Scandinavian Journal of Public Health, 2018; 46: 565–579

SJPH

REVIEW ARTICLE

A comparison of measured versus self-reported anthropometrics for assessing obesity in adults: a literature review

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Abstract

Aims: Up-to-date information on the accuracy between different anthropometric data collection methods is vital for the reliability of anthropometric data. A previous review on this matter was conducted a decade ago. Our aim was to conduct a literature review on the accuracy of self-reported height, weight, and body mass index (BMI) against measured values for assessing obesity in adults. To obtain an overview of the present situation, we included studies published after the previous review. Differences according to sex, BMI groups, and continents were also assessed. *Methods:* Studies published between January 2006 and April 2017 were identified from a literature search on PubMed. *Results:* Our search retrieved 62 publications on adult populations that showed a tendency for self-reported height to be overestimated and weight to be underestimated when compared with measured values. The findings were similar for both sexes. BMI derived from self-reported height and weight was underestimated; there was a clear tendency for underestimation of overweight (from 1.8%-points to 9.8%-points) and obesity (from 0.7%-points to 13.4%-points) prevalence by self-report. The bias was greater in overweight and obese participants than those of normal weight. Studies conducted in North America showed a greater bias, whereas the bias in Asian studies seemed to be lower than those from other continents. ***Conclusions:* With globally rising obesity rates, accurate estimation of obesity is essential for effective public health policies to support obesity prevention. As self-report bias tends to be higher among overweight and obese individuals, measured anthropometrics provide a more reliable tool for assessing the prevalence of obesity.**

Keywords: *Accuracy, anthropometry, body mass index, body height, body weight, obesity, self-report*

Introduction

Obesity has become one of the main public health challenges worldwide [1]. The prevalence of obesity has more than doubled since the 1980s, and it has been estimated that at least one-third of the world's adult population is either overweight or obese [2]. Obesity is a multifactorial condition that causes metabolic dysregulations that increase the risk of several non-communicable diseases (NCDs), such as cardiovascular disease (CVD) and type 2 diabetes. The World Health Organization (WHO) has set the global targets for the prevention of NCDs; one of these is to stop the increase in obesity [3].

Successful monitoring of overweight and obesity in the general population is necessary for effective public health policy. The WHO recommends that countries conduct health examination or nutrition surveys with anthropometric measures (e.g., height and weight) to evaluate whether the global targets will be reached [3]. In many countries, information on overweight and obesity prevalence is based on self-reported anthropometrics, which are easier and a more time-efficient and cost-efficient data collection method in large population samples than objective measurements.

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Date received 14 August 2017; reviewed 29 January 2018; accepted 4 February 2018

DOI: 10.1177/1403494818761971
journals.sagepub.com/home/sjp
SAGE

Several factors can cause bias on self-reported anthropometric measures and influence the magnitude of the bias, such as sex, age, and body mass index (BMI). These reporting biases may result in inaccurate estimation of BMI and consequently the prevalence of obesity, which leads to an unreliable assessment of the disease and the mortality risk of a population [4,5]. A previous review on the validity of self-reported height and weight was published a decade ago in 2007 [6]. This review showed that people overestimated their height and underestimated their weight in a wide range of different populations compared to measured values. In particular, women and participants who were overweight or obese underestimated their weight, whereas men and participants in older age groups overestimated their height. Height overestimation among older age groups is common, as people may report height that had been measured when they were younger and with increasing age people tend to become shorter due to changes in bone and muscle structures.

Increasing health awareness and social desirability, especially in western societies, are important factors that may lead people to report height and weight values that are closer to their ideal rather than to actual values [7,8]. At the same time, rising obesity rates may cause heavier body weights to appear more normal and result in the normalization of obesity, which may affect self-reporting bias as well [9,10]. Although the bias related to self-reported anthropometrics is well acknowledged, it is not known how these changes have affected the present overall picture of the self-reporting bias. There are few studies that have examined temporal changes in bias of anthropometric measurements based on self-reporting and the results from these studies are conflicting [11–14]. Therefore, to obtain reliable anthropometric data, up-to-date information on the accuracy between different anthropometric data collection methods and up-to-date knowledge about potential bias due to data collection methods is needed.

Our aim was to conduct a literature review of the present situation in self-reported height, weight and BMI validity against measured values for assessing obesity in adults. Differences according to sex, BMI groups, and continents were also assessed. To obtain up-to-date information and an overall picture of the present situation, we included studies published after the systematic review of Connor Gorber et al. [6].

Methods of the review

Search strategy

Published studies were identified from a literature search on PubMed. The search of this non-systematic review was restricted to full papers published in English between January 2006 and April 2017 and to adult populations (age >18) with sample size >100 participants. The search terms included following keywords: (measured weight[Title/Abstract] OR measured height[Title/Abstract] OR measured obesity[Title/Abstract] OR measured BMI[Title/Abstract] OR obesity measure*[Title/Abstract] OR clinical measure* [Title/Abstract] OR objective measure*[Title/Abstract] OR direct measure*[Title/Abstract]) OR measure* [Title/Abstract] AND (self report*[Title]) AND (anthropometry[MeSH Terms] OR body mass index[MeSH Terms] OR body weight[MeSH Terms] OR body height[MeSH Terms] OR height[Title] OR weight[Title] OR obesity[Title]).

Methods

The results from individual studies are presented as combined data for men and women (overall sample) and according to sex and BMI groups with mean differences (self-reported minus measured values) and standard deviations (SD) of these mean differences. SDs were calculated whenever possible if confidence intervals or standard errors were reported in the original publications. The anthropometrics are given in the international system of units (SI). If other units were used in the original publications, equivalent SI values were calculated. Furthermore, WHO guidelines were followed (unless otherwise noted) in classification of BMI: underweight (<18.5 kg/m^2), normal (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (≥30.0 kg/m^2).

Results

Search

The initial database search plan and selection of the keywords were conducted with an information specialist. MM made the final selection of the keywords, conducted the PubMed search on 3 May 2017, and performed the selection of the publications. If there was uncertainty in decision making, the final decision was made with HT. The total number of publications identified was 415. After reading the titles and abstracts, an initial selection of 61 publications was made. These were read in full, and finally 58 publications were included in the review. Four additional publications were identified by reviewing the references of these publications; thus the final number of publications in the review was 62 (Table I).

