energy excess from food intake, and at the same time, physical non - activity increased the incidence of hypertension, diabetes, and dyslipidemia, and long - term muscle non - use further cut down resting energy expenditure, forming a vicious circle among physical non - activity, lessened basal metabolic rate, and weight increase [4]. Also, adolescents' overuse of electronic devices led to lack of sleep, and the shortened sleep length disturbed the pulsatile secretion of growth hormone (with the highest secretion during the night), harming protein synthesis and linear growth as well as bone and organ development, and more secretion of ghrelin caused eating disorders like binge eating or loss of appetite, which was bad for adolescents' health; moreover, general drug use decreased melatonin secretion (by 18.7%) and rapid eye movement (REM) sleep, messing up sleep cycles and worsening circadian cognitive and emotional problems [5]. Some adolescents had unhealthy practices such as smoking and alcohol misuse, and smoking injured the respiratory mucosa while nicotine restrained taste buds, decreasing the desire to eat, and drinking alcohol hindered the absorption of vitamin B1 and folic acid, resulting in cognitive damage, interference with red blood cell formation, liver metabolic function disorder, and lower protein synthesis efficiency, thus impairing nutrient transformation and storage [6].

2.3.3 Physical Health Status of Children and Adolescents

The physical well - being of children and teenagers has a substantial influence on their nutrient uptake as well and disease elements could bring about or worsen malnutrition, for example, disorders in the digestive system (like long - term diarrhea and lactose malabsorption) might harm the intestinal lining, cut down on the secretion or effectiveness of digestive enzymes (for instance, lactase), and lower the rate at which proteins, vitamins, and minerals are absorbed, causing poor digestion so that even if a great deal of food was consumed, it might be expelled without proper digestion and moreover, inflammation in the intestines could hinder absorption and possibly lead to the loss of proteins and iron from the blood; infectious illnesses (such as pneumonia, parasitic infections) and long - lasting inflammatory conditions could set off systemic inflammatory reactions, bringing about a hypermetabolic state: higher core body temperature, faster breakdown of proteins, and a sudden jump in energy expenditure, all beyond normal limits and not promptly restocking the necessary nutrients could result in a negative nitrogen balance and nutritional shortages; what is more, obesity stemming from malnutrition might promote the emergence of associated chronic diseases, forming a harmful cycle between malnutrition and serious diseases like how obesity could lead to kidney problems via metabolic syndrome where common risk factors group together and some patients might eventually have their kidney function decline [7].

2.3.4 Social Environment of Children and Adolescents

A great many low - income households are unable to bear the cost of purchasing foods abundant in high - quality protein, trace elements, and fresh produce because of economic constraints, which leads to a deficiency in nutrient intake during the adolescent growth phase, and some teenagers also overconsume "triple - no" substandard foods with excessive salt, fat, and oil, causing a long - term nutritional imbalance; although China had issued a number of policy documents like the "Outline of Healthy China 2030", stressing the enhancement of children's and teenagers' nutrition, the policy

implementation in certain areas was still deficient and the nutritional intervention measures lacked continuity [8]. Nowadays, given the extensive use of mobile phones in society, the internet's spreading power greatly impacts children's and teenagers' dietary awareness, and some food brands draw consumers' attention via exaggerated promotions or improper marketing methods, unintentionally promoting high - energy, low - nutrition eating patterns, and the herd mentality among adolescents and social - cultural ideas might also quietly influence their pursuit of an unhealthy "pale, youthful, and slim" body type, while the healthcare system is short of adequate screening and intervention abilities regarding malnutrition and some primary healthcare facilities are without professional nutritional evaluation devices and staff, so it was difficult to spot children's and teenagers' nutritional problems early on and offer targeted advice.

