Prevalence of overweight/obesity in South Asia: A narrative review

Avivar Awasthi, Akhila Bhandarkar Panduranga, Aditya Deshpande

1. Introduction

Overweight (ov) and obesity (ob) are part of a spectrum of excess adipose tissue mass in the body. Ob is known to cause many chronic complications.1 Ov and ob are practically defined having an elevated body mass index (BMI) (≥25 kg/m2 and ≥30 kg/m2). WHO criteria,2 ≥ 23 kg/m2 and ≥ 25 kg/m2: Asian criteria,3 respectively. Ob ranks as the sixth leading cause of disability-adjusted life years (DALYs).5 By 2030, more than 1 billion people globally will be living with ob.6 Historically, the prevalence of overweight/obesity (ov/ob) related DALYs has been high in developed nations, however, there has been a steady increase in low and middle income countries.7,8 South Asian countries like Maldives, Bhutan, Myanmar, Nepal, and Bangladesh are amongst countries with the most rapid rise in ob.9 India and Pakistan are included in countries which are predicted to have the highest prevalence of adult ob (BMI ≥30 kg/m2) by 2030.6 Changing dietary and environmental habits, increase in sedentary lifestyle, sleep deprivation, stressors, environmental contaminants, epigenetic influences, and early-life undernutrition are linked to the rise in subjects with ov/ob.10 These factors independently, or in concert with one another lead to the growing burden of ov/ob.

This review article provides an overview on country wise prevalence of ov/ob in South Asian countries. The prevalence of ov/ob were evaluated in children 0–5 years of age, adult men and women who underwent anthropometric evaluation in National surveys. The aim of the study is to provide country wise prevalence of ov/ob in South Asian countries.

2. Methods

2.1. Data

A literature search was conducted for all national surveys up to 1st January 2023, for South Asian countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Myanmar, Pakistan, Sri Lanka). Specifically, national surveys conducted within the last 10 years were included.

Results: The prevalence of ov/ob in adults and children 0–5 years of age ranged from 22.4 to 52.4%, and 1.3–7.6%, respectively. There was a higher prevalence seen in women, urban population, and higher socioeconomic status.

Conclusion: The prevalence of ov/ob in South Asia is high and it may be even higher if Asian BMI cut-offs are applied to the surveyed population. Preventive strategies need to be tailored to the unique characteristics of ov/ob in South Asia.
health surveys (DHS), conducted within the last 10 years (up to 1st January 2023) have been included in this review. The Myanmar Micronutrient and Food Consumption survey (MMFCS), Bhutan multiple indicator cluster survey (MICS), and the Koninklijk Instituut voor de Tropen (KITs) Royal Tropical School, Afghanistan, have also been included in this review article. For prevalence of other non-communicable diseases (NCDs), IDF atlas for diabetes mellitus, and NCD Risk Factor Collaboration (NCD-RisC) for hypertension were included. The global nutrition report derived from the global dietary data base was utilized for daily dietary intake. The World bank data were extracted for GDP of South Asian countries for the year 2021.

2.2. Measurements

Using anthropometric data provided for participants of National surveys, body mass index (BMI) ≥ 25 kg/m² was recorded for adults, and weight-for-height > +2 z score was recorded for children 0–5 years of age. Underweight children, as defined by weight-for-age < −2 z score was recorded for children aged 0–5 years. High waist circumference (WC) and waist-hip ratio (WHR) were also included and were defined as waist circumference (WC) of ≥ 90 cm (104 cm) in men, and 80 cm (88 cm) in women, and WHR of > 0.9 in men, and > 0.85 in women to be significant. The inclusion criteria were consenting adults aged >15 years to <70 years of age, and children 0–5 years of age. Pregnant women were not included in anthropometric measurements in surveys. Hypertension was defined as blood pressure greater than 140/90 mm Hg or those individuals who were already on treatment for hypertension. Cardiovascular disease was defined as presence of heart attack, or chest pain due to heart disease, or stroke. Diabetes mellitus was diagnosed using the American Diabetes Association (ADA) criteria for diagnosis of the same.12

2.3. Analysis

The data were entered in Microsoft excel spreadsheet. Data on BMI, weight for height, waist circumference, and waist-hip ratio were entered for adults, male, female, and children 0–5 years of age. The findings were summarised in this review. Prevalence of ov/ob, other NCDs, and daily dietary intake have been presented in tabular form and in the form of a 2-dimensional column chart.