Height

Overall sample (combined data on men and women). Data on self-reported and measured height

Table I. Characteristics of the studies and study populations.

Reference	Country (study)	Sample size	Age range/ mean	Study population	Outcomes	Time lag	Order
Ikeda [15]	Japan (National Nutrition Survey 1986, Comprehensive Survey of Living Conditions 1986)	10,469 (44% men)	20–89	general population	W, H, BMI	NR	SR first
Lu et al. [16]	China (Jiangsu Provincial Surveillance Survey on Chronic Disease and Behavioral Risk Factor 2013)	5867 (44% men)	18–94	residents of Jiangsu	W, H, BMI	NR	NR
Anai et al. [17]	Japan	363 (55% men)	16–88	general population of Kumamoto	W, H, BMI	none	SR first
Celis-Morales et al. [18]	7 European countries (Food4Me intervention)	140 (44% men)	18–68	volunteers via adverts	W, H, BMI	≤ 2 weeks	SR first
Niedzwiedzka et al. [19]	Poland	394 (49% men)	65+	general population of elderly	W, H, BMI	none	SR first
Skeie et al. [20]	Norway (NOWAC study)	280	46–64	general population of women	W, H, BMI	≤ 1 year	SR first
Wright et al. [21]	UK (Million Women Study)	3999	50–64	women attending breast screening centers	W, H, BMI	NR	NR
Hsiao et al. [22]	USA	951 (91% men)	18–65	firefighters	W, H	none	SR first
Magnusson et al. [23]	Norway	(150 without and 449 with osteoarthritis)	40–79	residents of Ullensaker	W, H, BMI	≈ 8 months	SR first
Murphy et al. [24]	USA	280 (19% men)	18–65	health management program participants	W, H, BMI	≤ 2 weeks	SR first
Poston et al. [25]	USA	1001	20+	male firefighters	W, H, BMI	none	SR first
Pursey et al. [26]	Australia	117 (20% men)	18–35	volunteers via online adverts	W, H, BMI	≤ 1 month	SR first
Tolonen et al. [27]	12 European countries (EHES pilot study)	4127 (44% men)	25–64	general population	W, H, BMI	none	SR first
Tsai et al. [28]	Colombia	597	21–55	mothers of school children	W, H	1.5–2.4 months	SR first
Xie et al. [29]	China (Hong Kong Women's Health study)	144	35–65	female nurses	W, H, BMI	NR	SR first
Yoon et al. [30]	South Korea (KLoSA study)	510 (43% men)	≥45	middle aged and older population	W, H, BMI	NR	NR
Bonn et al. [31]	Sweden	149 (23% men)	20–65	volunteers via public adverts	W	≈ 2 months	SR first
Hattori and Sturm [12]	USA (NHANES 1999–2008)	18,394 (51% men)	20–89	general population	W, H, BMI	NR	NR
Lassale et al. [32]	France (NutriNet-Study)	2513 (23% men)	53.8±13.3	volunteers via multimedia campaigns	W, H, BMI	3 days	SR first
May et al. [33]	UK (Epic-Norfolk Study)	20,536 (45% men)	39–79	general middle-aged/elderly population	W	≤ 2 months	SR first
Pasalich et al. [34]	Australia	104 (42% men)	60–70	Community-dwelling elderly	W, H, BMI	≤ 2 months	SR first
Stommel and Osier [14]	USA (NHANES III 1988–1994, NHANES 2005–2008)	16,552 (NHANES III)	≥18	general population	BMI	NR	NR

(Continued)

Table I. (Continued)

Reference	Country (study)	Sample size	Age range/mean	Study population	Outcomes	Time lag	Order
		10,700 (NHANES 2005–2008)		general population	BMI	NR	NR
Yoong et al. [35]	Australia	172 (45% men)	18+	attendees for GP appointment (informed)	W, H, BMI	NR	SR first
		160 (43% men)	18+	attendees for GP appointment (uninformed)	W, H, BMI	NR	SR first
Großschädl et al. [36]	Austria	473 (53% men)	20–84	adults attending health check	W, H, BMI	none	SR first
Lin et al. [37]	USA (Sister Study)	18,639 self-report via CATI	45–64	general population of middle-aged females	W, H, BMI	≤ 1 month	varied
		13,985 self-report via questionnaire	45–64	general population of middle-aged females	W, H, BMI	≤ 1 month	
Wen and Kowaleski-Jones [38]	USA (NHANES 2007–2008)	5343 (50% men)	≥20	general population	W, H, BMI	NR	NR
Yong and Saito [39]	Japan (Nihon Uni Long Study of Aging)	1634 (49% men)	70+	general population of elderly	W, H, BMI	none	SR first
Bes-Rastrollo et al. [40]	USA, Canada (Adventist Health Study 2)	911 (45% men)	58.3 ±13.4	Seventh-day Adventist church members	W, H, BMI	NR	SR first
Dijkshoorn et al. [41]	Netherlands (Amsterdam Health Monitor 2004)	441 (40% men) Dutch	18–69	general population of Amsterdam	W, H, BMI	none	SR first
		414 (42% men) Dutch-Turkish	18–69	general population of Amsterdam	W, H, BMI	none	SR first
		344 (42% men) Dutch-Moroccans	18–69	general population of Amsterdam	W, H, BMI	none	SR first
Griebeler et al. [42]	USA (SPARE study)	428	45–60	menopausal women via adverts	W, H, BMI	NR	SR first
Hayes et al. [43]	Australia (NNS, NHS)	9635 (49% men) NHS, NNS 1995	20+	general population	BMI	2–3 weeks	SR first
		9141 (50% men) NHS 2007–2008					
Isidoro et al. [44]	Spain	1951	45–68	women enrolling breast cancer screening	W, H, BMI	none	SR first
Krul et al. [45]	Italy, Netherlands, North America (CAESAR project)	792 (52% men) Italy	18–65	general population (Italy)	W, H, BMI	none	SR first
		1257 (45% men) Netherlands	18–65	general population (Netherlands)	W, H, BMI	none	SR first
		2354 (47% men) North America	18–65	general population (North America)	W, H, BMI	none	SR first
Lee et al. [46]	Korea	1567 (36% men)	30–70	health examination attendees	W, H, BMI	1 week	SR first
Lois et al. [47]	UK	585 (88% men)	NR	global engineering company workers	W, H, BMI	NR	NR