2.3.5 Mental Health of Children and Adolescents

In the context of tremendous financial and educational strains within modern families, a great number of teenagers are confronted with diverse mental health problems and chief among these are psychological abnormalities like anxiety and depression which can trigger abnormal eating patterns such as decreased food consumption because of low spirits and self - deprivation, thus leading to a lack of essential nutrients including vitamins, energy, and minerals, while they might also overeat with features of consuming large amounts of high - sugar and high - fat processed foods, which causes excess energy intake and insufficient absorption of trace elements, consequently bringing about hidden malnutrition; long - term psychological suffering activates the hypothalamic - pituitary - adrenal (HPA) axis making sebastrol levels remain high for a long time and this hormone accelerates the breakdown of muscle proteins causing teenagers to lose weight quickly, at the same time it suppresses insulin secretion and disrupts mineral absorption in the intestines increasing the likelihood of nutrition - related illnesses such as iron - deficiency anemia and osteoporosis, and malnutrition also impacts the production of neurotransmitters worsening adolescents' mental disorders and forming a vicious circle of mental health problems and malnutrition.

2.3.6 Age of Children and Adolescents

Age constitutes a crucial physiological element that has an impact on malnutrition among children and adolescents and as growth and development advanced, substantial distinctions in physiological requirements, dietary conduct, and environmental adaptability gave rise to diverse age - specific patterns of malnutrition risk; the infancy period from 0 to 3 years denoted the zenith of growth rate throughout life with an exceptionally high necessity for micronutrients, nevertheless, their digestive and absorptive systems were not fully developed so they were highly prone to protein - energy malnutrition and iron - deficiency anemia when feeding methods were unsuitable which could have long - term irreversible effects on growth paths; in the pre - school phase between 4 and 6 years, children's capacity to feed themselves enhanced but their dietary habits remained unsteady with prevalent pickiness and a preference for particular foods and coupled with irregular outdoor activities, this frequently led to simultaneous deficiencies in micronutrients and imbalances in energy; the school - age stage from 7 to 12 years witnessed the emergence of initial academic stress and if the combinations of school meals were not well - balanced, it might result in a relative lack of calories and shortages in dietary fiber and minerals like calcium; during the adolescent stage from 13 to 18 years, the second growth spurt took place marked by rapid height and weight gains causing a steep increase in energy and nutrient needs and at the same time, psychological alterations during adolescence could induce irregular eating habits, extreme dieting, or more consumption of high - calorie snacks and along with sedentary behaviors due to academic pressure, this stage turned into a high - risk period for both being overweight/obese and various kinds of "hidden hunger".

3. Strategies for Preventing Malnutrition in Children and Adolescents

3.1. Family Level

At the family level, parents could assist in averting malnutrition by meticulously planning meals, which entails guaranteeing that every day there was a proper balance among the quantities of protein, energy and crucial trace nutrients consumed as they were supposed to offer an array of whole grains, fresh fruit and vegetables, fish, shellfish and lean meat so that children might be less dependent on food high in fat and sugar and establishing fixed mealtimes and apportioning energy intake reasonably between breakfast, lunch and dinner with breakfast and dinner being comparatively light while restricting children's intake of sugary beverages and high - fat snacks could forestall excessive calorie consumption and encourage healthier eating patterns and creating a warm and stress - free home atmosphere was also vital as parents needed to be concerned about their children's mental state, discuss academic pressures frankly and refrain from piling on stress via excessive criticism or reproach and routine health screenings such as standard blood tests and physical exams were also advised to spot any potential health problems early and if required, dietary modifications or vitamin supplements should be implemented under medical supervision.

3.2. School Level

Schools could play a crucial part by enhancing the daily menu with a variety of fresh fruits, vegetables, whole grains, and low - fat meats to guarantee sufficient micronutrient intake for every student, particularly young children [9]. It was also vital to strengthen the administration of school cafeterias and campus shops so the sale of sugary, oily, and salty foods needed to be curbed while milk and fresh fruit which are nutrient - rich should have been easily accessible, and popularizing relevant nutritional knowledge in schools might be accomplished by inviting dietitians to give special lectures which would assist students in realizing the hazards of malnutrition and the significance of consuming a range of trace elements, and the 'S - M - A - R - T' teaching concept could also be incorporated into the educational framework to make ideological and political education more adaptable [10]. At the same time routine physical check - ups should be carried out for students and individualized interventions for those who were malnourished or had other problems could be implemented in cooperation with nearby hospitals and moreover the leading role of teachers and parents could be utilized to inspire students to cultivate healthy eating habits.