3. Results

Amongst the nine countries included in this review, the highest prevalence of ov/ob was present in Maldives (52.5%), and the lowest prevalence was noted in Myanmar (22.4%). There was a higher number of female participants surveyed (except in Afghanistan). Women, and boys (except in Bhutan) had a higher prevalence of ov/ob in all South Asian countries.

The prevalence of adult ov/ob, children (0–5 years of age) ov/ob are mentioned in Table 1. The prevalence of other NCDs are mentioned in Table 2.

3.1. India

In India, there has been an upward trend in the prevalence of ov/ob

Table 2
Prevalence of non-communicable diseases in South Asia.

<table>
<thead>
<tr>
<th>Country</th>
<th>Diabetes prevalence (20–79 years), (%)</th>
<th>Age standardized estimates for systemic hypertension (30–79 years), (male, female), (%)</th>
<th>Cardiovascular disease (15–79 years), (%)</th>
<th>Heart attack, or chest pain from heart disease, or stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan22,23</td>
<td>8.7</td>
<td>35.3, 45.3</td>
<td>14.9³</td>
<td></td>
</tr>
<tr>
<td>Bangladesh16,18</td>
<td>12.5</td>
<td>23.5, 34.2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Bhutan27,28</td>
<td>8.8</td>
<td>43.6, 43</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>India13</td>
<td>8.3</td>
<td>31.6, 30.4</td>
<td>3.5¹</td>
<td></td>
</tr>
<tr>
<td>Maldives25,30</td>
<td>6.7</td>
<td>20.9, 27.¹</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Myanmar24,36</td>
<td>6.5</td>
<td>35.2, 40.1</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Nepal23,31,32</td>
<td>6.3</td>
<td>39.6, 33.9</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>Pakistan26,33</td>
<td>26.7</td>
<td>41.6, 44.8</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>Sri Lanka22,23</td>
<td>9.8</td>
<td>34.4, 36.5</td>
<td>4.2</td>
<td></td>
</tr>
</tbody>
</table>

Table 1
Prevalence of ov/ob (including abdominal obesity) in South Asia.

<table>
<thead>
<tr>
<th>Country [reference]</th>
<th>Year</th>
<th>Setting</th>
<th>Sample size (Male, female, 0–5 years)</th>
<th>0–5 yrs (%)</th>
<th>Abdominal ob (%)</th>
<th>Inclusion criteria</th>
<th>Diagnostic criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan22,23</td>
<td>2018, 2019</td>
<td>National</td>
<td>1979, 1687, 23,141</td>
<td>4</td>
<td>A: 42.7; M: 37.9</td>
<td>Adults 18–69; children 0–5 years</td>
<td>ov 25–30, ob &gt; 30, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
<tr>
<td>Bangladesh16,18</td>
<td>2018, 2017–2018</td>
<td>National</td>
<td>3779, 4206, 1113</td>
<td>2</td>
<td>A: 24.8; M: 18.3</td>
<td>Adults 18–69; children 0–5 years</td>
<td>ov 25–30, ob &gt; 30, WC &gt; 90 cm men, WC &gt; 80 cm women, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
<tr>
<td>Bhutan27,28</td>
<td>2010, 2019</td>
<td>National</td>
<td>2158, 3337, 5863</td>
<td>7.6</td>
<td>A: 44.9; M: 40.1</td>
<td>Adults 15–69 years</td>
<td>ov 25–30, ob &gt; 30, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
<tr>
<td>India13</td>
<td>2019–2021</td>
<td>National</td>
<td>94,087, 658,896, 205,641</td>
<td>3.4</td>
<td>A: NA; M: 23.7</td>
<td>Adults 15–49 years</td>
<td>ov 25–30, ob &gt; 30, WC &gt; 104 cm men, WHR &gt; 0.85 women, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
<tr>
<td>Maldives25,30</td>
<td>2016–2017, 2020–2021</td>
<td>National</td>
<td>788, 1879, 2260</td>
<td>4.9</td>
<td>A: 52.4; M: 46.5</td>
<td>Adults 15–69 years</td>
<td>ov 25–30, ob &gt; 30, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
<tr>
<td>Nepal23,26</td>
<td>2019, 2022</td>
<td>National</td>
<td>1992, 3507, 2628</td>
<td>1.3</td>
<td>A: 24.3; M: 23.4</td>
<td>Adults 15–69 years</td>
<td>ov 25–30, ob &gt; 30, WC &gt; 90 cm men, WC &gt; 80 cm women, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
<tr>
<td>Pakistan20,21</td>
<td>2017–2018, 2014–2015</td>
<td>National</td>
<td>3150, 3722, 3574</td>
<td>2.5</td>
<td>A: 38.6; M: 41.3</td>
<td>Adults 15–49 years</td>
<td>ov 25–30, ob &gt; 30, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
<tr>
<td>Sri Lanka22,23</td>
<td>2014, 2016</td>
<td>National</td>
<td>1859, 2872, 7817</td>
<td>2</td>
<td>A: 29.3; M: 24.6</td>
<td>Adults 18–69; children 0–5 years</td>
<td>ov 25–30, ob &gt; 30, 0–5 yrs &gt; +2 Z score weight for height</td>
</tr>
</tbody>
</table>