Table I. (Continued)

Reference	Country (study)	Sample size	Age range/ mean	Study population	Outcomes	Time lag	Order
Ng et al. [48]	Australia (The 45 and Up Study)	608 (48% men)	45+	general population of middle-aged	W, H, BMI	≈ 2 weeks	SR first
Park et al. [49]	UK (EPIC-Norfolk study)	21,789 (46% men)	39–79	general population of middle-aged+	W, H, BMI	≤ 2 months	SR first
Shields et al. [50]	Canada (CCHS, CHMS)	3895 (CCHS 2005)	18–79	general population	W, H, BMI	none	SR first
		3625 (CHMS 2007–2009)	18–79	general population	W, H, BMI	1day to 6 weeks	SR first
		3876 (CCHS 2008)	18–79	general population	W, H, BMI	none	SR first
Van Valkengoed et al. [51]	Netherlands (SUNSET-study)	502 (49% men) Dutch	35–60	Amsterdam population register	W, H, BMI	NR	SR first
		335 (44% men) Hindustani-Surinamese	35–60	Amsterdam population register	W, H, BMI	NR	SR first
		585 (32% men) African-Surinamese	35–60	Amsterdam population register	W, H, BMI	NR	SR first
Burton et al. [52]	Australia (ALSWH)	159	54–59	mid-aged women	W, H, BMI	≤ 3 weeks	SR first
Connor Gorber and Tremblay [11]	USA, Canada (NHANES, CHHS, CCHS)	12,134 (48% men) NHANES II (1976–1980)	18–74	general population	W, H, BMI	≤ several weeks	SR first
		13,599 (48% men) NHANES III (1988–1994)	18–74	general population	W, H, BMI	≤ several weeks	SR first
		4163 (52% men) NHANES (2003–2004)	18–74	general population	W, H, BMI	≤ several weeks	SR first
		15,488 (50% men) CHHS (1986–1992)	18–74	general population	W, H, BMI	≤ 2 weeks	SR first
		3687 (47% men) CCHS (2005)	18–74	general population	W, H, BMI	none	SR first
Dahl et al. [53]	Sweden	774	40–88	sample from Swedish Twin Registry	W, H, BMI	NR	NR
Fillenbaum et al. [54]	USA (DEPESE)	1761 (36% men)	71+	community dwelling elderly	W, H, BMI	none	SR first
Lucca and Moura [55]	Brazil (PLATINO project)	726 (44% men)	40–99	middle-aged/elderly general population	W, H, BMI	≤ 15 days	SR first
Meng et al. [56]	USA (Health and retirement study)	6799 (42% men)	50+	middle-aged/elderly general population	W, H, BMI	NR	SR first
Ahluwalia et al. [57]	USA (WISEWOMAN project)	733	40–64	low-income women	W, H, BMI	NR	NR
Merrill and Richardson [58]	USA (NHANES 2001–2006)	16,814 (49% men)	16+	general population	W, H, BMI	NR	NR
Oliveira et al. [59]	Portugal	1914 (39% men)	≥18	general population	W, H, BMI	none	SR first

(Continued)

Table I. (Continued)

Reference	Country (study)	Sample size	Age range/ mean	Study population	Outcomes	Time lag	Order
Stommel and Schoenborn [60]	USA, NHANES (2001–2006)	15,161	≥18	general population	W, H, BMI	NR	SR first
Danubio et al. [61]	Italy	272 (53% men)	18–36	students	W, H, BMI	none	SR first
Dekkers et al. [62]	Netherlands	1298 (67% men)	43.9±8.6	overweight working population	W, H, BMI	≈ 2 weeks	SR first
Elgar and Stewart [63]	Canada (CCHS)	4615 (46% men)	12+	general population	W, H, BMI	NR	SR first
Jeffery et al. [64]	USA (Epidemiology and Care of Comorbid Obesity and Depression Study)	115 non depressed + 135 depressed	≥40	obese women	W, H	26±19days	SR first
Larsen et al. [65]	Netherlands	209	20.9±2.40	female students	W, H, BMI	none	SR first
Paradis et al. [66]	Canada	617 (40% men)	18–55	adults via public adverts	W, H, BMI	2-3 weeks	SR first
Sahyoun et al. [67]	USA (NHAHES III)	4590 (49% men)	≥60y	general population of elderly	W, H, BMI	NR	NR
Shields et al. [5]	Canada (CCHS study)	4537 (46% men)	12+	general population	W, H, BMI	NR	SR first
Brunner Huber [68]	USA (CHIC study)	275	18–45	females using birth control	W, H, BMI	none	SR first
McAdams et al. [69]	USA (NHANES 1988–1994)	10,639	≥20	general population	W, H, BMI	1 month	SR first
Nyholm et al. [70]	Sweden	1703 (51% men)	30–75	general population of Skaraborg	W, H, BMI	2 weeks	SR first
White et al. [71]	USA	179	42.8	female gastric bypass surgery candidates	W, H, BMI	NR	NR
Taylor et al. [72]	Australia	1537 (45% men)	18+	general population	W, H, BMI	≈23.5 days	SR first

ALSWH, Australian Longitudinal Study on Women's Health; BMI, body mass index; CAESAR, Civilian American and European Surface Anthropometry Resource; CATI, computer-assisted telephone interview; CCHS, Canadian Community Health Survey; CHIC, Contraceptive History, Initiation, and Choice; CHMS, Canadian Health Measures Survey; DEPESE, Duke Established Populations for Epidemiologic Studies of the Elderly; EHES, European Health Examination Survey; H, height ; KLoSA, Korean Longitudinal Study of Aging; NHANES, National Health And Nutrition Examination Survey; NHS, National Health Survey; NNS, National Nutrition Survey; NOWAC, NOrwegian Women And Cancer; NR, not reported; PLATINO, Latin-American Pulmonary Obstruction Investigation Project; SPARE, Soy Phytoestrogens As Replacement Estrogen; SR, self-report; SUNSET, SUrinamese in The Netherlands: Study on EThnicity; WISEWOMAN, Well-Integrated Screening and Evaluation for WOMen Across the Nation.

was obtained from 58 studies (see Supplementary Table I online). Of these, 25 studies reported combined data on men and women; the majority showed that height was overestimated by self-report with mean differences (between self-reported and measured values) ranging from 0.2 cm to 2.6 cm [18,45]. Overall SDs of the mean differences ranged from 1.5 cm to 9.9 cm [40,62]. Two studies found conflicting results [24,34]. In an Australian study, elderly people underestimated their height by a mean of 0.1 cm [34], while no difference between self-reported and measured height was found in a US study on health management program participants [24]. Furthermore, the overestimation of self-reported height seemed similar across the continents.

