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DOUBLE BURDEN OF MALNUTRITION IN DEVELOPING COUNTRIES AS A GLOBAL PROBLEM. PART 1. (LITERATURE REVIEW OF RESEARCH IN VIETNAM)

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Abstract. This series of three reviews of the current literature summarizes the causes, prevalence, consequences, and key approaches to prevention of malnutrition in Vietnam. It is widely recognized that developing countries have a combination of undernutrition in one part of the population and overweight and obesity in another. This situation is called the double burden of malnutrition, the prevalence of which varies from 5 to 30% in Southeast Asian countries. The first, introductory review presents the problem of underweight, overweight, obesity, and micronutrient deficiencies in the Pacific region and globally, and provides a brief overview of the health consequences of these conditions. It is reported that in Southeast Asia, 25% of children are underweight, and 11 to 30% are obese, depending on gender, age, and region of residence. The review also reveals the socioeconomic causes of the double burden of malnutrition in Vietnam. According to experts, this is due to rapid economic transformation and urbanization, which have led to a change in diet towards more caloric, micronutrient-poor processed foods, and have contributed to a sedentary lifestyle. An analysis of the literature shows that the health and social development policies pursued by the country's leadership have led to a reduction in poverty, nutritional deficiencies, maternal and infant malnutrition, a smoothing of the economic gap between the city and the village, an increase in food production and food security in general. However, this has led to an increase in the percentage of obesity and excess body weight due to the population's failure to adhere to the principles of healthy eating and physical activity.

Keywords: double burden of malnutrition, underweight, obesity, Vietnam

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ДВОЙНОЕ БРЕМЯ НЕПОЛНОЦЕННОГО ПИТАНИЯ В РАЗВИВАЮЩИХСЯ СТРАНАХ КАК ГЛОБАЛЬНАЯ ПРОБЛЕМА. ЧАСТЬ 1. (ЛИТЕРАТУРНЫЙ ОБЗОР ИССЛЕДОВАНИЙ ВО ВЬЕТНАМЕ)

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Резюме. В серии, состоящей из трех обзоров современной литературы, обобщаются сведения о причинах, распространенности, последствиях и основных подходах к профилактике неполноценного питания во Вьетнаме. Общепризнанно, что в развивающихся странах имеет место сочетание дефицита питания у одной части населения и наличие избытка массы тела и ожирения у другой. Такая ситуация называется двойным бременем неполноценного питания, распространенность которого варьирует от 5 до 30% в странах Юго-Восточной Азии. В первом, вводном, обзоре представлены сведения о проблеме дефицита и избытка массы тела, ожирения, недостаточности микроэлементов в Тихоокеанском регионе и в мире, а также приводится краткий обзор последствий этих состояний для здоровья. Сообщается, что в Юго-Восточной Азии дефицитные состояния регистрируются у 25% детей, а ожирением страдают от 11 до 30% населения в зависимости от пола, возраста и региона проживания. В данном обзоре раскрываются также социально-экономические причины двойного бремени неполноценного питания во Вьетнаме. По оценкам специалистов, это происходит из-за бедности одних регионов и урбанизации других, приводящих к изменению рациона питания в сторону более калорийных, бедных микроэлементами обработанных пищевых продуктов, а также способствующих малоподвижному образу жизни. Анализ литературы показал, что политика в сфере здравоохранения и социального развития, проводимая руководством страны, привела к сокращению бедности, дефицита питания, материнской и младенческой смертности, сглаживанию экономической разницы между городом и деревней, увеличению производства продуктов питания и продовольственной безопасности в целом. Однако это привело к увеличению процента ожирения и избытка массы тела из-за несоблюдения населением принципов здорового питания и физической активности.