3.3. Social Level

There were still economic differences among diverse regions in China, so differentiated subsidies need to be established according to the economic conditions of each region to enable catering services across all areas to keep a balanced intake of energy, protein, vitamins, minerals and other nutrients; targeted economic subsidy support mechanisms had to be carried out for low - income families, ensuring children's daily nutritional balance via the distribution of nutritious meals; meanwhile, market supervision must be intensified, clearly forbidding false advertising of high - sugar and high - fat foods to cut down the flow of unregulated items in the market and requiring standardized amounts of food additives, especially in the regulation of infant formula milk powder since the intake of trace elements during early childhood greatly influenced adult health, thus the safety of milk powder in the market should be ensured; health education and awareness of healthy eating should be promoted in primary and secondary schools as well as communities to cultivate regular meal habits and rational dietary combinations and more efforts should be made to spread the harms of "dieting for weight loss" and "overeating" to the body; regular physical examinations, nutritional evaluations and psychological screenings should be arranged by hospitals or relevant community departments in cooperation with families, schools and medical institutions to work out individualized intervention plans.

3.4. Public Health System Level

Malnutrition among children and teenagers has an impact not just on individual well-being but is also associated with the quality of the forthcoming generation, so it was essential to construct a prevention and intervention framework from the vantage point of the public health system; firstly, the nutrition surveillance and early-warning system needed to be enhanced and a nationally-coordinated, three-tiered (provincial, municipal, and county) interconnected surveillance network should have been established which would cover diverse urban and rural kindergartens, schools, and child-care facilities with emphasis placed on monitoring crucial indicators like growth and development status as well as anemia rates; data from multiple departments such as education, health, and civil affairs had to be combined to create a unified and shareable data platform and dynamic early-warning models should be set up by utilizing big-data technology; the laws, regulations, and standards regarding nutritional health ought to be further refined and the division of duties among different departments must be made clear; special funds with hierarchical allocation should be established and more assistance should be provided to rural and underdeveloped regions; the collaborative governance of departments like education, health, and family planning, along with market supervision, should be promoted to comprehensively address issues such as diet enhancement, food safety, and nutrition oversight; a multi-channel online and offline promotional network should be constructed to conduct targeted nutrition-knowledge dissemination for parents, teachers, and teenagers in order to boost the nation's nutritional-health proficiency; more resources should be allocated to rural and economically disadvantaged areas and nutritional subsidy and safeguard measures for children in difficult situations should be improved; at the same time, a nutrition emergency-support mechanism during public-health crises should be established to ensure the nutritional provision for children and teenagers during special times.

4. Conclusions

Malnutrition among children and adolescents represents a significant global public health hurdle and at present, China faces a rather complicated situation where under-nutrition and over-weight/obesity coexist along with extensive micro-nutrient deficiencies which was affected by a mix of elements like eating habits, physical ailments, health conditions, mental well-being and social surroundings and the dearth of family-based education, the nonexistence of nutrition and health instruction in schools and the scarcity of relevant medical services in communities were the central reasons for malnutrition among children and adolescents in China and moreover, the unevenness in economic development among different areas had aggravated the problem to a great extent.

Families, educational institutions, and the broader society need to work together to enhance the nutritional status of children and teenagers, so parents ought to improve dietary arrangements, regulate mealtimes and eating routines while schools were supposed to boost health education to make sure that pupils got enough essential nutrients every day and through cooperation with families and communities, students could reach an ideal level of nutritional intake, also at the social level, market supervision had to be intensified to restrict the flow of high-fat and high-sugar foods and social organizations should have played a guiding and regulating part by closely cooperating with communities and families to carry out nutrition-related interventions. This study had some limitations: firstly, the data coverage was inadequate as not much attention was paid to special areas like remote mountainous regions and ethnic minority areas, which made it difficult to fully grasp the regional differences in malnutrition among children and adolescents and secondly, the long-term evaluation mechanism for intervention measures remained imperfect because there were no follow-up studies to evaluate the lasting effects, which prevented people from accurately assessing the effectiveness of the interventions. Future research would improve the evaluation and implementation systems, set up a long-term follow-up mechanism, and utilize digital tools to increase the efficiency and accuracy of monitoring and intervention and more efforts should be made to develop and implement nutrition policies, reinforce cross-departmental cooperation, and promote a joint

endeavor involving families, schools, and society to slowly build a comprehensive nutrition support system covering the whole life span of children and adolescents.

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