By sex. A total of 38 studies had data on men (Supplementary Table I). Height was overestimated in the majority of the studies, with mean differences ranging from 0.3 cm to 2.9 cm [22,70], while SDs of the mean differences ranged from 1.1 cm to 7.2 cm [17,34]. Two studies, however, found no differences between self-reported and measured height [17,54], while in the Canadian Health Measures Survey conducted between 2007 and 2009, men underestimated their height by a mean of 1.2 cm [50].

Height was overestimated in the majority of the 50 studies that had data on women, with mean differences ranging from 0.2 cm to 4.0 cm (Supplementary Table I) [20,55]. SDs of the mean differences for women ranged from 0.9 cm to 7.7 cm [15,17]. Height was underestimated in five studies, with mean differences ranging from 0.2 cm to 1.0 cm [17,34,64], while two studies found no difference [18,47].

By BMI categories. A total of nine studies reported data on self-reported and measured height by BMI categories (Supplementary Table I). The majority of the studies showed that height was overestimated in all BMI categories (also in men and women). The overestimation, however, was increased towards the higher BMI categories. For example, in combined data from the NHANES surveys conducted between 2001 and 2006 (n = 15,161), normal weight participants overestimated their height by a mean of 0.6 cm, while obese participants overestimated their height by a mean of 1.2 cm [60].

Weight

Overall sample. A total of 60 studies reported data on self-reported and measured weight (Supplementary Table II). Of these, 25 studies had combined data on men and women. Weight was underestimated by self-report in the majority of the studies, with mean differences ranging from 0.1 kg to 2.3 kg [11,16,63], while SDs of the mean differences ranged from 1.4 kg to 8.3 kg [32,69]. Weight was overestimated by a mean of 0.1 kg in a Polish study with elderly participants [19]. Furthermore, underestimation of self-reported weight was lower in Asian studies and higher in North American studies when compared with studies conducted on the other continents.

By sex. Thirty-nine studies that reported data on men showed that weight was underestimated by self-report. Mean differences ranged from 0.1 kg to 2.2 kg [16,50], while SDs of the mean differences ranged from 1.9 kg to 9.8 kg (Supplementary Table II) [46,67]. Four studies had conflicting results [11,12,41,51]. In the NHANES surveys (1976–1980, 1999–2000, 2001–2002, 2003–2004, and 2007–2008), men overestimated their weight by mean differences ranging from 0.1 kg to 0.4 kg. In the NHANES conducted between 2005 and 2006, weight was underestimated by a mean of 0.1 kg [11,12]. Two Dutch studies that examined ethnic differences between self-reported and measured weight had inconsistent results. A study on Turkish, Moroccan, and Dutch people in the Netherlands found that weight was overestimated by Dutch (0.1 kg) and Turkish (0.5 kg) men but no difference was found in Moroccan men [41]. The other Dutch study found that weight was underestimated by Dutch (1.2 kg) men and men of African-Surinamese (0.8 kg) origin, while participants of Hindustani-Surinamese origin overestimated their weight by a mean of 0.3 kg [51].

Similarly, the majority of the 51 studies on women showed that weight was underestimated by self-report with mean differences between self-reported and measured values ranging from 0.1 kg to 3.4 kg (Supplementary Table II) [16,65]. SDs of the mean differences for women ranged from 0.1 kg to 7.3 kg [67,69]. Women overestimated their weight in three studies, with mean differences ranging from 0.1 kg to 0.3 kg [46,54,71], while a study on Chinese nurses and a study on British engineering company workers found no difference between self-reported and measured weight [29,47]. In a Dutch study, women with Moroccan and Turkish origin underestimated their weight by a mean of 0.2 kg and by a mean of 0.4 kg, respectively, whereas no difference was found among women of Dutch origin [41].

By BMI categories. A total of nine studies reported self-reported and measured weight by BMI categories (Supplementary Table II). In all of these studies, underestimation of weight increased towards the higher BMI categories and hence was highest among obese participants [12,16,18,26,40,45,60,69,72].

Table II. Mean differences in BMI (self-reported minus measured BMI).