Ключевые слова: двойное бремя неполноценного питания, дефицит массы тела, ожирение, Вьетнам

INTRODUCTION

The double burden of malnutrition (DBM) is a public health situation characterized by the coexistence of undernutrition and its associated health disorders with overweight and obesity [1, 2]. This phenomenon is typical for developing countries in general [1, 3] and for Vietnam in particular [4, 5], where economic heterogeneity leads to a combination of extreme poverty in one part of the population and increased prosperity in another. It should also be noted that a relationship exists between these two opposite forms of malnutrition and overnutrition: undernutrition in early childhood is a significant risk factor for obesity in adulthood [6].

The prevalence of the double burden of malnutrition and associated disorders [7] varies from 5 to 30% in Southeast Asia [3]. Of the 11 countries in the region, 9 have high or very high prevalence of stunting (≥20%) and wasting (≥5%), and 5 countries have high prevalence of overweight (≥5%) among children under 5 years of age [8]. Recognition of DBM as a general health problem requires the development and implementation of dual actions and measures to simultaneously combat malnutrition and obesity [3, 9], consisting of redesigning and expanding priority interventions and programs in the fields of healthcare, social protection, education and agri-food systems [1].

AIM

To summarize the information on the causes, prevalence and medical consequences of eating disorders presented in modern scientific literature in the world, in Southeast Asia in general and in Vietnam in particular.

THE GLOBAL PROBLEM OF DEFICIENCY DISORDERS

All over the world around 171 million children under 5 years of age have nutritional stunting [10]. Severe malnutrition is still the main reason of lethal outcomes among them [11, 12]. In 2012, more than 3.4 million of lethal outcomes among young children were associated with malnutrition [13]. According to experts, diagnosis and treatment of malnutrition can prevent more than 400 000 lethal outcomes in children [14]. In 2020, it was counted that 146.3 million of children under 5 years of age had stunting and malnutrition [15]. However, since the COVID-19 pandemic, there has been a doubling of the prevalence of malnutrition, with an estimated 344.5 million young children diagnosed with stunting as of June 2022 [16]. It is also necessary to note that in case of the absence of medical intervention, the prevalence of stunting usually increases to a maximum between the ages of 1.5 and 5 years and then declines until puberty [17, 18].

More than 98% of children with nutritional and growth disorders live in states with low and middle income [15, 19], in ethnic minority communities [20] and indigenous peoples [20]. According to estimates from 1997 to 2010, malnutrition causes more than one-third of the 7.7 million deaths annually among children under 5 years of age in Asia and Africa [21]. Socio-economic factors, such as population's failure to comply with sanitary and hygienic standards, lack of access to medical services and clean water are the cause of reduced food availability [22], which leads to malnutrition, refusal to breastfeed and impaired physical development [11].

However, the situation is gradually improving. The world data shows that in the period from 1990 to 2016, the prevalence of stunting in children under 5 years of age decreased from 39.5 to 22.9% [13]. In Southeast Asia and the Pacific region, the prevalence of stunting and underweight has decreased by 24.8% and 25%, respectively, since 1990 [23, 24]. This trend is most likely a consequence of measures taken in the region to improve the education of mothers and fathers, the socio-economic status of households, sanitation conditions, access to maternal health services and family planning [25].

Children who experience early growth retardation and underweight may exhibit cognitive deficits in early childhood [18], early school age and adolescence [15], and even into adulthood [26, 27]. Special studies have revealed lower results in cognitive, language and motor development in two-year-old kindergarten children with growth and weight deficits [28, 29]. In school-age children, nutrition is one of the factors determining timing of sexual development, and also age-related changes of musculoskeletal system, cardiorespiratory system, and immunity [30]. In developing countries (Ethiopia, India, Peru and Vietnam), early childhood physical development deficits are also negatively associated with studying results in mathematics, languages, reading in children aged 8, 12 and 15 years [31] and psychoemotional status [32].

The deficiency of body weight is also a factor of increased sensitivity to respiratory and intestinal infections, measles virus, malarial plasmodium [13]. In these children, infectious diseases are characterized by a more severe, protracted course and a high frequency of complications [13].