A: adults; BMI: body mass index; M: male; NA: not available; ov: overweight; ob: obesity; F: females; WC: waist circumference; WHR: Waist-hip ratio.

a Age 15–69 years.

b 30–79 years of age.
as evidenced by a rise from National Family Health Survey NFHS-4 (male: 20.7%, female: 19.6%) to NFHS-5 (male: 23.7%, female: 24%).\(^\text{13}\) The total economic burden of ov/ob in India in 2019 was 1.02% of the country’s gross domestic product (GDP) ($28.95 billion). This figure is set to increase to 2.47% of the country’s GDP ($838.6 billion) in 2060.\(^\text{14}\)

There is a higher prevalence of ov/ob in urban population (30%) as compared to rural areas (19%).\(^\text{13}\) Similarly, the prevalence of obesity is higher in higher socioeconomic states (Andhra Pradesh, Telangana, Tamil Nadu, Punjab, Karnataka, Kerala) and north eastern states. All the Union Territories (UTs) have a high ov/ob prevalence (Fig. 1). Based on the NFHS-5 (2019–2021), the prevalence of ov in children (0–5 years of age), men, and women was 3.4%, 9%, and 24%, respectively. High risk WHR was seen in 47.7% men (≥0.90), and 56.7% women (≥0.85). Factors influencing rates of ov/ob were seen to be older age, urban population, and those with a higher wealth quintile. While assessing marital status, unmarried men and women, and widowed men had the lowest prevalence of ov/ob. Childhood ov/ob in 0–5 years of age is higher in north eastern states and some UTs.\(^\text{13}\) Higher rates of ov/ob are observed in children born to mothers with higher education, ov/ob mothers, higher socioeconomic status (SES), lower size at birth, children living in urban areas, and children belonging to Sikh and Buddhist religion. The prevalence of underweight children (0–5 years of age) has shown a decreasing trend compared to the previous national survey (36%–32%).\(^\text{13}\)

### 3.3. Pakistan

The prevalence of ov/ob in Pakistan is 41.2%\(^\text{20}\) with prevalence in women being 52.2%.\(^\text{21}\) The number of ov/ob women increased by 5%,\(^\text{21}\) and the highest rates were seen in the Islamabad Capital Territory (ICT) (68%), Federally Administered Tribal Areas (FATA) (58%), Khyber Pakhtunkhwa (57%), and Punjab (56%). Ov/ob has increased in urban and rural Pakistan with rising SES. The prevalence of ov/ob in children 0–5 years of age is 2.5%.\(^\text{21}\) The prevalence of ov/ob in children is highest in first born, children born to mothers with higher BMI, children born to mothers with higher education, children belonging to a higher SES, and those living in urban areas.\(^\text{22}\) The prevalence of underweight children (0–5 years of age) has seen a downward trend (30%–23%).\(^\text{21}\)

### 3.2. Bangladesh

Amongst adults in Bangladesh, 4.3% (2.3% women, 8.6% men) are ob, and 20.5% (25.1% women, 16% men) are ov. BMI was significantly higher in 25–39- and 40-54-years age groups. Women, married individuals, urban residents, higher education levels and higher SES were associated with increased BMI.\(^\text{16,17}\) A similar prevalence of ov/ob was reported in the nationwide survey in 2018.\(^\text{18}\) The pooled analysis of National Demographic Health Survey (NDHS) revealed a higher prevalence of ov/ob among women (35%).\(^\text{19}\)