Reference	BMI (kg/m²)		
	total (SD)	**men** (SD)	**women** (SD)
Asia			
Ikeda [15][a]			
All	–	0.3 (NC) ↓	0.7 (NC) ↓
BMI <18.5	–	0.7 (1.7) ↑	0.3 (2.3) ↑
BMI 18.5–24.9	–	0.2 (NC) ↓	0.5 (NC) ↓
BMI 25.0–27.4	–	0.9 (2.6) ↓	1.2 (2.8) ↓
BMI 27.5–29.9	–	1.1 (1.3) ↓	2.1 (1.7) ↓
BMI ≥30	–	1.6 (2.1) ↓	3.5 (3.7) ↓
Lu et al. [16]			
All	0.4 (3.5) ↓	0.4 (1.2) ↓	0.4 (1.3) ↓
BMI <18.5	0.5 (3.0) ↑		
BMI 18.5–24.9	0.1 (2.4) ↓		
BMI 25.0–29.9	0.5 (2.2) ↓		
BMI ≥30	1.2 (2.7) ↓		
Anai et al. [17][a]	–	0.3 (0.8) ↓	0.2 (1.5) ↓
Xie et al. [29]	–	–	0.1 (1.4) ↓
Yoon et al. [30]	–	0.8 (NR) ↓	1.6 (NR) ↓
Yong and Saito [39][a]	–	0.7 (1.2) ↓	0.8 (1.5) ↓
Lee et al. [46]			
All	–	0.1 (0.7) ↓	0.1 (0.5) ↓
BMI <20.0	–	0.5 (0.8) ↑	0.2 (0.6) ↑
BMI 20.0–24.9	–	0.0 (0.7) ↔	0.0 (0.6) ↔
BMI 25.0–29.9	–	0.2 (0.8) ↓	0.4 (0.9) ↓
BMI ≥30.0	–	0.8 (1.5) ↓	0.5 (1.4) ↓
Australia			
Pursey et al. [26]			
All	0.6 (0.1) ↓	0.5 (1.0) ↓	0.6 (1.0) ↓
BMI 18.0–24.9	0.5 (0.8) ↓	–	–
BMI ≥25	0.9 (1.2) ↓	–	–
Pasalich et al. [34]	0.4 (1.6) ↓	0.9 (2.1) ↓	0.1 (1.2) ↓
Yoong et al. 2013 [35]			
informed[b]	0.7 (1.9) ↓	–	–
uninformed[b]	0.6 (2.2) ↓	–	–
Hayes et al. [43][a]			
NHS, NNS 1995	–	1.2 (2.1) ↓	1.4 (2.0) ↓
NHS 2007–2008	–	0.6 (2.1) ↓	0.7 (2.0) ↓
Ng et al. [48][a]			
All	0.7 (1.6) ↓	0.9 (3.4) ↓	0.6 (1.4) ↓
BMI <20	–	0.2 (0.3) ↓	0.2 (1.2) ↑
BMI 20.0–24.9	–	0.4 (1.0) ↓	0.2 (0.9) ↓
BMI 25.0–29.9	–	0.8 (2.0) ↓	0.6 (1.3) ↓
BMI ≥30	–	1.3 (1.3) ↓	1.1 (1.6) ↓
Burton et al. [52]	–	–	0.1 (1.6) ↓
Taylor et al. [72][a]	1.0 (1.7) ↓	0.9 (1.5) ↓	1.1 (1.9) ↓
Europe			
Celis-Morales et al. [18]			
All	0.3 (NR) ↓	0.4 (NR) ↓	0.2 (NR) ↓
BMI 18.5–24.9	0.1 (NR) ↓	–	–
BMI 25.0–29.9	0.5 (NR) ↓	–	–
BMI ≥30.0	0.5 (NR) ↓	–	–
Niedzwiedzka et al. [19][a]	0.7 (NR) ↓	0.6 (NR) ↓	0.7 (NR) ↓
Skeie et al. [20][a]	–	–	0.6 (1.5) ↓
Wright et al. [21]	–	–	0.7 (1.2) ↓
Magnusson et al. [23]			
without osteoarthritis	0.8 (NR) ↓	–	–
with osteoarthritis	1.3 (NR) ↓	–	–
Tolonen et al. [27][a]	–	0.7 (NR) ↓	0.8 (NR) ↓
Lassale et al. [32]	0.3 (1.5) ↓	–	–
Dijkshoorn et al. [41][a]			
Dutch	–	0.2 (1.4) ↓	0.2 (1.1) ↓
Turkish-Dutch	–	0.4 (1.5) ↓	0.8 (1.8) ↓
Moroccan-Dutch	–	0.2 (1.6) ↓	0.7 (2.3) ↓
Großschädl et al. [36]	0.4 (1.1) ↓	0.4 (1.1)↓	0.4 (1.1) ↓
Isidoro et al. [44]			
All	–	–	1.2 (NR) ↓
BMI <25	–	–	0.6 (1.2) ↓
BMI 25.0–29.9	–	–	1.2 (1.3) ↓
BMI ≥30	–	–	2.0 (1.9) ↓
Krul et al. [45][a]		0.6 (1.2) ↓	0.7 (1.2) ↓
Italy	–	0.6 (0.9) ↓	1.1 (1.0) ↓
North America	–	0.5 (1.3) ↓	0.8 (1.1) ↓
Netherlands	–	0.7 (1.2) ↓	0.6 (1.3) ↓
Lois et al. [47]	0.5 (1.8) ↓	0.5 (1.8) ↓	0.2 (1.6) ↓
Park et al. [49][a]	0.9 (NR) ↓	0.9 (1.3) ↓	0.9 (1.4) ↓
Van Valkengoed et al. [51]			
Dutch	–	0.7 (1.3) ↓	1.0 (1.3) ↓
Hindustani-Surinamese	–	0.3 (1.7) ↓	1.0 (1.5) ↓
African-Surinamese	–	0.6 (1.7) ↓	1.1 (1.9) ↓
Dahl et al. [53]	0.6 (1.3) ↓	–	–
Oliveira et al. [59][a]			
≤45 years	–	0.7 (1.4) ↓	0.9 (1.2) ↓
>45 years	–	0.9 (1.3) ↓	1.3 (1.6) ↓
Danubio et al. [61]	–	1.1 (1.2) ↓	1.5 (1.4) ↓
Dekkers et al. [62]			
All	0.7 (0.8) ↓	0.7 (0.8) ↓	0.7 (0.8) ↓
BMI 25.0–29.9	0.6 (0.7) ↓	–	–
BMI ≥30	0.9 (1.0) ↓	–	–
Larsen et al. [65]	–	–	1.5 (1.0) ↓
Nyholm et al. [70][a]	–	0.6 (1.1) ↓	0.8 (1.1) ↓
BMI <18.5	–	–	0.4 (NR) ↑
BMI 18.5–24.9	–	0.2 (NR) ↓	0.5 (NR) ↓
BMI 25.0–29.9	–	0.6 (NR) ↓	0.9 (NR) ↓
BMI 30.0–34.9	–	1.2 (NR) ↓	1.2 (NR) ↓
BMI ≥35	–	1.4 (NR) ↓	1.5 (NR) ↓
North America			
Murphy et al. [24]	0.4 (1.7) ↓		
Poston et al. [25]			
All	–	0.1 (0.9) ↑	–
BMI 18.5–24.9	–	0.5 (0.9) ↑	–
BMI 25.0–29.9	–	0.2 (0.9) ↑	–
BMI 30.0–34.9	–	0.1 (0.9) ↓	–

Table II. (Continued)