Although significant progress has been made in reducing the global burden of micronutrient deficiencies in recent decades, their prevalence remains high in some population groups [33]. Thus, around 56% of children under 5 years of age and 69% of women of reproductive age (15–49 years old) all over the world suffer from a deficiency of at least one micronutrient [30]. Iron, zinc and vitamin A deficiencies

are the most common nutritional deficiency worldwide [33]. Poor nutrition during adolescence affects growth and pubertal development, and its consequences are transmitted to future generations [30].

Deficiencies of iron, folate, zinc, iodine, and vitamin A lead to delayed psychomotor development [34]. Deficiencies of vitamin D and calcium contribute to the development of rickets and osteomalacia [35]. Iron deficiency leads to anemia [36].

Micronutrient deficiencies are widespread worldwide, including in Southeast Asia [37, 38].

Some researchers suggest that stunting after 2 years of age may lead to irreversible consequences [10], while earlier intervention may lead to recovery [39]. Thus, monitoring nutritional status and anthropometric parameters to identify early markers of nutritional deficiency is crucial for maintaining the health of children living in Asia [22].

THE GLOBAL PROBLEM OF OVERWEIGHT AND OBESITY

Obesity is a global healthcare crisis whose prevalence continues to increase. According to a recent forecast by the World Obesity Federation, by 2030, approximately one billion people worldwide will suffer from a metabolic disorder [40].

According to experts, over four decades (1975–2016), the global prevalence of obesity increased to 4.9% among girls and 6.9% among boys [41]. In 2014–2016, the total number of overweight children worldwide was 124 million [41], and 42 million (~4.8 to 6%) were children under 5 years of age [19]. The vast majority (about 31 million) live in low- and middle-income countries [11, 40], and this number is steadily increasing [19]. In 2022, 37 million children under 5 years of age and 390 million adolescents aged 5 to 19 years were overweight and obese[1].

The prevalence of obesity significantly increases in Southeast Asia [41]. It is reported that 10.7% of children under five years of age in this region are overweight [19]. Among older school-age children, this figure exceeds 30%, depending on the place of residence [42]. Experts estimate that this is due to rapid economic transformation and urbanization, which have led to a shift in diet towards more calorie-dense, micronutrient-poor processed foods, and have also contributed to a sedentary lifestyle [43].

Overweight is a major causative factor in numerous diseases. Even relatively “metabolic healthy” obesity [44] contributes to the progression of *cardiovascular pathology*, acting as a risk factor for the development of atherosclerotic vascular lesions [45, 46], hypertension [47, 48], coronary heart disease [45, 47], cardiomyopathy [49], and arrhythmia [45, 47]. Impaired cardiac contractility combined with increased myocardial stress provokes heart failure [45, 47], which increases the risk of sudden death [45] in overweight patients.

An increase in the volume of adipose tissue *causes insulin resistance and provokes type 2 diabetes mellitus* [50, 51].

Leukocytosis and thrombocytosis are often observed in obese patients due to systemic aseptic inflammation, which can cause microvascular damage and *spontaneous thrombus formation,* increasing the risk of spontaneous thromboembolism [52]. Impaired microcirculation and lymph flow in the skin, combined with endocrine dysfunction, contribute to the development of *dermatological symptoms* and diseases such as acanthosis nigricans, lipedema, striae, hirsutism, lymphedema, plantar hyperkeratosis, cellulite, and impaired wound healing [53].

Abdominal obesity increases abdominal pressure and contributes to the development *of stomach* and *intestinal diseases.* Gastroesophageal reflux disease and Barrett's esophagus [54], erosive esophagitis and gastritis, polyps and the risk of their malignancy, irritable bowel syndrome, cholecystitis, and pancreatitis are frequently associated with excess body weight [55]. Obesity can cause non-alcoholic fatty liver disease [56].

The discussed pathology of metabolism also leads *to fertility disorders* and, as a consequence, increases the risk of male [57] and female infertility [58]. Endocrine consequences of excess body fat are decreased secretion of gonadotropins and testosterone, erectile dysfunction [59], and early onset of menopause [60].

