REVIEW ARTICLE

Addressing the Double Burden of Malnutrition using the Life Course Perspective

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ABSTRACT

The double burden of malnutrition refers to the coexistence of undernutrition which is typically characterised by stunting and wasting, alongside overnutrition at all levels of the population. The objective of this article is to review the current issues in addressing the double burden of malnutrition using the life course approach. Studies addressing life course approach in DBM were identified through PubMed & EMBASE databases. Relevant studies were critically appraised. The challenges, opportunities and way forward in addressing DBM through the life course concept were discussed. The review showed that the DBM dilemma could be addressed via a holistic perspective through a life course concept as nutrition plays an important role in influencing health from pre-conception to old age. The life course concept proposes that environmental exposures, including biological, physical, social, and behavioral factors, including life experiences, throughout life, influence health outcomes in current generations and their offspring. *Malaysian Journal of Medicine and Health Sciences* (2022) 18(6):305-310. doi:10.47836/mjmhs18.6.39

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INTRODUCTION

From a global perspective, there is a growing concern regarding malnutrition across all ages in all parts of the world regardless of social and economic status. Malnutrition can either be undernutrition or overnutrition. The critical nutritional periods in the life cycle starts with the first 1000 days of life through childhood and adolescence into young adulthood. According to Mbuya et al. childhood overweight has increased 25% in recent years in Malaysia, Brunei and Thailand whereas globally, estimated 38.2 million children under the age of five were categorised as overweight or obese (1). There is mounting apprehension in the context of malnutrition today and it is termed the Double Burden of Malnutrition (DBM) (2-4).

DBM is characterised by the coexistence of both under nutrition and over nutrition throughout the life course of which under nutrition at the beginning of life results in an increased propensity for over nutrition in adulthood (5, 6). This contrasting and confounding form of malnutrition presents a global public health challenge as it is affecting individuals, households and populations across the life course and is most prevalent in low-income and middle-income countries (LMICs) (7, 8).

The coexistence of DBM within the Asia-Pacific region has been reported to be alarmingly high recent years (9-12). As a result, the economic and medical consequences of DBM in the Asia-Pacific countries are of great significance. As such, reducing the DBM is fundamental to managing health outcomes in the Asia-Pacific region (9, 12).

At the individual level, DBM can manifest as obesity with nutrient deficiency or as an overweight adult who was stunted during childhood. At the household level DBM may present as a child who is undernourished in a family with underweight grandparents and at the population level DBM exists when both overweight cases and underweight cases are prevalent in the community (6, 13).

WHO categorizes DBM under five main categories namely; stunting in children under five; wasting in children under five; micronutrient deficiencies; moderate and severe thinness or underweight in adult; and overweight and obesity in adult (6). According to WHO in its 2018 Global Nutrition Report, there were 45% of death among undernutrition children under five

years old, mainly in low and middle-income countries (14).

Additionally, at the other end of the spectrum, diseases developed later in life are the cumulative products of continuous exposures across the whole lifespan.(15) Langley-Evans in 2014 described the exposures as the nutritional exposures which are divided into nutritional environment (in utero, infancy, childhood and adult) and non-dietary exposure (social class, stress, infection and smoking) (15). These exposures which occur at all stages of life may modify the disease pathway. There has been a growing interest in the applicability of life course concept in addressing DBM. This narrative review provides a pragmatic summary of the current state of the rapidly evolving evidence supporting the life course concept approach in addressing DBM.

As DBM calls for a multidisciplinary approach that targets multiple underlying factors, acknowledging the relevance of critical periods or stages in people's lives to their health is crucial (16, 17). The objective of this article is to review the current issues in addressing the double burden of malnutrition using the life course approach.

METHODS

To capture relevant literatures, all publications types were included in this review. Article were identified primarily through a search for publications with a "life course approach" AND/OR "life course concept" and "double burden malnutrition" in the PubMed and EMBASE databases. A review of citations within these articles identified additional relevant articles. All relevant studies were rigorously critically appraised.

RESULTS AND DISCUSSION

Life Course Concept

The DBM dilemma could be addressed via a holistic perspective through a life course concept. The idea of life course concept involves environmental exposures, including biological, physical, social, and behavioural factors, in addition to life experiences, throughout the entire life span, influence health outcomes in current and future generations (18-21). The health status throughout life is dictated from the early stage of life through nutrition. Malnutrition since birth or earlier, may dictate the health status of an individual during adulthood. In 2017, The World Health Organization (WHO) has taken an action, through its policy, addressing this issue aiming at zero malnutrition as a global goal. This issue will be discussed based on several life stages.

