

Approaches Concerning Malnutrition and Oral Health in Public Health Nutrition

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ABSTRACT

Malnutrition is a worldwide problem that has a negative impact on the physical health, development, and ability to recover of children. Protein-calorie malnutrition (PCM) is prevalent in pregnant women, the elderly, and small children and is a primary cause of obesity in developing nations. Vitamin A, iron, iodine, zinc, and folate are necessary for maintaining a well-rounded diet and promoting optimal nutrition. Approximately 33% of individuals in sub-Saharan Africa do not have access to these essential nutrients, which has a detrimental impact on their mental and physical well-being, energy levels, and economic development. Oral microbial communities, such as Streptococcus and Enterococcus, have an impact on human health and the development of diseases. Malnutrition heightens the susceptibility to infection and death, particularly in infants under the age of five, with diarrhoea and respiratory diseases being the primary contributors to mortality. Gaining a more profound comprehension of the oral microbiota can facilitate the development of more effective management strategies. Children with comorbidities who experience severe malnutrition face a fourfold increase in their chance of mortality. It is crucial for medical practitioners to give priority to the diagnosis and treatment of severe acute malnutrition in children, as the presence of comorbidities raises the risk of death for highly malnourished children by a factor of four.

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Introduction

An infant's or child's dietary requirements have a substantial impact on a number of aspects of their health, including healthy growth and development, participation in vigorous physical activity, and resilience to severe illnesses [1]. Certain minerals might be lacking or absent, which can result in malnutrition. The source, severity, and length of malnutrition all affect how it manifests and how bad it is [2]. A shortage of macronutrients such as protein, carbohydrates, and fats can result in protein-calorie malnutrition (PCM). Together with these imbalances, micronutrient deficiencies provide serious nutritional challenges, especially for expectant mothers, the elderly, and young children. This issue has an impact on a sizable portion of the population, according to Rodriguez et al. [2]. Malnutrition and developmental delays are major contributors to child mortality in developing nations, where they account for around half of all child fatalities [3]. The rapid advancement of the nutrition transition in Sokoto has resulted in an increasing prevalence of obesity, which is a critical issue, especially in semi-urban and rural areas. Nutrient shortages are becoming more common worldwide, and obesity is becoming more common as well. Malnutrition is a major worldwide health concern that is widespread. A kind of malnutrition known as undernutrition is characterised by wasting, stunted growth, and shortages of essential vitamins and minerals. Another indicator

of malnutrition that arises from an excess of some nutrients is obesity. The most accurate markers of malnutrition in children are underweight, stunting, and wasting, and these conditions are primarily found in a few nations in Eastern and South Asia. According to a 2011 analysis by Gupta et al., around 33% and 28%, respectively, of children under the age of five are classified as underweight in these regions. The source of the information is Simon et al. [4]. Hunger is definitely associated with higher death rates and an increased susceptibility to infection, according to numerous studies. Micronutrients are essential for sustaining appropriate nutrition, and a diet deficient in these nutrients can cause a number of health problems in humans. The micronutrients iron, zinc, iodine, vitamin A, and folate have attracted the greatest scholarly interest recently. A significant fraction of the world's population suffers from a deficiency of vital micronutrients, an ongoing problem in many African countries. According to Kuku-Shittu et al. about 33 percent of people living in Africa's southern areas are deficient in important vitamins and minerals. These deficiencies have a substantial effect on people's energy levels, physical and mental health, and overall well-being. Moreover, these deficiencies have a negative impact on the economic advancement of the communities in this area. The source of the reference is Bik et al. [5].

Numerous native bacteria inhabit the human body, forming distinct populations in different anatomical locations. Microbial communities found in the mouth cavity have a significant impact

on human health and illness. Individual dental health depends on the presence of beneficial endogenous bacteria on the surfaces of the gums, teeth, and linings of the oral cavity [6]. There hasn't been much research done on the composition of the oral flora and the microorganisms that make it up. All people have bacteria in their surface tissues, which include the buccal cavity. The age, eating habits, and personal hygiene habits of an individual can all have an impact on the microbial composition and abundance [7]. According to a study by Bik et al. oral bacteria are the primary cause of a number of systemic illnesses, such as bacterial endocarditis, lung pneumonia, infant osteomyelitis, preterm low birth weight, and cardiovascular disease [8]. The human mouth is a very dynamic environment that is home to a wide variety of bacterial species. These bacteria engage in fierce competition in this specific habitat, which results in the production of multispecies biofilms. Some of the bacteria that are often found in the mouth are *Streptococcus*, *Lactobacillus*, *Enterococcus*, *Staphylococcus*, *Corynebacterium*, *Veillonella*, and *Bacteroids* [9, 10]. Mouth microbial-plaque colonies are biofilms that reside on surfaces in the mouth cavity of the host and are made up of a variety of genetically different bacteria. Numerous processes, including coaggregation and coadhesion, as well as other physiological and metabolic connections, promote bacterial communication [11].