Excess adiposity, as well as associated endocrine and metabolic changes, negatively affect *bone mineral density,* provoking osteoporosis [61] and contributing to an increase in the incidence of bone fractures [62] and osteoarthritis [63].

Also, individuals with obesity are at risk for *neurological disorders.* This risk is linked to structural and functional changes in the hippocampus and hypothalamus with subsequent neuroendocrine disorders. This dysregulation is characterized by an imbalance in autonomic control and a systemic immune-inflammatory response [64]. According to several authors [65], all of the above is a mechanism of the relationship between obesity and disturbances of psychoemotional status, depression, anxiety in adults [66] and children [67]. Humans with obesity usually face pervasive social stigma and are often discriminated against in the workplace, as well as in educational and health institutions [68, 69]. Obesity provokes gynecomastia due to hyperestrogenemia

[1] https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight (accessed: 10.07.2025).

as a result of excessive activation of aromatase, which converts testosterone into estrogen due to the influence of growth hormone, insulin-like growth factor 1, prolactin and other factors [70]. Changes in body shape that are unpopular from the point of view of beauty standards, coupled with stigmatization in society, are additional factors in the disruption of the psycho-emotional status of obese patients and provoke compulsive overeating [71].

Overweight is also one of the causes of peripheral nerve pathology, such as carpal tunnel syndrome [72]. A link has also been reported between obesity and the development of migraine [73], tension headaches [73], and idiopathic intracranial hypertension [74].

Being overweight or obese increases the risk of sleep disorders and contributes to the development of obstructive sleep apnea [49, 75], which can further impair sleep quality [76]. Insufficient sleep is associated with difficulties in appetite control, leading to obesity [76]. The combination of obesity, daytime hypercapnia (arterial $PaCO_2$ ≥45 mmHg) and hypoxia, sleep-disordered breathing is called obesity-hypoventilation syndrome, which was first described as "Pickwickian Syndrome" in the 1950s [77].

A key signalling pathway linking obesity and *tumour growth* is the PI3K/Akt/mTOR cascade, a target of many humoral factors associated with adipose tissue growth that regulates cell proliferation and survival [78]. All over the world, the burden of obesity-related tumours is 11.9% in men and 13.1% in women. There is strong evidence that excess body weight is associated with an increased risk of tumour growth in 13 anatomical sites: endometrial, esophageal, renal, and pancreatic adenocarcinoma; hepatocellular carcinoma; tumours of the gastric cardia; meningioma; multiple myeloma; colorectal cancer, postmenopausal breast cancer, ovarian cancer, gallbladder cancer, and thyroid cancer [79, 80]. Chronic inflammation due to obesity promotes tumour development, and insulin resistance enhances cell proliferation directly or indirectly [81].

In 2010, mortality rate due to obesity complications in Vietnam was 72% of total reasons [82]. The main predictors of lethal outcome were: cardiovascular diseases, oncological pathology, chronic obstructive pulmonary disease and diabetes mellitus [82]. Special studies in Vietnam show that the prevalence of type 2 diabetes mellitus increased from 1.4% in 1990 to 4.4% in 2002 among individuals aged 30–64 years [83, 84]. In 2009, the prevalence of this disease among residents of Vietnam of the same age category was 11.4%. There was similar picture in children: in 1993, this disease was found in 2.5% of school-age children under 15 years of age; in 2001 the prevalence of type 2 diabetes mellitus was 6.6% [85, 86]. In 2020–2023, this indicator remained at approximately the same level [40, 87]. Projections indicate that this increase will continue in the future, with diabetes prevalence nearly doubling by 2030 [88]. National studies also showed that low-density lipoprotein levels in 2017 increased significantly (by 36.6%) compared to 2007 levels [8].

According to estimates for 2021, mortality from obesity-related diseases in Vietnam was as follows for men and women: cerebrovascular accident — 186.4 and 147.7 per 100,000 population; ischemic heart disease — 72.2 and 58.6 per 100,000 population; diabetes mellitus — 22.4 and 39.6 per 100,000 population; hypertension in women — 24.6 per 100,000 population; liver cancer in men — 36.9 per 100,000 population; breast cancer in women — 18.9 per 100,000 population[1].

