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Review

Prevalence of obesity in India: A systematic review

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ABSTRACT

Recent studies have reported that globally, more than 1.9 billion adults are overweight and 650 million are obese. Approximately 2.8 million deaths are reported as a result of being overweight or obese. Due to the consumption of energy dense food (i.e. unhealthy food habits), sedentary life style, lack of health care services and financial support, the developing countries are facing high risk of obesity and their adverse consequences (i.e. diabetes, ischemic heart disease, etc). In India, more than 135 million individuals were affected by obesity. The prevalence of obesity in India varies due to age, gender, geographical environment, socio-economic status, etc. According to ICMR-INDIAB study 2015, prevalence rate of obesity and central obesity are varies from 11.8% to 31.3% and 16.9%–36.3% respectively. In India, abdominal obesity is one of the major risk factors for cardiovascular disease (CVDs). Various studies have shown that the prevalence of obesity among women were significantly higher as compared to men. Obesity is one of the main medical and financial burdens for the government. This problem of obesity can be preventable by spreading public awareness about obesity and its health consequences. Governmental agencies should promote the benefits of healthy life style, food habits and physical activity. The aim of this article is to report the prevalence of obesity in different regions of India and highlight the problem areas.

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1. Introduction

Body mass index (BMI) is a ratio of weight in kilograms divided by height in metres squared (Kg/m²). It is good a predictor for overall health and nutritional status. Obesity is one of the most neglected health problems which lead to the diabetes and cardiovascular disease [3]. More than 1.9 billion adults are overweight and 650 million are obese. Approximately 2.8 million deaths are reported as a result of being overweight or obese. Overweight and obesity have become a major public health problem in both developing and developed countries.

India is a developing country which is in a transitional state of under nutrition due to poverty and obesity due to the industrialization and rapid urbanization. In India, more than 135 million individuals were affected by obesity. Previously, different studies were reported which after using different methodologies and cut

off points for defining obesity that created complications in comparison. Presently there is no collective data of prevalence of obesity in India. So, that the present study represents the prevalence of general obesity in India on the basis of studies reported during last 20 years.

2. Methodology

- i) **Search strategy-** A literature search was conducted in the electronic databases (Google Scholar and Pub Med) and was limited to article published in English. The search words included “body mass index”, “Underweight”, “Obesity” and “India” in combination with “risk factors”, “outcomes” “prevention” and “cures”. This process yielded 65 references, including reports from national and international organizations, government reports, review articles and research studies.
- ii) **Criteria for screening obesity:**

- a) **WHO criteria for screening obesity for Asian population** [24]- Men WC = 85 cm; WHR = 0.90; and Women WC = 80 cm; WHR = 0.80
BMI (Kg/m²): Underweight = <18.5; Normal = 18.5–22.9; Overweight = 23.0–24.9; Obesity I = 25.0–29.9; Obesity II ≥ 30.0.

Abbreviation: M, Male; F, Female; WC, Waist circumference; WHR, Waist-hip ratio; BMI, Body mass index; WHO, World health organization; NFHS-4, National Family Health Survey- 4; NHLBI, National heart, lung and blood institute; GERD, Gastroesophageal Reflux Disease.

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Table 1

Represents the prevalence of obesity in India (1998–2018).

S.No	Author	Year Of Study Reported	State	Age (Yrs)	No. Of Individuals		BMI Criteria for General obesity (kg/m ²)	Prevalence Of Obesity (%)	
					Male	Female		Male	Female
1	Mishra et al. [8,22]	2018	Rajasthan	25 –65	Urban:57 Rural:89	Urban:92 Rural:194	≥27.5	Rural: 20.78 Urban:37.5	
2	Ningombam et al. [17]	2018	Manipur	18 –60	258 Liangmai; 263 Mizo	>25	42* Liangmai 51* Mizo		
3	Kandpal et al. [5]	2016	Uttarakhand	20 –60	104	184	>25	54.8	57.6
4	NFHS-4 [14]	2015–16	Bihar Goa Haryana Karnataka Madhya Pradesh Meghalaya Tamil Nadu West Bengal Uttarakhand Uttar Pradesh Tripura Telangana Sikkim Rajasthan Puducherry Punjab Odisha Nagaland Mizoram Manipur Maharashtra Lakshadweep Kerala Jharkhand Jammu & Kashmir Himachal Pradesh Gujarat Daman & Diu Dadra & Nagar Haveli Delhi NCT Chhattisgarh Chandigarh Assam Arunachal Pradesh Andhra Pradesh Andaman & Nicobar Island	15 –49	5433 767 3381 3760 9496 1144 4795 2402 1994 12,939 821 1,054 801 5892 610 3027 4209 1440 1617 1747 4455 156 1864 3820 5584 2185 5574 432 206 672 3529 120 3860 1930 1399 411	45,812 1696 21,652 26,291 62,803 9201 28,820 17,668 17,300 97,661 4804 7567 5293 41,965 4012 19,484 33,721 10,790 12,279 13,593 29,460 1070 11,033 29,046 23,800 9929 22,932 1393 796 5914 25,172 746 28,447 14,294 10,428 2811	≥25	12.6 32.6 20 22.1 10.9 10.1 28.2 14.2 17.7 12.5 15.9 24.2 34.8 13.2 37.1 27.8 17.2 14.0 21.0 19.8 23.8 24.6 28.5 11.1 20.5 22.0 19.7 34.2 22.9 24.6 10.2 32.0 12.9 20.6 33.5 38.2	11.7 33.5 21 23.3 13.6 12.2 30.9 19.9 20.4 16.5 16.0 28.1 26.7 14.1 36.7 31.3 16.5 16.2 21.1 26.0 23.4 41.4 32.4 10.3 29.1 28.6 23.7 29.0 19.1 34.9 11.9 41.5 13.2 18.8 33.2 31.8
5	ICMR-INDIAB (Urban & Rural) [18]	2015	Tamil Nadu Maharashtra Jharkhand Chandigarh	≥20	Rural: 2800/state Urban: 1200/ state		≥25	20.6 15.7 11.5 24.2	28.4 17.6 12.1 38.7
6	Mungreiphy et al. [11]	2011	Tangkhuil Naga	20 –70	257	–	≥25	17.6	
7	NCD risk factor surveillance 2003–2005 [10]	2008	North India -(Delhi) Ballabgarh- (Haryana) South India -Chennai, Tamil Nadu Trivandrum (Kerala) East India -Dibrugarh (Assam) West India - Nagpur (Maharashtra)	15 –64	5103 7990 7847 7537 8365 7661		≥25	23.8* 27.2* 15.9* 15*	
8	Das M & Bose K [2]	2006	West Bengal (Marwaris)	>20	110	110	≥25	44.5	71.8
9	Sidhu & Kaur [21]	2005	Punjab	20 –45	–	1700 (Urban:900; Rural: 800)	≥25	–	Urban: 43.88; Rural: 22.26
10	Shukla et al. [20]	2002	Mumbai	≥35	40,071	59,527	≥25	19	30
11	Yajnik [25]	2002	Pune, Maharashtra	>40	159	162	≥25	1.8	9.8
12	Misra et al. [9]	2001	Delhi NCT (Slum)	>18	170	362	>25	13.3	15.6
13	Zargar [26]	2000	Kashmir Valley	≥40	2496	2587	≥25	7.01	23.69
14	Reddy [19]	1998	Andhra Pradesh	18 –75	456	663	≥25	6.6	10

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