Reference	BMI (kg/m²)		
	total (SD)	**men** (SD)	**women** (SD)
BMI ≥35	–	0.9 (0.9) ↓	–
Hattori and Sturm [12][a]			
NHANES 1999–2000			
All	0.6 (1.8) ↓	0.3 (1.5) ↓	0.8 (2.1) ↓
BMI <30	0.3 (1.5) ↓	–	–
BMI ≥30	1.3 (2.4) ↓	–	–
NHANES 2001–2002			
All	0.5 (2.0) ↓	0.2 (2.0) ↓	0.8 (1.9) ↓
BMI <30	0.2 (1.7) ↓	–	–
BMI ≥30	1.2 (2.4) ↓	–	–
NHANES 2003–2004			
All	0.5 (1.7) ↓	0.3 (1.5) ↓	0.6 (1.8) ↓
BMI <30	0.2 (1.3) ↓	–	–
BMI ≥30	1.1 (2.2) ↓	–	–
NHANES 2005–2006			
All	0.6 (1.8) ↓	0.4 (1.7) ↓	0.7 (1.8) ↓
BMI <30	0.2 (1.3) ↓	–	–
BMI ≥30	1.2 (2.3) ↓	–	–
NHANES 2007–2008			
All	0.6 (1.7) ↓	0.4 (1.6) ↓	0.8 (1.8) ↓
BMI <30	0.2 (1.3) ↓	–	–
BMI ≥30	1.3 (2.2) ↓	–	–
Stommel and Osier [14][a]			
NHANES 1988–1994			
All	0.6 (3.3) ↓	–	–
BMI 18.5–24.9	0.1 (NR) ↓	–	–
BMI 25.0–29.9	0.6 (NR) ↓	–	–
BMI 29.9–34.9	1.3 (NR) ↓	–	–
BMI 35.0–39.9	1.8 (NR) ↓	–	–
BMI ≥40	3.5 (NR) ↓	–	–
NHANES 2005–2008			
All	0.6 (2.7) ↓	–	–
BMI 18.5–24.9	0.0 (NR) ↔	–	–
BMI 25.0–29.9	0.6 (NR) ↓	–	–
BMI 29.9–34.9	1.0 (NR) ↓	–	–
BMI 35.0–39.9	1.6 (NR) ↓	–	–
BMI ≥40	2.3 (NR) ↓	–	–
Lin et al. [37][a]			
CATI[c]	–	–	0.7 (0.8) ↓
questionnaire[c]	–	–	(NR)
Wen and Kowaleski-Jones [38]	–	0.4 (NR) ↓	0.8 (NR) ↓
Bes-Rastrollo et al. [40]			
All	0.6 (2.2) ↓	0.5 (1.8) ↓	0.7 (2.5) ↓
BMI <30	0.4 (2.0) ↓	–	–
BMI ≥30	0.9 (2.8) ↓	–	–
Griebeler et al. [42]			
All	–	–	1.3 (1.6) ↓
BMI <20	–	–	0.2 (0.8) ↓
BMI 20.0–24.9	–	–	0.8 (1.4) ↓
BMI 25.0–29.9	–	–	1.4 (1.5) ↓
BMI >30	–	–	2.4 (1.6) ↓
Shields et al. [50][a]			
CCHS 2005	–	1.0 (NR) ↓	1.3 (NR) ↓
CCHS 2008	–	0.6 (NR) ↓	0.9 (NR) ↓
CHMS 2007–2009	–	1.2 (NR) ↓	1.5 (NR) ↓

Table II. (Continued)

Reference	BMI (kg/m²)		
	total (SD)	**men** (SD)	**women** (SD)
Connor Gorber and Tremblay [11][a]			
NHANES 1976–1980	0.4 (NR) ↓	0.3 (NR) ↓	0.6 (NR) ↓
NHANES 1988–1994	0.5 (NR) ↓	0.3 (NR) ↓	0.7 (NR) ↓
NHANES 2003–2004	0.5 (NR) ↓	0.3 (NR) ↓	0.7 (NR) ↓
CHHS 1986–1992	0.8 (NR) ↓	0.7 (NR) ↓	0.9 (NR) ↓
CCHS 2005	1.1 (NR) ↓	1.0 (NR) ↓	1.2 (NR) ↓
Fillenbaum et al. [54]	–	0.7 (1.8) ↓	0.9 (2.0) ↓
Meng et al. [56][a]	1.2 (8.2) ↓	–	–
Ahluwalia et al. [57]	–	–	0.8 (NR) ↓
Merrill and Richardson [58][a]			
All	–	0.3 (1.8) ↓	0.8 (1.9) ↓
BMI <18.5	–	1.0 (2.0) ↑	0.3 (1.1) ↑
BMI 18.5–24.9	–	0.3 (2.4) ↑	0.2 (1.5) ↓
BMI 25.0–29.9	–	0.4 (1.7) ↓	0.9 (2.3) ↓
BMI ≥30	–	1.1 (2.6) ↓	1.6 (3.3) ↓
Stommel and Schoenborn [60]			
All	0.6 (2.5) ↓	–	–
BMI <18.5	0.6 (NR) ↑	–	–
BMI 18.5–24.9	0.0 (NR) ↔	–	–
BMI 25.0–29.9	0.5 (NR) ↓	–	–
BMI 30.0–39.9	1.2 (NR) ↓	–	–
BMI ≥40	2.1 (NR) ↓	–	–
Elgar and Stewart [63][a]	1.2 (4.2) ↓	1.0 (4.0) ↓	1.3 (4.2) ↓
Jeffery et al. [64]	–	–	–
Paradis et al. [66]	–	0.4 (1.4) ↓	0.7 (1.4) ↓
Sahyoun et al. [67][a]			
BMI<18.5	–	0.8 (3.3) ↑	0.4 (2.4) ↑
BMI 18.5–24.9	–	1.0 (2.8) ↓	0.6 (2.8) ↓
BMI 25–29.9	–	0.8 (3.2) ↓	1.1 (2.9) ↓
BMI ≥30	–	1.5 (2.1) ↓	1.9 (2.5) ↓
Shields et al. [5][a]			
All	1.1 (1.7) ↓	0.9 (2.3) ↓	1.2 (2.5) ↓
BMI <18.5	–	2.6 (4.9) ↑	0.2 (1.6) ↑
BMI 18.5–24.9	–	0.1 (2.1) ↓	0.5 (1.7) ↓
BMI 25.0–29.9	–	1.0 (2.2) ↓	1.4 (2.7) ↓
BMI 30.0–34.9	–	1.9 (3.0) ↓	2.1 (3.8) ↓
BMI 35.0–39.9	–	2.7 (2.6) ↓	3.0 (5.0) ↓
BMI ≥40	–	4.0 (3.2) ↓	5.0 (7.5) ↓
Brunner Huber [68]	–	–	0.8 (1.9) ↓
McAdams et al. [69][a]			
All	0.5 (3.1) ↓	0.2 (2.9) ↓	0.7 (2.9) ↓
BMI <25	0.0 (NR) ↔	0.3 (NR) ↑	0.2 (NR) ↓
BMI 25.0–29.9	0.6 (NR) ↓	0.4 (NR) ↓	0.9 (NR) ↓
BMI ≥30	1.8 (NR) ↓	1.4 (NR) ↓	2.1 (NR) ↓
South America			
Lucca and Moura [55][a]	–	0.4 (NR) ↓	1.5 (NR) ↓
BMI ≤24.9	–	0.6 (NR) ↑	0.9 (NR) ↓