Thus, non-communicable diseases associated with metabolic disorders rank first among the causes of death, ahead of even COVID-19 (35.6 per 100,000 population) and deaths resulting from road traffic accidents (26.5 per 100,000 population).[2]

SOCIO-ECONOMIC CAUSES OF MALNUTRITION IN VIETNAM

Vietnam is a country in Southeast Asia with an estimated population of 100,352,192 in 2023 and projected to grow by 9.6% to 110,008,908 by 2050. The country covers an area of 331,000 km2, three-quarters of which are highlands and mountains. Children aged 0 to 14 make up 11.2% of the population, adolescents and adults 78.7%, and seniors aged 65 and over 10%[3]. In Vietnam, many ethnic groups live together: the Kinh people make up the largest percentage, approximately 86% [5]. Ethnic minorities mainly live in mountainous areas, middle regions, or rural areas of northern Vietnam, while the Kinh people live mainly in urban and metropolitan areas [5].

Almost two-thirds of Vietnam's population lives in rural areas, but the proportion of rural residents has declined from 76% to 73% between 2005 and 2023 [89].

Since 1986, the government carried out an economic reform (Doi Moi) aimed at stimulating the country's economic development [82, 90]. In 1994–2008, Vietnam was an example of a country with one of the fastest growing gross domestic product in the world, rapidly moving from high rates of poverty and malnutrition to industrialization to higher living standards and adequate nutrition [82, 90].

In 2020, Vietnam's economy grew at a slower pace than in previous years. Retail sales increased by 5.2% in July

[1] https://data.who.int/countries/704 (accessed:10.07.2025).

[2] The same source.

[3] The same source.

2020 and by only 2.3% in August 2020. Foreign direct investment flows also declined significantly, from US$3.1 billion in July 2020 to US$720 million in August 2020. During the lockdown, many workers lost part of their income or jobs [91], as tourism is a vital source of increasing the population's well-being. In 2019, Vietnam received 18 million foreign tourists and collected revenue of US$27.5 billion in 2018, which accounted for about 11% of 2018 GDP [92]. Following travel restrictions imposed in February 2020, the Vietnamese tourism industry lost 32% of its international customers, mainly from China. Since March 2020, all flights to Vietnam have been cancelled due to the COVID-19 outbreak in the EU and the US. The Vietnamese government imposed a two-week social distancing order on April 1, 2020 [92]. According to CEIC Data, Vietnam's annual household income per capita reached US$2,409.69 in 2022, up from US$2,178.78 in December 2021. In December 2022, this figure hit a historical high of US$2,409.69, which stands in sharp contrast to the record low of US$183.96 in December 1994[1].

The country's annual Gross Domestic Product (GDP) growth rate increased from 4% in the late 1980s to 7–11% from 1991 to 2011 and by about 5% from 2012 to the present, with minimal fluctuations following the regional financial crises of the late 1990s and late 2000s [82]. GDP per capita in purchasing power parity terms has also increased from less than US$1,000 in the 1980s to US$2,650 in 2000 and by about US$5,500 in 2014 [82].

At the same time, the population's income remains insufficient. According to a 2023 study by Nguyen N.T.T. et al., among 883 participants, 59.1% were willing to pay for reproductive health services at an average maximum price of US$36.2, which is significantly less than the current average price of US$86.2. The authors attribute the low willingness to pay for reproductive health services compared to current prices to a general low awareness of the need for reproductive health services and low income [93].

With rapid economic growth, social and wealth inequalities have emerged, and overnutrition has increased [90]. Rapid economic development, urbanization, and globalization through free trade and investment, coupled with changes in the food system since the 1990s, have contributed to the consumption of calorie-dense, nutrient-poor foods and sedentary lifestyles among children [5]. This shift has led to the development of a double or triple burden of malnutrition, with overweight and obesity becoming more common, while nutritional deficiencies persist [3].

