

Malnutrition and Related Non-Communicable Diseases

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ABSTRACT

Malnutrition, with its wide range of harmful effects on individuals and society, is one of the health challenges plaguing the world. Malnutrition is classified as either overnutrition or undernutrition. Body Mass Index and specific measurements such as abdominal circumference are useful diagnostic tools in determining these conditions. Studies have reported an increased in global prevalence of malnutrition across various regions around the world. Low and middle-income countries have been reported with the highest rates of malnutrition.

Malnutrition is related to a wide host of non-communicable diseases such as hypertension, diabetes, metabolic syndrome, etc. This relationship is supported by the existence of factors such as weight, linking an individual's nutritional status with non-communicable diseases. The capacity-load model also explains how factors responsible for an individual's linear growth predispose them to certain diseased conditions. Due to its various detrimental impacts, it's recommended that efforts should be made towards the adoption of healthy nutritional lifestyles by individuals and the development and implementation of beneficial nutritional policies both at the national and global levels to assist in bringing a stop to this menace.

KEYWORDS: Non-communicable Diseases, Malnutrition, Poor Diet, Deficiency

INTRODUCTION

Malnutrition is one of the health challenges plaguing the world. Malnutrition is defined as a state caused by inadequate uptake or intake of nutrients, resulting in altered body composition, reduced physical and mental function, and impaired clinical outcomes from diseases.¹ Malnutrition has deleterious effects on the health of the individual and society. Diets and nutrition are the top factors responsible for global deaths.² Studies have also reported an annual loss of over 2.8% of the world's gross domestic product (GDP) incurred indirect treatment of malnourished persons and reduced economic productivity due to malnutrition.³ Malnutrition is divided into Undernutrition and Overnutrition.

Undernutrition includes stunting, being underweight, wasting, and deficiencies of essential vitamins and minerals.⁴ Undernutrition can be related to an underlying disease or non-related to a disease condition.¹ Diseases associated with undernutrition include anorexia nervosa, Parkinson's disease, Crohn's disease, etc. The non-disease-related undernutrition is due to psychological or socio-economic reasons such as poverty, famine, going on hunger strikes, bad dentition, imprisonment, and so on.¹ It is the predominant form of malnutrition in developing regions of the world. A person is regarded as

undernourished if they present with a low Body Mass Index.¹ Overnutrition involves excessive consumption and ingestion of nutrients.⁴ Obesity is a common implication of overnutrition. It is categorised with the use of the Body Mass Index (BMI), which is a measure of the person's weight (in kg) divided by the height (in square meters). A person is considered overweight with a BMI >25 kg/m² and obese with a BMI >30 kg/m². The waist circumference also serves as a good measure of abdominal obesity. It is measured in the mid-horizontal plane between the superior iliac crest and the last rib. The European guidelines define abdominal obesity as a waist circumference >94 cm for males and ≥ 80 cm for females.¹

PREVALENCE

Low and middle-income countries have the highest rates of undernutrition.³ Studies have reported that over 700 million people faced hunger in 2020.⁵ Asia and Africa have the highest rates of undernutrition, with both continents housing more than half of the world's total population of undernourished people. Over 252,000 deaths were caused by nutritional deficiencies in 2019.⁶ The global incidence rate of nutritional

deficiencies was estimated at over 2270 per 100,000 in both sexes, and a more significant percentage was attributed to protein-energy malnutrition.⁶ Over 140 million children under the age of five were reported to suffer from stunting in 2020, with a larger percentage in the Central and Southern parts of Asia (37%) and Sub-Saharan Africa (37%).⁵ Over 45 million children suffered from wasting in 2020, with the highest prevalence in Southern Asia (14%) and Sub-Saharan Africa.⁵ An estimated rate of 14.6% of global newborns in 2015 had low birth weight and suffered an increased risk of mortality.⁵ Over 39 million children under the age of five were reported to be overweight in 2020. A higher prevalence of obesity has been reported in adults, with an over 2% increase from 2012 to 2016.⁵

