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## REVIEW ARTICLE

## OBESITY, AN EMERGING EPIDEMIC IN PAKISTAN-A REVIEW OF EVIDENCE

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**Background:** In Pakistan, the disease pattern is facing a huge changeover from acute and communicable diseases to the non-communicable diseases. Moreover, an emerging epidemic of obesity is still under recognized in Pakistan. A detailed review and dissemination of the existing knowledge to determine the extent of burden of obesity can help understand this important public health issue. **Methods:** A detailed literature review was conducted through PubMed search engines, regarding obesity burden in Pakistan. The original peer reviewed research articles, reports of WHO in English language, non-government organizations reports were included in the review. “Obesity AND Pakistan” were used as a search terms. **Results:** Pakistan is suffering from epidemic of obesity, affecting all age groups. Urban population, particularly women shows considerable higher burden of obesity as compared to men and women from rural population. However, among children and adolescents there is variation in prevalence of obesity. Girls from all age groups are predominantly more obese as compared to boys. Most of the studies have estimated child obesity among school going children of different age groups and need careful interpretation. **Conclusion:** Pakistan is currently suffering from an emerging epidemic of obesity. The rising burden of obesity is widespread among adults (man and women) and children. The burden of obesity is higher among females in all age groups as compare to males. Effective interventions are required at population level to prevent and control this emerging public health issue.

**Keywords:** Obesity; Malnutrition; Epidemic; Pakistan

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## INTRODUCTION

Obesity is a preventable medical condition characterized by increased fat deposition in the body as a result of increased caloric intake or decreased physical activity.<sup>1</sup> Globally, World Health Organization (WHO) classifies the overweight and obesity on the basis of body mass index (BMI), excluding Asians which have a much lower cut-off due to their higher risk of morbidity secondary to obesity.<sup>1</sup> Obesity has serious health effects and it is a known independent risk factor for many non-communicable diseases including cardiovascular diseases, hypertension, type-II diabetes mellitus, hyperlipidaemia, osteoarthritis, obstructive sleep apnoea and certain cancers.<sup>1–3</sup> Obesity can lead to catastrophic financial losses in a community by increased health related expenditure for treatment of non-communicable diseases while reducing overall productivity of the society.<sup>3</sup> It is reported that obesity contributes to more than 36 billion of DALYs (Disability adjusted life years) globally in addition to (2–6) percent total health expenditure of health in many countries.<sup>2</sup>

Globally, changing trends for food, increase in sedentary life style, rapid industrialization and urbanization are the key factors which contribute to increasing burden of obesity as an emerging epidemic. It is a known fact that countries sharing the

highest burden of obesity also share the highest burden of diabetes mellitus and metabolic syndrome.<sup>3</sup> This association of obesity with non-communicable diseases makes this problem as a priority public health issue of this century. It is estimated in 2008, that 1.46 billion adults of world are overweight and 502 million are obese, where 170 million of the children around the world are obese and overweight.<sup>2,3</sup> Hence, obesity is affecting a large proportion of the world’s population.<sup>2</sup> Countries bearing the major burden of obesity pandemic include Papua New Guinea; 79–80 percent obese population, Qatar 34–45 percent obese population, Lebanon 36–38 percent obese population and United States 32–35 percent of obese population overall.<sup>4</sup>

Obesity was previously considered as a major public health issue of developed countries only, but for last two decades due to rapid social and environmental transitions it is identified that obesity have increased three times in middle and low income countries and affecting people of all age groups including children while these countries are already fighting with severe issues related to malnutrition especially in children.<sup>5</sup> In Pakistan the disease pattern of the country facing an acute changeover from communicable diseases to a rising trend of non-communicable diseases. Apart from other non-communicable diseases obesity has emerged as an epidemic which is still under recognized in Pakistan.

