Journal of Pharmaceutical Research International

33(41A): 118-125, 2021; Article no.JPRI.72483
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Malnutrition and Some Related Factors in Primary School Children in Saudi Arabia: Systemic Review

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i41A32310
Editor(s):
(1) Dr. Sirigireddy Sivajothi, Sri Venkateswara Veterinary University, India.
Reviewers:
(1) Amaechi Dennis, Veritas University, Nigeria.
(2) Meenakshi Bhilwar, University of Missouri, USA.
Complete Peer review History: https://www.sdiarticle4.com/review-history/72483

Systematic Review Article

Received 06 June 2021
Accepted 12 August 2021
Published 16 August 2021

ABSTRACT

Background: Malnutrition is an underlying factor in many diseases in both children and adults, and it contributes greatly to the disability-adjusted life years worldwide. It is a major public health concern in developing countries among children since it places a heavy burden on already disadvantaged communities.
Methods: This is systematic review was carried out, including PubMed, Google Scholar, and EBSCO using the following terms in different combinations: Malnutrition, overweight, underweight, systemic review, primary school children, Saudi Arabia.
Results: The review included 9 studies from different countries that assess the level of malnutrition and associated factors among school children. Many of studies reported high prevalence of malnutrition among school children which included overweight, stunting, wasting and underweight. The studies reported that age, gender, regularity of father's employment, and dietary factors were associated with malnutrition. Also, the type of school attended was found to be associated with malnutrition.
Conclusion: This review concluded that there was high malnutrition prevalence among school children in different parts and its affected by many factors like age and gender.

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Keywords: Malnutrition; overweight; underweight; systemic review; primary school children; Saudi Arabia.

1. INTRODUCTION

Elementary school life represents an active growth stage in childhood, as it is a dynamic period of physical growth as well as mental development of the child [1]. Studies show that health problems caused by poor nutrition in elementary school are one of the causes of low school enrollment, high stones, early withdrawal and unsatisfactory class execution [2]. Pupils in primary school represent an important social group in the society because they are more vulnerable to malnutrition; underweight or obesity [3].

Children constitute a large proportion of the world's population; thus, well-being and growth in this stage of life ensures a healthy society. Infants and young children are vulnerable to malnutrition due to high nutritional requirements for growth and development. The term malnutrition refers to over- or imbalanced as well as deficiency intake of calories, protein, and / or other nutrients [4]. Hunger and not receiving sufficient food may lead to malnutrition. Also, malnutrition can sometimes occur because of lack of a specific nutrient, such as vitamins, in the diet [5].

In developing countries, child malnutrition is a major public health problem. It affects all aspects of children's lives; its impact is not limited to physical health, but also extends to psychological, social and spiritual well-being [6].

Malnutrition is an underlying factor in many diseases in both children and adults, and it contributes greatly to the disability-adjusted life years worldwide [7]. It is particularly prevalent in developing countries, where it affects one out of every three preschool-age children [8].

Various issues can lead to malnutrition, insufficient food intake, infection, psychosocial deprivation and an unhealthy environment, as well as poor hygiene, social inequality, and possibly some genetic factors. Reports from different organizations such as the World Bank indicate that compared to children living in food-safe households, children living in households that cannot get enough clean and healthy food are more likely to suffer from malnutrition and food-related problems. Health [9].

Malnutrition is manifested by stunted growth, weight loss, underweight, micronutrient deficiency or overweight, and obesity (the "double burden" of malnutrition) [10].

Stunting is a cumulative process of reduced growth that predominantly occurs before three years of age and persists into school age [11]. It is linked to poor mental development and poor academic and school performance and thus becomes a public health burden. This association is due to complex environmental, social and economic factors, in addition to nutritional ignorance [12]. Stunting in children may be the result of chronic lack of adequate nutrition or the effects of chronic or recurrent diseases, stunting as an indicator of chronic malnutrition, or excessive weight gain in early childhood. It can lead to poor physical and mental development in later life, obesity and chronic diseases [13]. Approximately 1% of adults' height decline is due to stunted growth in children by 1.4% loss in productivity [14].

Concerning the latest Egypt's Demographics and Health Survey, 2014, acrobatics is still a serious public health problem in Egypt, affecting 1 in 5 children below the age of 5 [14].