Numerous studies have demonstrated a connection between hunger and an increased susceptibility to illness and mortality [2]. For children under five, the most prevalent causes of illness are severe respiratory infections and sudden diarrhoea. Numerous studies have established a causal connection between these fatalities and hunger. Because malnutrition is rarely listed as a direct cause of death on official death certificates, the entire impact of the condition is frequently underestimated [8]. With a focus on protein-calorie malnutrition (PCM), this review aims to explore the relationship between malnutrition and the microbial flora in children's mouths. Examining the prevalence and severity of malnutrition in children—more especially, protein-calorie malnutrition—is the goal. 2. Examine the composition and diversity of oral microbial communities in children who are malnourished, focusing on the bacteria *Streptococcus* and *Enterococcus*. 3. Examine the relationship between oral microbial flora, malnutrition, and children's increased susceptibility to infectious diseases. This work investigates the impact of malnutrition on the composition of oral bacterial populations, with a particular emphasis on *Streptococcus* and *Enterococcus*, and their potential role in children's health and illness development.

Methodology

The objective of this study is to elucidate the correlation between bacterial infections and malnutrition. Moreover, we investigate the relationship between malnutrition and an increase in infectious diseases in children. A comprehensive literature search was conducted to determine the extent of research on the correlation between hunger and bacteria. We conducted a search in the MEDLINE database, which is housed in the National Library of Medicine in Bethesda, Maryland, with the purpose of locating original research papers. This was accomplished using the PUBMED query programme. In addition, we utilised internet resources such as Scopus and EMBASE for our analysis. The systematic database queries conducted from 2010 to 2022 focused mostly on articles published in English, specifically those with an English abstract. The research focused on the keyword groupings of malnourished children, malnutrition, bacteria, Nigeria, and worldwide reach. Subsequently, a distinct investigation was conducted to determine the available body of knowledge on the presence of microorganisms in malnourished children. This review

examines bacteria and malnutrition as separate subjects. The excluded studies did not involve persons who were malnourished or investigate the association between malnutrition and other infectious diseases, such as HIV, as per the specified criteria for inclusion. The analysis also excluded research on adults with severe underweight.

Discussion

This paper presents an argument in favour of doing a thorough investigation of the complex interaction that exists between hunger, oral health, and the dynamics of microorganisms. Practitioners of public health have the potential to develop targeted treatments that are aimed at improving the overall health outcomes within the region when they incorporate an interdisciplinary approach into their work. Malnutrition and deficits in micronutrients continue to be the most pressing concerns in the field of public health nutrition in this particular region. The current analysis was successful in identifying a large number of genotypes of oral bacteria that belong to the categories of *Streptococcus* and *Enterococcus*. Alghamdi also confirmed that these bacteria had a variety of patterns of susceptibility to antibiotics. This discovery was also supported by the findings of the previous study [10]. According to the findings of Karajibani et al., the study that was examined came to the conclusion that there were various levels of malnutrition, ranging from mild to severe, but that overweight and obesity were not frequent among children and adolescents [3]. Jain discovered that bacterial biofilm cells are able to maintain a consistent intracellular pH level, which enables them to demonstrate physiological stability and resistance to acidity [11].

Conclusion

The results of this study offer important new insights into the relationship between malnutrition, bacterial infections, and an increased susceptibility to infectious diseases in children who are undernourished. By gaining a deeper understanding of the significance of oral microflora, which functions as a collection of different bacteria that exhibit coordinated behaviour, it will be possible to develop management strategies that are more efficient. It was shown that there was a significant correlation between the presence of comorbidity and subsequent mortality. When the children were admitted, it was discovered that the mortality rate for severely malnourished children with complications was four times greater than the mortality rate for severely malnourished children who did not have any other health problems. When it comes to paediatric children who are suffering from severe acute malnutrition, medical practitioners and healthcare providers should make it a priority to swiftly detect and effectively manage any difficulties that may arise [12-15].

Ethics Approval and Consent to Participate

Ethical clearance was obtained from the Ethical Review Committee of Sokoto State Ministry of Health, Kebbi State University of Science and Technology Aliero, And Sokoto State Specialist Hospital Sokoto. The objective and purpose of the study were explained to officials at the Kebbi State University of Science and Technology Aliero, Sokoto Ministry of Health, Specialist Hospital Sokoto and written permission consent was obtained from the study participants. For those study participants whose age is below 18 years consent to participate in the study was obtained from their parent and care givers during the samples collection time as seen below.

Availability of Data and material

These can be made available on request.

Competing interest

No competing interest

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Author Contribution

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Manuscript Idea Conception and Design

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