Few studies have been done so far, and to identify the various burden in different age groups both in children and adults. There is a need of detailed review and dissemination of the existing knowledge, to determine the extent of burden of obesity and its distribution among various high risk groups can result in better understanding of this important public health issue.

## MATERIAL AND METHODS

A detailed literature review was conducted through PubMed search engines, regarding obesity burden in Pakistan. The original peer reviewed research articles, reports of WHO in English language, non-government organizations reports were included in the review. "Obesity AND Pakistan" was used as a search terms. Articles were retrieved and reviewed, to study the burden of obesity in Pakistan. Seven articles were included in the review out of which four were related to adult obesity in Pakistan while three studies were related to child obesity. A detailed review of articles was done to assess the burden of obesity and its distribution in Pakistan.

## RESULTS AND DISCUSSION

Pakistan is a developing country facing a "double burden," comprising diseases associated with under development issues leading to poor quality of life (infectious diseases and nutritional deficiencies) and non-communicable disorders secondary to urbanization or rapid industrialization.<sup>6</sup> In Pakistan contributory factors are environmental changes, urbanization, lifestyles modification, consumption of high density diets, and decrease physical activity have resulted in a rising burden of overweight and obesity.<sup>7</sup> In Pakistan, the existing literature is scarce regarding the burden of overweight and obesity. Studies have identified the variable burden of overweight and obesity among various populations distinct on the basis of gender and age groups, including school-aged children. Furthermore, various studies have identified substantial increase in the burden of obesity particularly among children, comprising 43 percent of Pakistan's total population. Recognition of the high risk groups is also important for appreciation of the risk and targeted control measures.

In Pakistan obesity among adults has emerged as a public health threat in past few decades. Studies have identified rising proportions of overweight and obese among adults especially those, living in urban areas while females to have a higher proportion of overweight and obese than males of similar population.

The National Health Survey of Pakistan (NHSP) conducted from 1990–1994,

reported the double burden of disease, i.e., under-nutrition and overweight among adolescents and adults' population.<sup>8</sup> According to this Pakistan National Health Survey (1990–94), the prevalence of obesity among adults (25–44 years) in rural areas of Pakistan was; 9% among men and 14% among women. However the prevalence of obesity even higher in urban areas i.e. 22% for men and 37% women were obese in urban settings.<sup>8</sup> The evidence of high prevalence of an overweight and obesity among Pakistani females were also supported by the Pakistan demographic health survey 2013.<sup>9</sup> The PDHS 2013 reported 11% prevalence of obesity in among men and 19% among women living in rural settings while in urban settings 23% of men and 40% of all women were obese.<sup>10</sup> A study conducted in northern areas of Pakistan has described an age-adjusted prevalence of overweight and obesity around 13.5% and 14.1% for men and women respectively and an increase in prevalence per year equally for both men and women.<sup>11</sup> Another study conducted in the city of Multan, Pakistan considering the new recommended BMI cut-off for Asians found 46% of the people were overweight and obese, while 24.55% were underweight. The mean BMI of males and females were different significantly with a proportion of overweight or obese around 55.12% among males and 36.15% among females contrary to findings from other studies conducted in other parts of country.<sup>12</sup>

The NHS reported that around 1% of the Pakistani population is obese and 5% is overweight in the young age group, i.e., 15–24 years. A survey of three affluent schools of Karachi reported that overweight and obesity among children and adolescent were associated with unhealthy lifestyle and lack of proper food intake (imbalance in the uptake of carbohydrate, fat and protein).<sup>13</sup> Similar findings were reported from neighbouring countries like India and Sri Lanka, with high prevalence of overweight and obesity in their populations particularly among urban settings.<sup>14,15</sup> These findings were also comparable to the data available from other countries like United Kingdom, Qatar and Iran.<sup>16–19</sup> However, the dietary and nutritional patterns, i.e., nutritional transition, resulting from large modifications in the overall pattern of the dietary habit, associated with the socio-economic and demographic change. These changes effect the health and are associated with a high prevalence of obesity; particularly childhood obesity.<sup>20</sup>