Application of Concept

Prenatal

The primary goal to have a good start and to minimise all risks involved in being malnourished is to get the nutrition right before the child's second birthday which is a concept of first 1000 days of life or before an individual reaches the age of two. The earliest that we could address DBM in line with the 1000 days concept is during the pre-conceptional stage. This duration of age is where we can intervene to optimize linear growth and after which the likelihood of having to undergo catch-up growth could be significantly diminished (4, 22). Many health implications could result from any derangement at early stage of life including diabetes, hypertension, and obesity. Ramakrishnan (23) reported that nutrition education and counselling (NEC) shows some potential in addressing this issue and hence should ideally start with women of reproductive age including adolescent girls and/or young adults. On the other hand, pharmacotherapeutic approach is by having daily prenatal iron-folate (IFA)) for three months on and three months off and restarted whenever needed and multiple micronutrients (MM) supplements may demonstrate some propensity for good child growth and motor development in the first two years of life as shown by Ramkrishnan in 2020 (23).

After Birth

After birth, or what is known as the next 24 postnatal months which make up the rest of the first 1000 days of life is the next critical stage. Undernutrition is most prevalent among younger age groups. Undernutrition can also be assessed in terms of depleted stores or circulating concentrations of nutrients, reflecting dietary inadequacy (4, 24). However, the gold standard for screening of malnutrition for this age group has yet to be established (25). In recent years, the effect of micronutrient deficiency in undernutrition, such as stunting and wasting increasingly coexists with being overweight among adolescence (26, 27). While historically, malnutrition has always been associated with low income status at individual or country/community level, this may no longer hold true as increasingly malnutrition is affecting all levels of society. Consequently, low birth weight, anaemia, growth failure, weakened resistance to infection, increased susceptibility to lead poisoning, and dental disease are prevalent (28). Hence, nutrition-specific interventions and programmes including micronutrient supplementation and fortification is essential to improve maternal, infant and child health outcomes (29, 30). However, While mothers are targeted to facilitate nutritional interventions to improve infant health outcomes, the measurement of health outcomes in women is lacking (29).

Adolescence

Changing lifestyle may have been and still is the best and ultimate malnutrition prevention during adolescence. For this age group, self-motivation and self-awareness towards a healthy diet are crucial as at this age they are beginning to have more control over their nutrition and more influence on food selection (31, 32). The

main engagement for this age group should focus on the healthy eating concept. Healthy eating concept addresses the importance of the first meal to start the day including a well-balanced diet using all the food groups depicted by the seven colours: green, yellow, orange, and red (GYOR), representing vegetables and fruits; purple (P), the protein source; brown (B), whole grains; and white (W), milk products.(33) Schott et al., from their multiple trajectories' studies found that adolescence may represent a second window of opportunity (after the first 1000 days) for growth recovery, during which stunting can decline substantially for a subset of children (34). This provides an insight for a strategic intervention method for this age group. In another view, Zhou et al suggested that environmental and policy interventions and nutrition education is needed to target specific geographic regions (35).

Adulthood

In adulthood, obesity which poses as a major risk factor for non-communicable diseases is concerning, hence many authorities are looking for any opportunities to provide avenues for prevention. Tackling obesity requires a multidimensional approach, and many are trying to formulate policies which would affect the population at large. Lyn et al. suggested some measures concerning policies regarding the influence of commercial interests (i.e. Product advertisement), mobilizing civil society (i.e. awareness on food labelling), and targeting vulnerable populations (i.e. through equity-focused frameworks) (36). However, creating a political influence toward policies is another challenge. The authorities or policy makers have to acknowledge the intensity of this problem by recognizing it as a high-profile global ambition (37). This would be consistent with WHO declaration 'Decade of Action on Nutrition and nutrition's positioning within the Sustainable Development' starting from 2016 until 2025. The success of this movement in many countries would be influenced by their own political environment (37).