Along with socioeconomic development, the dietary structure and lifestyle of the Vietnamese population have changed. The composition of the diet shifted toward fewer starchy staples and more proteins and lipids (meat, fish, and other protein-rich or fatty foods) [94]. Higher levels of industrialization and modernization have brought about a more sedentary lifestyle with reduced physical activity.

According to the General Statistics Office, total rice production increased from 27.5 million tons in 1997 to 32 million tons in 2001 and 35.7 million tons in 2005 [95]. Rice, which is the staple food in Vietnam, accounts for 85% of the food grain production [96]. Production of corn, cassava, peanuts and beans has also increased. Advances in animal husbandry have led to an increase in meat production from 1.59 million tons in 1997 to 1.9 million tons in 2001 and 2.5 million tons in 2005. Milk production reached 1.6 million tons and 79 thousand tons in 1998. In the 1990s, the average annual growth rates of live weight of pork, poultry, and cattle were 6.9, 6.3, and 5.5%, respectively. The growth rate of fruit and vegetable production was 5% per year [96]. Vegetable production increased from 4.8 million tons in 1990 to 6 million tons in 1999, and fruit production in 1999 was over 4.4 million tons [96]. Fish and seafood production doubled from 1.23 million tons in 1997 to 3.4 million tons in 2005 [95]. Due to urbanization and rising incomes, food consumption and eating habits of the Vietnamese people have changed significantly. The traditional diet based on grains, tubers, and vegetables has expanded to include more meat, eggs, milk, fats, and sugar, though this has been accompanied by a decline in fruit and vegetable consumption [97, 98].

Previous studies have shown that prices of meat and legumes increased significantly between 1996 and 2015 in Vietnam, leading to a decline in their consumption in poor households [98]. However, fish and seafood consumption remains low and has not improved since the 1980s. The popularity of traditional foods such as sesame, peanuts, tofu, green vegetables, and fish is declining. Some urban residents have switched to fast food, carbonated drinks, animal products, and refined carbohydrates (sugar, sweets) [95].

The country's health expenditure is expected to grow at an average annual rate of 9.4% (9% according to WHO) between 2022 and 2027, driven by the expansion of health insurance coverage for the population, as well as additional government spending[2], which is particularly important for poorer regions of the country [99]. Total net official development assistance for medical research and core health sectors

[1] https://www.ceicdata.com/en/indicator/vietnam/annual-household-income-per-capita (accessed:10.07.2025).

[2] https://www.clearstate.com/disease-trends-in-vietnam/ (accessed: 10.07.2025).

is US$1.42 per capita.[1] The physician density in 2021 was 8.33 per 10,000 population, an increase of 0.07 compared to 2012.[2]

By 2025, coverage of essential health services is expected to reach 10.1 million people. During the same period, the number of people in the country protected from health emergencies will increase to 18 million. The number of healthy people will reach 13.8 million.

All these measures led to an increase in average life expectancy, which was 67.6, 76.1 and 71.9 years for men, women and the general population in 2000, respectively, and 70.4, 79.2 and 74.8 years in 2020, and then decreased slightly due to the COVID-19 pandemic and in 2021 amounted to 69.7, 78 and 73.8 years.[3] According to the estimates for 2019–2022, the maternal mortality rate in Vietnam was 50.44 per 100,000 live births, the under-five mortality rate was 20.35 per 100,000 live births, and the neonatal mortality rate was 10.38 per 100,000 live births, which decreased by 0.62, 0.3, and 0.16 cases per 100,000 live births compared with the previous assessment period (2018–2021).[4] According to the General Statistics Office of Vietnam, the under-five mortality rate in Vietnam gradually decreased from 27.3 per 1,000 live births in 2005 to 21.5 per 1,000 live births in 2017 between 2005 and 2017. However, this decline was not uniform across all regions. Moreover, the vast differences in mortality rates remained virtually unchanged between regions during this period. While the wealthiest region had a low mortality rate of 12.6‰, in the poorest region, it was three times higher—36‰ in 2017. Notably, UNICEF data on mortality of children under 5 years of age partially aligns with these figures: this rate declined smoothly from 51.6 in 1990 to 20.3 in 2022 per 1,000 live births.[5]