MALNUTRITION AND NON-COMMUNICABLE DISEASES

Poor diet has been reported to be the leading cause of death and the most significant contributor to the non-communicable disease burden.⁷ Increased Body Mass Index (BMI), reduced physical activity, and smoking are all associated with non-communicable diseases.⁸ Overnutrition is a risk factor for non-communicable diseases.⁷ Increasing rates in the prevalence of non-communicable diseases have been reported in low and middle-income countries⁹, which could be attributed to the rate of overnutrition reported in these areas. Studies have reported that childhood overweight increases the risk of non-communicable diseases, such as cardiometabolic diseases, and their ability to thrive in an obesogenic environment in later life. Obesity is associated with non-communicable diseases such as cardiovascular diseases, which include myocardial infarction, calcification of the coronary artery, peripheral arterial disease, cerebrovascular disease, ischaemic heart disease and hypertension, diabetes, hyperglycaemia, metabolic syndrome, and obesity⁹. Studies have also reported that women who suffer undernutrition in childhood, commonly attributed to famine, have a higher risk of developing glucose metabolic disorders and metabolic syndrome⁹. Newborns with low birth weight have also been reported to suffer an increased risk of a low intelligent quotient, stunted growth, obesity, and diabetes in their adult years.⁵

THE LINEAR CONNECTIONS BETWEEN MALNUTRITION AND NON-COMMUNICABLE

Physicians can trace the first connection between a person's nutritional status and their predisposition to non-communicable diseases in the future can be traced to their weight at birth. It can be easily assumed that infants underweight at birth are predisposed to developing a non-communicable disease; however, the reverse is the case.

Macrosomic infants have a higher chance of developing non-communicable diseases stemming from malnutrition.¹⁰ This is not to say that foetal nutritional status solely determines the outcome of adult health status; it is only a variable.¹⁰

CAPACITY-LOAD MODEL ADDRESSING MALNUTRITION AND PREDISPOSITION TO NON-COMMUNICABLE DISEASES

Metabolic capacity refers to a range of traits recognised as metrics associated with maintaining a normal, healthy homeostatic process; these traits include nephron cell count, organ cell mass, cardiac structure, pancreatic beta cell mass, and airway diameter, to name a few. The features mentioned above are associated with growth and the period of hyperplastic development; their prevalence precludes a healthy adult life. Metabolic load is a term that characterises traits that diminish the body's metabolic processes, including: excess adiposity, physical inactivity, lipogenic diet, infections, smoking, and psychosocial stress. These traits are directly correlated with risk factors of non-communicable diseases; their development in adult life increases the chances of a disease occurring.¹¹

The capacity-load model draws a connection between factors of normal linear growth and environmental influences to inform possible reasons for a disease condition. For instance, cardiovascular diseases, diabetes, and hypertension are more commonly observed in shorter individuals, and this might be due to a relationship between height and organ growth. Although the trait-disease relationship is not to say that all factors associated with linear growth automatically connote an increase in disease occurrence, tall stature and rapid organ growth have been linked to cancers.¹² Macrosomic infants have increased levels of adipose which counts as metabolic load and can foreshadow a susceptibility to a non-communicable disease.

NUTRITION-RELATED PREVENTION STRATEGIES FOR NON-COMMUNICABLE DISEASES

Actionable prevention strategies to curb non-communicable diseases revolve around healthier diet plans and stricter management of risk factors predisposing to disease conditions. Lifestyle management on an individual level is most important, focusing on reconstructing habits that influence affected risk factors. On a national level, low and middle-income countries are becoming more affected by non-communicable diseases; these conditions reduce the quality of human labour. Another prevention strategy involves putting health policies revolving around nutritional practices in place to curb the occurrence of related non-communicable diseases. On a global level, bodies like the WHO and UN can create policies and strategies to control some factors; laws guiding tobacco

production, physical activities that discourage a sedentary lifestyle, and actionable plans to improve the standard of living.¹³

Nutrition-influenced cardiovascular diseases range from heart conditions like rheumatic heart disease or coronary heart diseases to blood vessel conditions like hypertension. Relevant risk factors include tobacco smoke, physical inactivity, obesity, and high cholesterol diet. Making healthy nutritional decisions and avoiding cigarette smoke can curb the occurrence of these diseases. Tobacco smoking is also the main culprit in many cancers and respiratory-related conditions. Chemical carcinogens from improper food and water handling are also implicated in cancers. Improved sanitation practices and better hygiene can help individuals stay healthy; dieticians also advice healthy consumption of fruits and vegetables as studies have noticed low intakes in lung cancer patients.¹⁴

Diabetes is a condition with increasing prevalence in more recent times, asides from genetic predisposition; this disease is aided by obesity, increased sugar intake, and a sedentary lifestyle. Diabetes can be controlled and managed by healthier food choices, avoiding sweetened beverages, reducing red meat consumption, and increasing whole grain consumption.¹⁵

CONCLUSION

The connection between Malnutrition and Non-communicable disease can give insight into curbing further occurrences of life-threatening conditions like diabetes, hypertension and even cancers, to mention a few. Significant feeding adjustments and stricter policies that can ensure healthy food consumption and reduce exposure to food-related risk factors should be considered priorities.

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