A survey conducted in UK among multi-ethnic and socioeconomic groups to determine the burden of childhood obesity found that 23% of children were reported overweight and 6% were obese. Among gender distribution, girls were more

likely to be overweight than boys' 24% vs. 22% respectively. The percentage of children who are obese and overweight also varies by ethnic group but not by socioeconomic status. The existing evidence suggest that children from India and Pakistan (boys) have an increased risk of being overweight than the general population while children from UK, Afro-Caribbean and Pakistani girls were at high risk of being obese.<sup>19</sup> Variation in height and weight among different ethnic group were also present.<sup>19</sup> Afro-Caribbean girls and boys mean BMI were higher, while Indian, Bangladeshi, and Chinese boys and girls have low BMI, as compared to general population.<sup>17,19</sup> Similarly the prevalence of childhood obesity in UK was found to be 14–19% in 1999 and 6–25% in 2001.<sup>21,22</sup>

There is dearth of literature in Pakistan regarding prevalence of obesity among school going children. The study was conducted in Hazara division, Pakistan, to determine the obesity prevalence in school going children. Prevalence of obesity was found to be 4.78% with the male to female ratio was 1:1.2.<sup>23</sup> The prevalence of obesity was higher among students of private school than students of government schools. Among children of age 12–14 years the prevalence was found to be 49%, while among 6–7 years' age prevalence was 20.26%. The burden in this study found similar to the results from other regional developing countries. There is a need to create awareness about obesity and the complications associate with this issue.<sup>23–25</sup> A similar study from Thailand, report the prevalence of obesity among children of 2–5 years was 7.9% and 6.7% in the 6–12 years of age.<sup>24</sup>

Another survey conducted among school-aged children in Karachi assessed the nutritional status and found that 27.3% of the school children were underweight, 14.3% of the children were stunted and the overall burden of overweight and obese children was 5.7. These findings were consistent with findings reported by NHSP.<sup>25</sup> The level of physical activity was inversely associated with being overweight or obese for those who engaged for more than 30 minutes of physical activity. These increasing trends of childhood obesity are consistent with global trends among developed countries as well; United States, 14–17% childhood obesity over a period of four years, Brazil, 2.5-fold increase in childhood obesity from 4 to 14% over the last three decades.<sup>26</sup>

The study highlights a rapid increase in the number of overweight and obesity among children despite a fact that there is persistently high burden of under nutrition. The age-related rise in overweight and obese children in Pakistan is associated with simultaneously decrease in physical activity, contributed as one of the major factors. The strategies

must include interventions for the prevention of obesity among children by promoting physical activity and healthy dietary intake especially in schools.<sup>25</sup>

#### **Strength and limitations:**

This review included articles from one search engine only which might have resulted in inclusion of articles only published in indexed journals. Furthermore, we didn't include any gray literature from national data sources. Most of the studies included in the review were small scale, peer reviewed cross-sectional studies however, their generalizability is questionable due to small sample size and specific target population, i.e., mostly school age children. Nevertheless, this review has its own strengths as it is the first paper focusing published evidence regarding obesity burden in Pakistan. This review highlights severe dearth of scientific evidence on obesity required for policy making and relevant public health action. This paper also indicates increasing burden of obesity among adult as well as children and provides rationale to promote research on obesity among all age groups, particularly children.

## **CONCLUSION AND RECOMMENDATIONS**

Pakistan is currently suffering from the emerging epidemic of obesity. The obesity burdens among adults and children have been increasing with the major risk factors including unhealthy lifestyle, unhealthy diet and physical inactivity. Immediate preventive and control measures are required to control the situation which may include enabling environments physical activity and availability healthy diet followed by awareness and childhood screening for obesity for a primordial approach for prevention while considering women and school age children as high risk groups.

**Conflict of interest:** Authors declare that they do not have any conflict of interest.

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