(Continued)

Table II. (Continued)

Reference	BMI (kg/m²)		
	total (SD)	**men** (SD)	**women** (SD)
BMI 25.0–29.9	–	0.7 (NR) ↓	1.3 (NR) ↓
BMI ≥30	–	1.9 (NR) ↓	2.4 (NR) ↓

↑, overestimated by self-report; ↓, underestimated by self-report; BMI, body mass index; CATI, computer-assisted telephone interview; CCHS, Canadian Community Health Survey; CHMS, Canadian Health Measures Survey; NC, not calculated(standard deviation could not be calculated); NHANES, National Health and Nutrition Examination Survey; NHS, National Health Survey; NNS, National Nutrition Survey; NR, not reported; SD, standard deviation.

[a]For a general population.

[b]Participants were notified before (informed) or after (uninformed) self-reporting that they would be measured.

[c]Self-reporting was based on CATI or a self-administered questionnaire.

This tendency was also seen for men and women. For example, in the Canadian Community Health Survey data (n = 4537), women of normal weight underestimated their weight by a mean of 1 kg, while obese (BMI ≥ 40) women underestimated their weight by a mean of 9 kg [5]. Men of normal weight men underestimated their weight by a mean of 0.3 kg and obese men by a mean of 5 kg. Furthermore, in many studies underweight participants (particularly men) overestimated their weight [5,15,58,60,67,70,72].

Body mass index

Overall sample. Data on self-reported (calculated from self-reported height and weight) and measured (calculated from measured height and weight) BMI was reported in 57 studies (Table II). Of these, 29 studies had data on the overall sample; in all of these studies BMI was underestimated by self-report by mean differences between self-reported and measured values ranging from 0.3 kg/m^2 to 1.2 kg/m^2 [18,32,56,63]. The overall SDs of the mean differences between self-reported and measured values ranged from 0.1 kg/m^2 to 8.2 kg/m^2 [26,56]. Furthermore, underestimation of self-reported BMI seemed to be lower in Asian studies and higher in North American studies when compared to the other continents.

By sex. A total of 37 studies reported data on men. BMI was underestimated in the majority of the studies with mean differences between self-reported and measured values ranging from 0.1 kg/m^2 to 1.2 kg/m^2 (Table II) [43,46,50]. SDs of the mean differences for men ranged from 0.7 kg/m^2 to 4.0 kg/m^2 [46,63]. However, among US firefighters BMI derived from self-reported measures was overestimated by a mean of 0.1 kg/m^2 [25].

All 46 studies that reported data on women showed that self-reported BMI was underestimated with mean differences between self-reported and measured values ranging from 0.1 kg/m^2 to 1.6 kg/m^2 [29,30,34,46,52]. SDs of the mean differences for women ranged from 0.5 kg/m^2 to 4.2 kg/m^2 [46,63].

By BMI categories. A total of 20 studies reported data on the mean differences between self-reported and measured BMI by BMI categories (Table II). Self-reported BMI was overestimated by underweight participants, whereas underestimation of BMI increased towards the higher BMI categories (particularly in women). For example, in the Canadian Health Community Survey (n = 4537), self-reported BMI was underestimated by a mean of 0.5 kg/m^2 in normal weight women, while women with a BMI over 40 underestimated their BMI by a mean of 5.0 kg/m^2 [5]. As for men, normal weight men underestimated their BMI by a mean of 0.1 kg/m^2, while men with a BMI over 40 underestimated their BMI by a mean of 4.0 kg/m^2.

Differences in prevalence of overweight and obesity

Prevalence of overweight in the overall sample. The mean differences in the prevalence of overweight and obesity, calculated from BMI based on self-reported values and measured values were derived from 34 studies (Table III). Of these, 12 studies had data on the overall sample. The majority of the studies showed that the prevalence of overweight was underestimated by self-report ranging from 1.8%-points to 9.3%-points [5,63]. In four studies, the prevalence of overweight was overestimated (mean differences ranged from 0.2%-points to 5.1%-points) [23,36,48,62]. An Australian study on general practitioners' appointment attendees found no difference in the prevalence of overweight [35]. Furthermore, the underestimation of overweight prevalence seemed to be lower in Australian studies than in the studies conducted on the other continents.

Prevalence of overweight according to sex. A total of 19 studies reported data on men (Table III). With the exception of two studies [36,62], the prevalence of overweight was underestimated when based on self-reported BMI, ranging from 0.5%-points to 9.4%-points [5,48]. The prevalence of overweight was overestimated by 2.0%-points among Austrian health check attendees and by 4.1%-points among Dutch overweight working population [36,62].

Table III. Mean differences in the prevalence of overweight and obesity.