Older Adults

The issues surrounding older adults are characterised by a decline of muscle mass not only due to ageing and poor physical activity but also to a poor adaptation to nutritional deficits (38, 39). Nutritional status of older people deteriorates as dependency and care needs grow, following a sequence from community living to nursing home and hospital (40). Fбvaro-Moreira et al. have identified risk factors for malnutrition among older adults were age, excessive polypharmacy, frailty in institutionalized persons, general health decline (including physical function and cognition), loss of interest in life, basal oral dysphagia and signs of impaired efficacy of swallowing, and institutionalisation (41). Some points on intervention including a study by Katsas et al. in Greece found that Mediterranean diet characterised by vegetables, fruits, legumes, nuts, beans, cereals, grains, fish, and unsaturated fats is associated with a lower risk for malnutrition (42). Others include multidisciplinary nutritional interventions, dietary intensive treatment, medical treatment, and meal delivery service through Meals on Wheels (43). Azzolino et al. also suggested that oral health would be an important issue to be addressed by healthcare providers to ensure food intake is not compromised (44).

In addition to the life course specific issues discussed above, there are other factors which are common to all life stages as discussed below.

Challenges & Opportunities in Addressing Malnutrition

Food Security

Food security is not limited to only issues of access to enough food for satiety but covers a multifaceted approach including issues of cultural adequacy and continuous safe food supply in the prevention of all forms of malnutrition (45, 46). While evidence linking food insecurity and child stunting is abundant, the evidence of food security as a risk factor for the double burden of malnutrition is still scarce (47). However, a recent study characterizing DBM in terms of the coexistence of child stunting and overweight/obese mother within a household found that food insecurity is a significant predictor. This suggests that food insecurity maybe a factor that should be considered in the prevention of DBM (48).

Availability of Different Foods

The lack of availability of different foods plays a big role in nutrition as availability affects food choices. People tend to consume foods which are available and affordable. Most of adolescence and adults today are exposed to energy-dense, nutrient-poor (EDNP) foods containing fats, oils, and sugars. As an example, the Americans have long been exposed to these (EDNP) particularly during snacking (42). Commonly, snacking foods are ultra-processed foods which is defined as industrial formulations with fats, sugars, and salt added during preparation, alongside other substances not used in normal cooking (49). This type of foods results in high number of negative health outcomes amongst Americans (49).

Meanwhile, individuals may be very selective based on personal preference too. This selective behaviour may put them at risk of being malnourished if their preference is limited to only one part of the food group.

Cultural and Religious Beliefs

Culture may influence the dietary patterns of a community, the culture itself is usually dictated by the availability of resources in the region. For instance, rice is considered a staple food for Asians and at the same time the Asian continent dominates in terms of global rice production. On a more micro level, the way the rice is prepared is dictated by the community culture. For

some cultural-based cuisines, the rice may contain an excess of dietary sodium and excessive animal fat which has been associated with hypertension.(49). Meanwhile, the Chinese tend to have it as steamed rice and plain in comparison, but nonetheless pairs it with a selection of oily stir fried dishes which may also be correlated the higher the risk of cardiovascular disease, fatty liver, and obesity (49). Some culture-related food beliefs also may pose disadvantages to the life course concept in where certain cultures prohibit the consumption of certain type of foods for pregnant mothers (50, 51). As an example, in Malaysia, the Malay culture sometimes discourages consumption of acidic fruits such as pineapples during pregnancy (as it is considered sharp and may cause harm to the pregnancy).

At the same time religious factors also influence nutrition by restricting certain food types or sources for its followers, such as how Islam and Judaism prohibits consumption of pork and alcohol.

The way forward

In concordance with the WHO direction to address DBM through a comprehensive plan aiming at a global goal for zero malnutrition, any attempt at addressing DBM must consider the whole spectrum of factors affecting DBM. It is an immense challenge to address all these factors considering the varied epidemiology, geography, political demography and socio-economy status of each country. The World Health Organization's recommended double-duty actions to tackle the double burden of malnutrition includes promotion and protection of exclusive breastfeeding in the first 6 months, promotion of appropriate early and complementary feeding in infants, maternal nutrition and antenatal care programs, regulations on marketing and school food policies and programs. In addition, Menon and Pecalvo (2019) suggested the consideration of marketing regulations (17).

A comprehensive global action plan must be in place; however, the implementation of such plan must take into consideration the local context. Engagement and monitoring at the regional stage is crucial to ensure this plan is well adhered to and effectively implemented. Vigorous actions should be attempted to involve governments, local authorities and non-governmental organisations (NGO).

CONCLUSION

Resolving malnutrition requires navigating across many pathways and integrating interventions in multiple sectors as a multidisciplinary approach is required to address its multiple underlying factors. Establishing comprehensive and holistic intervention plans such as effective policy-making that considers factors in socioeconomic and cultural drivers of malnutrition and applies them strategically across life stages is essential to prevent the passage of malnutrition to the future generations.

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