Based on its geographical location, Vietnam is divided into six socio-economic regions: the Red River Delta, the North Central and Highlands, the North Central and Central Coastal, the Central Highlands, the Southeast, and the Mekong Delta. The purpose of this division is to assist in planning and developing strategies and managing socio-economic development processes in each region of the country. The Southeast and Red River Delta regions regions are the most economically developed, while the North Central and Central Coastal regions and the Central Highlands have the lowest average incomes [100].

Along with the disparity in mortality rates of children under 5 years of age, the prevalence of malnutrition (underweight and stunting) was disproportionately higher in these regions during the period from 2005 to 2017. For example, the stunting rate in the Central Highlands was notably higher than in the South-East region, especially in 2017, reaching 33.4% vs.16.7% in the South-East [89]. The same trend in the prevalence of underweight was observed among regions: while the underweight rate in the South-East was 8.6%, it reached 20.8% in the Central Highlands in 2017 [100].

A Vietnam study conducted in 1996 revealed that 94% of women engaged in agriculture, compared to 40% in non-agricultural sectors, did not consume enough food [101]. Mothers of children from rural areas attended antenatal care (ANC) later, had fewer visits, and often did not receive specific health services [102]. In Vietnam, the overall fertility rate in rural areas has always been higher than in urban areas [103], but per capita income has an inverse relationship [102]. There are some barriers to accessing quality children's healthcare in rural areas, such as distance from clinics and hospitals. Financial, sociocultural, linguistic, and ethnic barriers are other potential barriers, along with a lack of awareness of the need to receive quality medical care.

In the period from 2010 to 2020, overall health equity in Vietnam has increased. The gap between rich and poor provinces in child health development has been significantly reduced, and regional differences in health service utilization continue to narrow. The per capita health budget, total number of health workers, hospital beds in communities, and number of health workers in communities have shown significant pro-poor effects, and Vietnam's health development strategy for poor areas has long achieved its goals. However, the Central Highlands, Northern Midlands, and North Central Coast regions remain at a relative disadvantage in terms of overall health development due to the unequal distribution of medical resources, which are disproportionately concentrated in major urban centers like Hanoi and Ho Chi Minh City [104].

CONCLUSION

Global statistics show a decline in levels of malnutrition and stunting in recent decades, driven largely by developed countries. In economically disadvantaged regions such as Southeast Asia, underweight and impaired growth remain a pressing issue. Furthermore, as elsewhere in the world, this region is experiencing a rising trend in overweight and obesity. For example, in Vietnam, non-communicable diseases related to metabolic disorders are the leading cause of death. Thus, in one country or region, malnutrition in one part of the population is combined with obesity in another. This situation is known in public health terms as the double burden of malnutrition. Studies in Vietnam show that the key

[1] The same source.

[2] The same source.

[3] The same source.

[4] The same source.

[5] https://data.unicef.org/country/vnm/ (accessed: 10.07.2025).

drivers of this double burden of malnutrition in this country are poverty, especially in rural areas, and the increased consumption of fast food — fast, cheap, high-calorie, flavour-enhanced, and readily available food, as well as decreased consumption of meat, seafood, fruit, and other foods rich in micronutrients and protein.

An analysis of literature sources shows that the health and social development policies pursued by the country's leadership have led to a reduction in poverty, nutritional deficiencies, maternal and infant mortality, a narrowing of the economic gap between the city and the countryside, an increase in food production and food security in general, but have inevitably led to an increase in the percentage of obesity and overweight due to the population's failure to adhere to the principles of healthy eating and physical activity.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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Вклад авторов. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

Источник финансирования. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.

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