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Public Health

journal homepage: www.elsevier.com/puhe

Review Paper

Risk factors of overweight and obesity in childhood and adolescence in South Asian countries: a systematic review of the evidence

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ARTICLE INFO

Article history:

Received 18 March 2014

Received in revised form

1 December 2014

Accepted 4 December 2014

Available online 6 March 2015

Keywords:

Overweight

Obesity

Physical activity

Nutrition

South Asia

Children

Adolescents

ABSTRACT

Objective: To assess and synthesize the published evidence on risk factors of overweight and obesity in childhood and adolescence in South Asia.

Study design: A systematically conducted narrative review.

Methods: A systematic review was conducted of all primary studies published between January 1990 and June 2013 from India, Pakistan, Nepal, Bangladesh, Sri Lanka, Bhutan, and Maldives located through the following data bases: PubMed, PubMed central, EMBASE, MEDLINE, BioMed central, Directory of Open Access Journals (DOAJ) and electronic libraries of the authors' institutions. Data extraction and quality appraisal of included studies was done independently by two authors and findings were synthesized in a narrative manner as meta-analysis was found to be inappropriate due to heterogeneity of the included studies.

Results: Eleven primary studies were included in the final review, all of which were conducted in school settings in India, Pakistan and Bangladesh. Prevalence of overweight and obesity showed wide variations in the included studies. The key individual risk factors with statistically significant associations to overweight and obesity included: lack of physical activities reported in six studies; prolonged TV watching/playing computer games reported in four studies; frequent consumption of fast food/junk food reported in four studies; and frequent consumption of calorie dense food items reported in two studies. Family level risk factors included higher socioeconomic status reported in four studies and family history of obesity reported in three studies.

Conclusion: This review provides evidence of key contributors to the increasing burden of obesity and overweight among children and adolescents in South Asia, and demonstrates the nutritional transition that characterizes other developing countries and regions around the world. The findings have implications for policy, practice and the development of interventions at various levels to promote healthy eating and physical activity among children and adolescents in the region as well as more globally.

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<http://dx.doi.org/10.1016/j.puhe.2014.12.004>

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Introduction

Obesity has emerged as a pervasive public health problem among the world's children and adolescents that is increasing at an alarming rate.^{1–5} In 2008, an estimated 170 million children aged less than 18 years were found to be overweight or obese, and it has been projected that about 30% of all children will be affected by this prominent nutritional and metabolic disorder by the year 2030.^{6,7} The disorder represents fat accumulation in adipocytes following an excess calorie intake through consumption of food that exceeds the body's metabolic requirements for growth, development and physical activities. This excess fat accumulation is classified as overweight or obesity depending on different ranges of body weight for the height of an individual.⁸ An individual is considered obese if he or she becomes excessively overweight with high level of accumulated fat in the body.⁹ Body Mass Index (BMI), defined as weight in kg/(height in meter)² is by far the most commonly used measure of obesity.¹⁰ Although BMI calculations are done the same way for children and adults, the criteria for interpreting the BMI number is different for children and adolescents from the criteria used for adults.¹¹ Unlike adults, BMI is interpreted through categories that take into account sex and age in the case of children and adolescents. This is based on the premise that the amount of body fat differs between boys and girls and changes with age.¹¹

Obesity in early life is crucial as it often leads to increased morbidity and mortality during young adulthood and poses increased risk of being obese in adulthood.^{12–15} For instance, obesity has been associated with a number of chronic disorders including hyperlipidaemia, hypertension, cardiovascular disease, metabolic syndrome, glucose intolerance and kidney disorders in early childhood.^{13,14} Obesity led type 2 diabetes mellitus has been shown to increase dramatically among children over the last two decades.¹⁵ Obese children are also at increased risk of suffering from several psychological problems including depression.² The economic implications of childhood obesity and its huge burden on health systems have been reported.¹⁶

Although global recognition about the health hazards of obesity in childhood and adolescence is relatively recent, it has been well established as a public health problem in economically developed countries.^{17–20} While the problem was restricted to the developed countries of the world until recently, the situation has changed drastically in recent years with studies reporting a pronounced increase in obesity prevalence among children and adolescents in developing countries over the past few decades.^{5,20,21} A recent well conducted systematic analysis of global, regional, and national prevalence of overweight and obesity reported an increase in prevalence rates among children and adolescents in developing countries, from 8.1% to 12.9% among boys and from 8.4% to 13.4% among girls during 1980–2013.⁵ Although childhood obesity prevalence is comparatively higher in developed countries, larger numbers of obese children tend to reside in low and middle income regions of the world due to the demographic profiles of their populations.

While countries in the South Asian region – Bangladesh, India, Pakistan, Nepal, Maldives, Bhutan and Sri Lanka – are predominantly economically underprivileged, an increasing trend in the prevalence of childhood obesity has been observed in recent years in countries where data are available. For example, prevalence of childhood obesity (5–19 yrs) increased from 9.8% to 11.7% between 2006 and 2009 in India,²² and it almost doubled among school children (5–14 yrs) in Pakistan between 1994 and 2005.^{17,23} This increasing trend of obesity prevalence among the South Asian children is beyond expectation as a vast majority of children are reported to be undernourished.²⁴ Although studies that provide relevant insights about the likely contributors of overweight and obesity are emerging, the problem of obesity remain largely unrecognized in the region, and it would seem that the individual studies do not provide sufficient evidence on their own to warrant appropriate action. This review aims to systematically synthesize the published literature on factors associated with overweight and obesity among children and adolescents in South Asian countries to inform policy, practice and future research.

Methods

A systematic review design was employed to identify, appraise and summarize the existing evidence on factors associated with overweight and obesity among children and adolescents for this study. This design was considered to be advantageous as systematic reviews allow the systematic collation and appraisal of existing evidence to generate unbiased, accurate and reliable information.²⁵ Conducting a primary study on this occasion would involve a very large sample to be representative of the population of this wide geographical area and will have considerable resource implications to produce robust, reliable and valid information.

The overall review question was framed using Population, Intervention (exposures), Comparator, Outcome and Study design (PICOS) framework.²⁶ The population comprised of children and adolescents aged 0–18 years in South Asian countries i.e., India, Bangladesh, Pakistan, Bhutan, Nepal, Maldives, Afghanistan and Sri Lanka. The exposures and comparators respectively included presence and absence of factors that are linked to increased risk of overweight and obesity. The primary outcome measure was overweight and obesity measured using Body Mass Index (BMI). The study design included quantitative and qualitative primary studies.

Data sources

A range of electronic data bases were used to locate primary studies published between January 1990 and June 2013 from India, Pakistan, Nepal, Bangladesh, Sri Lanka, Bhutan and The Maldives. Searched databases included: PubMed, PubMed central, EMBASE, MEDLINE, BioMed central, Directory of Open Access Journals (DOAJ) and the electronic libraries of the authors' institutions. A combination of text words and MeSH terms were used such as: 'obesity', 'childhood', 'overweight',

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