Nutritional stunting is a reflection of past recklessness and missed opportunities and is a sign of chronic malnutrition, which prevents a child from achieving the appropriate height for her or his age. Consistent deprivation from sufficient food because of poverty, recurring infections caused by contaminated environments or low hygiene, and limited access to proper healthcare services are known to be the main reasons for the occurrence of nutritional stunting yearly [15].

The term 'wasting' is used interchangeably for 'underweight' or 'thinness', although these are distinct in measurement and etiology. Whereas 'wasting' refers to low weight for height because of a short-term loss in muscular tissues, 'thinness' or being 'underweight' refers to a decrease in body fat as a result of dieting or long-term undernutrition [16].

Underweight indicates lower weight-for-age for a child. This index reflects acute and chronic malnutrition. In this situation, the child loses weight because of acute it is essential to

determine and eliminate immediate causes and underlying reasons for malnutrition [17]. Wasting has increased significantly since 2000 [18]. In Egypt, wasting and underweight for under five children stand at 8 and 6 percent, respectively [14]. In developing countries, 52.0% and 34.0–62.0% of the school-age children are stunted and underweight, respectively [17, 19].

According to UNICEF (2011), more than 200 million school age children were stunted and underweight; about one billion school children will be growing up by 2020 with impaired physical and mental development thus directing attention towards obesity as a coming epidemic [20].

Malnutrition is considered a direct and indirect reason for more than 60% of deaths in children yearly [15]. It can limit growth, impair the immune system, and increase infection and mortality rates. The WHO estimates that malnutrition accounts for 54 percent of child mortality worldwide [21], while for children under the age of five years, childhood underweight accounts for 35.0% of all deaths worldwide [19].

This review aimed to assess the level of malnutrition and associated factors among school children.

2. METHODS

This is systematic review was carried out, including PubMed, Google Scholar, and EBSCO using the following terms in different combinations: Malnutrition, overweight, underweight, systemic review, primary school children, Saudi Arabia. We included all full texts [community- based study, school- based -cross-sectional study, a descriptive-analytical and cross-sectional study]. The authors extracted the data, and then the author's names, year and region of publication, the study type, and the result were reported (Table 1).

3. RESULTS

The search of the mentioned databases returned a total of 126 studies that were included for title screening. 95 of them were included for abstract screening, which lead to the exclusion of 54 articles. The remaining 41 publications full-texts were reviewed. The full-text revision lead to the exclusion of 32 studies, and 9 were enrolled for final data extraction (Table 1).

The included studies had different study designs.

3.1 Results and Discussion

Child malnutrition in developing countries is a major public health problem because it places a heavy burden on already disadvantaged communities [31]. It is considered the most important nutritional disease in developing countries, mainly due to its high prevalence and high infant mortality rate [32].

Malnutrition is very common among children in low- and middle-income countries. However, the overall prevalence of underweight, stunting, and wasting among children varies greatly from country to country [30,33-35]. This disease can be considered as an indicator of the social and economic status of a society. Approximately 70% of malnourished children live in Asia, with the highest prevalence of malnutrition in infants and preschool children [36].

This systemic review included many studies from different countries aimed to assess the level of malnutrition and associated factors among school children.

In Saudi Arabia, a community -Based study was conducted to establish the prevalence data about malnutrition. The study reported that 6.9% and 1.3% of the children were moderately and severely underweight, respectively. The rates of moderate and severe wasting were 9.8% and 2.9%, respectively, and the prevalence of moderate and severe stunting was 10.9% and 2.8%, respectively [22]. Results from another study was carried out in Riyadh city, among 400 participants showed that more than half (63.0%) of the respondents suffer from malnutrition (underweight or overweight) [23].

In Iran, another study conducted in Semnan province among 2195 primary students demonstrated that the prevalence of malnutrition among students was high [24]. Also, in the city of Shahroud (Northeast of Iran), the results of study conducted, indicated the existence of malnutrition in the regions and factors affecting malnutrition included age, birth weight, birth spacing, and the mother’s BMI at child birth [27].