The prevalence of ov/ob in children 0–5 years of age is 2%.\(^\text{18}\) As for adults, children living in urban areas, born to high SES were associated with a higher prevalence of ov/ob. First born children were more likely to be ov/ob (4%). First born children, children born to women with higher education status, children living in urban areas, and with comprising of higher SES were more likely to ov/ob. Children living in Dhaka (4%) and Barishal (2.8%) divisions had the highest prevalence of ov/ob. Similar to Indian demographic trends, there is a decreasing trend of underweight children (33%–22%).\(^\text{18}\)

![Fig. 1. State wise prevalence of ov/ob in India [ref 13].](image-url)
3.4. Sri Lanka

Sri Lanka is no different with regards to increasing rates of ov/ob. The prevalence of ov/ob is 29.3% with men and women accounting for 24.6%, and 34.3%, respectively. Amongst women, the factors predisposing to higher rates of ov/ob were 40–49 years of age, urban residents, higher education, and higher SES. Childhood ov/ob (0–5 years of age) was 2%. Higher education status of mothers, higher BMI of mothers, and children living in urban areas had a higher prevalence of ov/ob. Similar to other South Asian countries, there is a declining trend in the prevalence of underweight children (21.1%–20.5%).

3.5. Nepal

The demographics of Nepal have been studied in seven provinces, and three distinct ecological zones, i.e. mountains, terai, and hills. The prevalence of ov/ob in Nepal has increased from previous surveys (21.7% in 2013, to 24.3% in 2019). Women were more likely to be ov/ob as compared to men (25.1% and 23.4%, respectively). Higher rates of ov/ob amongst women and men were seen in individuals living in urban areas, living in hills, residents belonging to the Bagmati and Gandaki provinces, belonging to higher SES, increasing age, greater educational qualification, and higher food security. The prevalence of ov/ob was stable at around 1% in children 0–5 years of age, whereas, the prevalence of underweight children (27%–19%) has decreased. Children born to mothers with higher education, higher SES, children living in urban areas and in mountain areas have higher rates of ov/ob.

3.6. Bhutan

A high prevalence of non-communicable diseases has been reported in the country. Less than half of the population is ov or ob, with a prevalence of 33.5%, and 11.4%, respectively. Women had a higher prevalence of ov (35.5%) as compared to men (31.7%). Similarly, women (14.8%) were more frequently obese than men (8.4%). Higher prevalence of ov/ob was associated with female gender, residing in urban areas, age between 40 and 54 years, higher SES, residents of the eastern region. The prevalence of ov/ob and underweight in children aged 0–5 years is 7.6% and 15.9%, respectively. Higher rates of childhood ov/ob was observed in children belonging to the eastern region (10%), living in urban areas, higher education status of mothers, higher SES.

3.7. Maldives

Surveys conducted in the Maldives have tended to include the majority of women and children, however, a little over half the eligible men were included. Amongst the studied participants, there is a higher prevalence of ov/ob in women (49%–59.3%) as compared to men (35%–46.5%). The overall prevalence of ov/ob in Maldives was found to be 52.4%. The proportion of women who are ov/ob increases steadily with age, and parity. Ov/ob is lesser in un married females, increasing education status and wealth. Older men, and men belonging to higher SES are more likely to be ov/ob. Unlike women, there is no consistent pattern in prevalence of ov/ob with education status in men. The prevalence of ov/ob in age 0–5 years is 5% which is lesser than the previous national survey (6%). Factors indicating higher prevalence of ov/ob in children aged 0–5 years are, first born and children born after an interval of more than 2 years, ov/ob mothers, children belonging to the north, and south-central regions. Interestingly, the rates of ov/ob increase with increasing quintiles of SES (4.8–5.8%). However, children of the highest wealth quintile have the lowest prevalence of ov/ob (1.5%). The prevalence of underweight children has shown a decreasing trend (17–15%).

3.8. Afghanistan

In Afghanistan ov/ob alone contributes to 1.33% of DALY among the countries of Asia Pacific region. The prevalence of ov/ob was 42.7%. People of every age and particularly women were found to be affected. Amongst the population surveyed, ov/ob accounted to 49.1% of women, and 37.9% of men. Prevalence of ov was higher with increasing age, a trend, which was not followed in ob subjects. The prevalence of ov/ob and low weight-for-age in children 0–5 years of age was 4%, and 24.1%, respectively.