According to Egyptian National Nutrition Institute, in the year (2010-2014), malnutrition was still a major health problem in the Egyptian community among different age groups and socioeconomic classes [37-39]. Our review included three studies were conducted in

different parts of Egypt; it found that malnutrition is very common in Fayoum, is consistent with the national epidemic including (developmental delay, underweight and wasting), and is related to age, gender, father's employment pattern and dietary factors. [25]. In Behera Governorate, Egypt, another study reported that the prevalence rates of stunting and severe stunting were (11.3% and 1.15%), respectively, and were significantly related to rural areas, mothers' low education and birth order ≥ 4. In addition, weight loss, overweight, and obesity accounted for 4.5%, 11%, and 8.2% of participants, respectively [26]. In Kafr El-Sheikh Governorate, a study reported that over-nutrition and obesity were the prominent malnutrition problem among studied group while wasting and underweight was affecting a minimum percentage of their number [28].

In India, it was found that malnutrition was highly prevalent with 70% of children were underweight [30].

In Ghana, a school-based cross-sectional study of comparing public and private schools found that school type was an important causal factor of underweight and underweight students [30]. Public school students are short and skinny as against those attending private schools. However, overweight was high among pupils attending private schools as against those attending schools in public schools [30]. This finding is comparable to many other studies examining undernutrition and associated factors in children. For example, a study carried out in Burkina Faso showed that children attending private schools had a better nutritional status than children attending public schools [40].