3.9. Myanmar

The STEPS survey 2014 in Myanmar reported an ob prevalence of 5.5% (2.6% men, 8.4% women) and ov prevalence of 16.9%. Other national surveys reported the prevalence of ov/ob in women to be 24.7%–30.8%, and 13.4%–14.1% in males. Prevalence of obesity increased with age, with a peak in the 45–54 year age group and thereafter declines. The prevalence of ov/ob increased with higher SES and increasing age. The prevalence of ov/ob children and underweight children aged 0–5 years were, 1.3% and 19%, respectively. Small for gestational age, children born to ov/ob mothers, children born to mothers with higher education, children belonging to higher SES, and those living in urban areas in and the Yangon region had a higher prevalence of ov/ob.

4. Discussion

Morbidity and mortality rates in ob individuals are higher and are attributable to increased risk for diabetes mellitus, cardiovascular disease, liver disease, malignancies, sleep apnoea, osteoarthritis, urinary incontinence, and psychosocial issues. This fact was further amplified during the COVID-19 pandemic where ob emerged as a leading predictor for COVID-19 complications and mortality.

Ob in South Asia has distinct characteristics when compared to other parts of the world. South Asians have a lower lean mass, shorter height and subsequently lower BMI. They have higher truncal, abdominal, and visceral obesity and are at higher risk for ob complications at a lower BMI. Women, and urban population are more likely to be ob/ob in South Asia. There are some unique biochemical differences as well like increased levels of proatherogenic small dense low-density lipoprotein (LDL) particles and C-reactive protein (CRP). The predominant dietary component for South Asians is carbohydrates with rice or wheat being the main source of calories. A recent study compared the Indian diet in the Consumption Expenditure Survey to the EAT-Lancet reference diet and found that the Indian dietary habits are unhealthy.

The overall prevalence of ov/ob in the developed world is very high with the prevalence in USA and Europe being 73.6% and about 60%, respectively. Men in USA and Europe are more likely to be ov/ob (74.1% and 63%), respectively compared to women (69.4% and 54%), respectively. The global overall prevalence of childhood ov/ob (<5 years of age) 5.7%, with the prevalence in the Americas and European region being 8%, and 7.9%, respectively. South-east Asian prevalence of ov/ob in children (0–5 years old) is lower at 3.3%.

The rate of ov/ob is increasing in developing nations, more so in South Asia. The true prevalence of ov/ob in South Asia is underreported and would be higher with the introduction and use of Asian BMI cut-offs. There is a higher prevalence of urban ov/ob as compared to rural areas in South Asia, which is in juxtaposition to patterns seen in the developed world.

In South Asia, the highest prevalence of ov/ob were seen in Maldives (52.5%), and Bhutan (44.9%). Coincidentally, these two countries have the lowest GDP in South Asia ($ 5.405 billion and $ 2.540 billion, respectively). Maldives had the highest intake of fruits and whole grains per day (115% and 114% of dietary intake target, respectively, Table 3). Bhutan trails behind Maldives and has second highest daily
Table 3

<table>
<thead>
<tr>
<th>Country</th>
<th>Dietary intake target [EAT-Lancet reference diet]</th>
<th>Global (%)</th>
<th>Sub-regional: South Asia (%)</th>
<th>Afghanistan (%)</th>
<th>Bangladesh (%)</th>
<th>Bhutan (%)</th>
<th>India (%)</th>
<th>Maldives (%)</th>
<th>Myanmar (%)</th>
<th>Nepal (%)</th>
<th>Pakistan (%)</th>
<th>Sri Lanka (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>200 g</td>
<td>40</td>
<td>22</td>
<td>33</td>
<td>27</td>
<td>49</td>
<td>18</td>
<td>115</td>
<td>35</td>
<td>40</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td>Vegetables</td>
<td>300 g</td>
<td>60</td>
<td>55</td>
<td>33</td>
<td>75</td>
<td>99</td>
<td>56</td>
<td>59</td>
<td>58</td>
<td>64</td>
<td>29</td>
<td>65</td>
</tr>
<tr>
<td>Legumes</td>
<td>100 g</td>
<td>26</td>
<td>26</td>
<td>104</td>
<td>29</td>
<td>71</td>
<td>25</td>
<td>28</td>
<td>26</td>
<td>36</td>
<td>59</td>
<td>11</td>
</tr>
<tr>
<td>Nuts</td>
<td>25 g</td>
<td>32</td>
<td>15</td>
<td>125</td>
<td>3</td>
<td>26</td>
<td>13</td>
<td>60</td>
<td>19</td>
<td>34</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Whole grains</td>
<td>125 g</td>
<td>39</td>
<td>83</td>
<td>33</td>
<td>28</td>
<td>36</td>
<td>97</td>
<td>114</td>
<td>18</td>
<td>24</td>
<td>50</td>
<td>64</td>
</tr>
<tr>
<td>Fish</td>
<td>28 g</td>
<td>101</td>
<td>42</td>
<td>12</td>
<td>149</td>
<td>88</td>
<td>34</td>
<td>144</td>
<td>462</td>
<td>210</td>
<td>30</td>
<td>16</td>
</tr>
<tr>
<td>Milk</td>
<td>250 g</td>
<td>80</td>
<td>43</td>
<td>36</td>
<td>18</td>
<td>51</td>
<td>43</td>
<td>92</td>
<td>45</td>
<td>30</td>
<td>26</td>
<td>35</td>
</tr>
<tr>
<td>Red meat</td>
<td>14 g</td>
<td>357</td>
<td>56</td>
<td>76</td>
<td>58</td>
<td>128</td>
<td>25</td>
<td>271</td>
<td>917</td>
<td>274</td>
<td>82</td>
<td>193</td>
</tr>
</tbody>
</table>