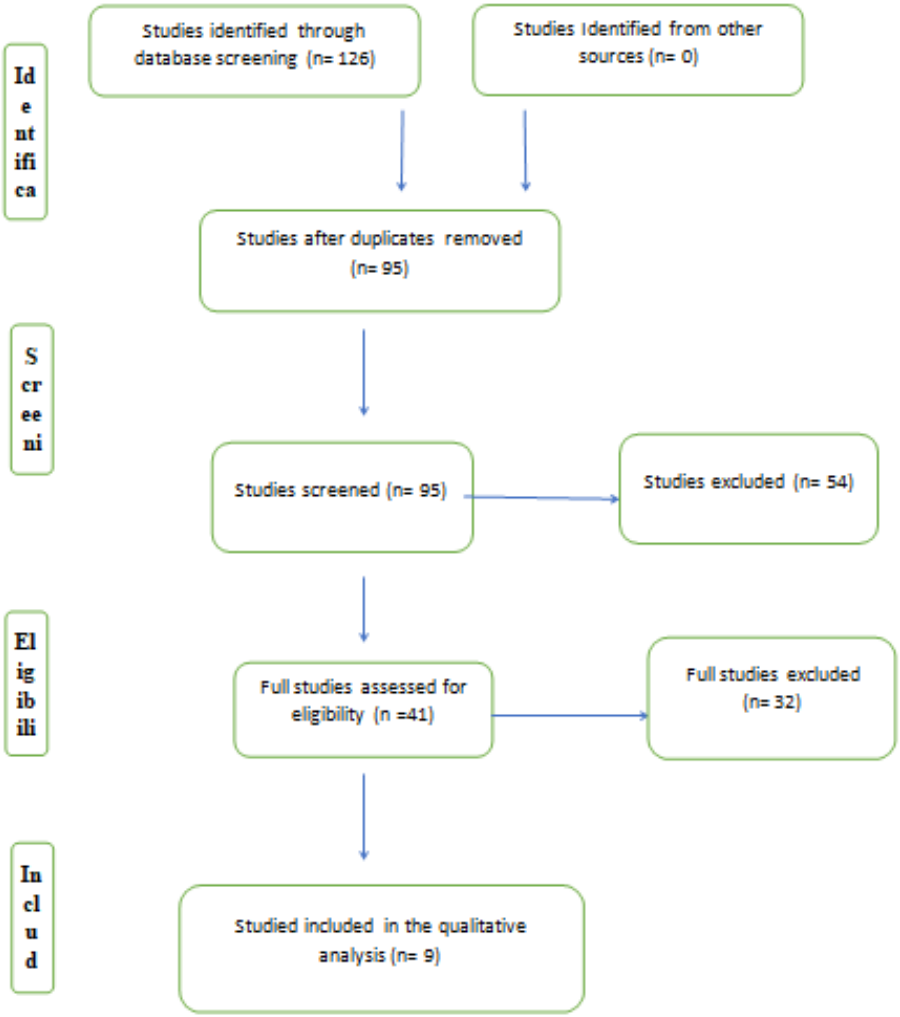

Fig. 1. Different study designs

Table 1. Author, country, year of publication, methodology and results

Author, years, country	Type of study	Results
El Mouzan, Mohammad I., et al. 2010 [22]. KSA	Community -Based study.	The study reported that the prevalence of moderate and severe underweight was 6.9% and 1.3%, respectively. Moderate and severe wasting was 9.8% and 2.9%, respectively. Finally, the prevalence of moderate and severe stunting was 10.9% and 2.8%, respectively. This study establishes the national prevalence of malnutrition among Saudi children.
Ali ZA. Et al. 2017 [23]. Riyadh City, Kingdom of Saudi Arabia.	Cross- Sectional study.	The study included simple random sample of 400 respondents with age between 6 and 19 years (200 boys and 200 girls). findings revealed that more than half (63.0%) of the respondents suffer from malnutrition (underweight or overweight).
Batool Karimi et al. 2016 [24]. Semnan province, Iran.	Cross- Sectional study.	The study was conducted among 2195 primary students and reported that 12.5, 9.2, and 9.0% of the students, respectively, were affected by thinness, underweight, and stunting. These findings demonstrated that the prevalence of malnutrition among students was high.
Wafaa Y et al. 2017 [25]. Fayoum Governorate, Egypt.	A cross-sectional school- based study.	The study reported that prevalence of stunting, underweight, and wasting was 34.2%, 3.4%, and 0.9%, respectively, while obesity was 14.9%. Malnutrition is highly prevalent in Fayoum in line with the national prevalence and associated with age, gender, regularity of father's employment, and dietary factors.
Nesrin K et al. 2019 [26] . Behera Governorate, Egypt.	A cross-sectional study.	The study found that the prevalence of stunting and severely stunting growth were (11.3% and 1.15%). It was significantly associated with rural location, poorly educated mothers and birth order≥ 4. Thinness, overweight and obesity were (4.5%, 11% and 8.2%).
Delvarianzadeh M et al. 2015 [27]. The city of Shahroud (Northeast of Iran).	A descriptive-analytical and cross-sectional study.	The results indicated the existence of malnutrition in the region. Based on the findings, the percentage of underweight, wasting, stunting and ratio of head circumference with age was determined to be 1.7%, 5.4%, 9.5%, and 8.6%, respectively. Factors affecting malnutrition included age, birth weight, birth spacing, and the mother's BMI at child birth.
Shimaa M. Koabar, et al. 2018 [28]. Kafr El-Sheikh Governorate, Egypt.	A cross-sectional study.	The study results revealed that the majority (31.6%) were Overweight followed by (13.1%) were obese. (6.7%) were wasted, (8.3%) were stunted, (1.3%) suffering from severe thinning and only (.9%) were underweight. The results of the study concluded that over-nutrition and obesity were the prominent malnutrition problem among studied group while wasting and underweight was affecting a minimum percentage of their number.
Agbozo, F et al. 2016 [29]. Hohoe Municipality, Ghana.	School-based cross-sectional- comparative study between public and private schools.	Overall, the prevalence of underweight, stunting, thinness and overweight in the study population was 9.3, 8.5, 5.7 and 4.6 % respectively. Stunting and thinness were high among pupils attending public schools as against those attending private schools. However, overweight was high among pupils attending private schools as against those attending schools in public schools. The type of school attended was found to be a strong determinant of underweight and thinness among pupils.
R. Bhoite et al. 2011 [30]. India.	A cross -sectional randomized study.	The study reported that malnutrition was highly prevalent with 70% of children were under weight. Stunting was found in 32.4% of girls and 30.8% of boys.

Overall, the assessment of nutritional status is one of the most important building blocks of the global strategy to prevent undernutrition and improve child health; in fact, it is an important means of finding people in societies or groups whose development does not correspond to the model considered [41-42].

4. CONCLUSION

This review concluded that there was high malnutrition prevalence among school children in different parts and its affected by many factors like age and gender.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle4.com/review-history/72483