* Dietary intakes in adults aged 25 years and over [Adapted from ref 42]. Intakes were based on modelled estimates for adults aged 25 years and older.

intake of fruits (49% of dietary intake target, Table 3) and has the highest consumption of vegetables (99% of dietary intake target, Table 3) compared to other South Asian countries. In children 0–5 years of age, the highest prevalence of ov/ob was seen in Bhutan (7.4%). The lowest prevalence of adult and childhood ov/ob was seen in Myanmar (22.4% and 1.3%, respectively), and Nepal (24.3% and 1.3%, respectively). There were no associations between dietary intake or GDP on the prevalence of ov/ob seen in Myanmar and Nepal. Further epidemiological research is required to find associations between risk factors and prevalence of ov/ob in South Asia.

Higher prevalence of childhood undernutrition may lead to overnutrition and ov/ob in adulthood. There was no clear association of prevalence of underweight and ov/ob in South Asian countries. The prevalence of underweight ranged from 15% to 32%. This was higher than the global average for low weight-for-age children (12.6%).

Therefore, there is a need to increase awareness, to address the causes of overnutrition as well as undernutrition, and to mobilize resources to tackle both these extremes of nutritional states in the South Asian population. This two-pronged approach should be started from childhood and should be rigorously enforced.

The increasing urban prevalence of ov/ob in South Asia may provide a unique opportunity to implement urban health programmes. Large scale studies are required to identify potential genetic clusters for ob which could provide preventive and therapeutic strategies. There is a need for national surveys to subclassify ov/ob subjects into those who are metabolically healthy ob, and to identify normal weight obese individuals. Such novel classifications of obesity may lead to enhanced awareness, newer goals for treating and estimating burden of NCDs, and to tailor nutrition and awareness programs.

The strength of this review is utilizing standardized national surveys for assessing subjects with ov/ob in South Asian countries. Lesser number of male participants recruited in national surveys, using international WHO criteria for diagnosing subjects with ov/ob, and not including prevalence of ov/ob in children 5–15 years are demerits of this review article.

5. Conclusion

The rates of ov/ob are increasing at an alarming rate in South Asia. This can be attributed to changing lifestyle and dietary habits, increased stressors, sleep deprivation, environmental pollution, and epigenetic changes. The prevalence of ov/ob in adults and children ranged from 22.4 to 52.4%, and 1.3–7.6%, respectively. Older population, women, urban population, higher SES had a higher prevalence of ov/ob. There should be efforts in spreading awareness and preventing ov/ob. Further larger scale studies are required to look differentiate metabolically healthy obesity, and normal weight obesity and to assess the impact of these on the general population.

Financial disclosure

None reported.

Funding

This review article has no funding.

Disclosure

The authors declare no conflicts of interest.

Declaration of competing interest

None reported.

References

1 World obesity Federation [Internet]. Obesity is a disease [cited on 2023 Jan 02]. Available from: www.worldobesityday.org/assets/downloads/Obesity_is_a_Disease.pdf; 2021.
15 ICMR-NCDIR, National Noncommunicable Disease Monitoring Survey (NNMS) 2017–18, Bengaluru, India.