Reference	**Mean difference in prevalence**, %					
	overweight (BMI 25.0–29.9 kg/m²)			obese (BMI ≥ 30.0 kg/m²)		
	total	men	women	total	men	women
Asia						
Ikeda [15][a]	–	3.7 ↓	5.1 ↓	–	0.3 ↓	1.3 ↓
Lu et al. [16]	5.8 ↓	4.3 ↓	7.8 ↓	1.3 ↓	0.6 ↓	2.1 ↓
Xie et al. [29]	–	–	1.4 ↓[b]	–	–	0.7 ↓[b]
Yoon et al. [30]	–	19.5 ↓[c]	17.9 ↓[c]	–	–	–
Yong and Saito [39][a]	–	6.2 ↓	4.9 ↓	–	0.7 ↓	2.9 ↓
Lee et al. [46]		1.1 ↓[c]	2.0 ↓[c]			
Australia						
Yoong et al. 2013 [35]	0	–	–	5.0 ↓	–	–
Hayes et al. [43][a]	–	1.4 ↓	3.3 ↓	–	3.9 ↓	3.4 ↓
Ng et al. [48][a]	0.8 ↑	0.5 ↓	2.2 ↑	5.6 ↓	6.8 ↓	4.4 ↓
Burton et al. [52]	–	–	4.4 ↓	–	–	0.6 ↓
Taylor et al. [72][a]	2.1 ↓	0.7 ↓	3.7 ↓	7.2 ↓	7.6 ↓	6.9 ↓
Europe						
Celis-Morales et al. [18]	2.8 ↓	–	–	0.7 ↓	–	–
Niedzwiedzka et al. [19][a]	6.0 ↓	6.0 ↓	6.0 ↓	5.0 ↓	8.0 ↓	2.0 ↓
Skeie et al. [20][a]	–	–	8.2 ↓	–	–	1.9 ↓
Magnusson et al. [23]						
without osteoarthritis	3.3 ↑	–	–	10.6 ↓	–	–
with osteoarthritis	5.1 ↑	–	–	13.4 ↓	–	–
Tolonen et al. [27][a]	–	4.4 ↓	6.1 ↓	–	4.4 ↓	4.2 ↓
Lassale et al. [32]	2.2 ↓	–	–	1.7 ↓	–	–
May et al. [33][a]	–	1.0 ↓	0.6 ↓	–	0.6 ↓	0.7 ↓
Dijkshoorn et al. [41][a]						
Dutch	–	–	–	–	2.9 ↓	2.5 ↓
Turkish-Dutch	–	–	–	–	3.4 ↓	5.5 ↓
Moroccan-Dutch	–	–	–	–	4.2 ↓	5.3 ↓
Großschädl et al. [36]	0.2 ↑	2.0 ↑	1.8 ↓	2.9 ↓	2.8 ↓	3.3 ↓
Isidoro et al. [44]	–	–	3.0 ↓	–	–	8.4 ↓
Krul et al. [45][a]						
Italy	–	7.1 ↓	3.6 ↓	–	2.2 ↓	2.4 ↓
North America	–	3.4 ↓	2.8 ↓	–	2.7 ↓	2.7 ↓
Netherlands	–	1.5 ↓	2.9 ↓	–	3.7 ↓	1.5 ↓
Park et al. [49][a]	4.6 ↓	–	–	6.8 ↓	–	–
Danubio et al. [61]	–	8.1 ↓	7.8 ↓	–	3.3 ↓	0.9 ↓
Dekkers et al. [62]	3.4 ↑	4.1 ↑	1.8 ↑	6.9 ↓	6.8 ↓	6.9 ↓
Larsen et al. [65]	–	–	–	–	–	3.4 ↓
Nyholm et al. [70][a]	–	–	–	–	5.3 ↓	4.9 ↓
North America						
Griebeler et al. [42]	–	–	2.6 ↓	–	–	11.9 ↓
Fillenbaum et al. [54]	–	–	–	–	–	–
African-American	2.5 ↓	–	–	5.4 ↓	–	–
White	3.0 ↓			6.5 ↓		
Ahluwalia et al. [57]	–	–	2.2 ↓	–	–	–
Elgar and Stewart [63][a]	1.8 ↓	0.6 ↓	3.0 ↓	7.6 ↓	8.8 ↓	6.4 ↓
Shields et al. [5][a]	9.3 ↓	9.4 ↓	9.1 ↓	7.4 ↓	8.8 ↓	6.0 ↓
Brunner Huber [68]	–	–	0.4 ↑	–	–	2.4 ↑
South America						
Tsai et al. [28]	–	–	11.4 ↓[c]	–	–	4.6 ↓
Lucca and Moura [55][a]	–	–	–	–	2.5 ↓	6.4 ↓

↑, overestimated by self-report; ↓, underestimated by self-report.
[a]For a general population.
[b]BMI for overweight 23–25 kg/m², BMI for obese ≥25 kg/m².
[c]Included both overweight and obese participants.

In the majority of the 21 studies that reported data on women, the prevalence of overweight was underestimated by self-report, ranging from 0.6%-points to 11.4%-points (Table III) [28,33]. In three studies, the prevalence of overweight was overestimated by 0.4%-points [68], 1.8%-points [62], and by 2.2%-points [48].

Prevalence of obesity in overall sample. The prevalence of obesity was underestimated by self-report in all 13 studies with data on the overall sample, ranging from 0.7%-points to 13.4%-points (Table III) [18,23]. Furthermore, underestimation of obesity prevalence was lower in Asian studies and higher in North American studies than those in the other continents.

Prevalence of obesity according to sex. A total of 18 studies reported data on men and all studies showed that the prevalence of obesity was underestimated by self-report, ranging from 0.3%-points to 8.8%-points (Table III) [5,15,63]. Furthermore, in a South Korean study that included participants from middle age onwards, the prevalence of obesity (defined as BMI ≥25.0 kg/m^2) was underestimated in men by 20%-points and in women by 18%-points [30].

In the 26 studies that reported data on women, with the exception of one study the prevalence of obesity was underestimated when based on self-reported BMI [68], ranging from 0.6 %-points to 11.9%-points (Table III) [42,52]. In a US study on women using birth control, the self-reported prevalence of obesity was overestimated by 2.4%-points [68].

Discussion

This literature review of studies published between 2006 and 2017 revealed a tendency for underestimation of self-reported weight and overestimation of height compared with the measured values. These biases were evident for both sexes. Furthermore, BMI derived from self-reported height and weight was underestimated and consequently, a clear tendency for underestimation of the prevalence of overweight and obesity was found. The bias tended to be greater for those in the higher BMI groups. Furthermore, continent differences on self-reported bias were also found.

The bias observed here was similar to those of the systematic review by Connor Gorber et al. [6], which compared self-reported and measured height, weight and BMI based on 64 studies on men and women published between 1982 and 2005. The studies included in our review, however, showed a slightly narrower range for the overall mean differences for weight (0.1–2.3 kg vs 0.1–3.5 kg), height (0.1–2.6 cm vs 0.6–7.5 cm) and BMI (0.3–1.2 kg/m^2 vs 0.2–1.8 kg/m^2). Similar tendencies were also seen for men and women separately.

Few recent studies have examined the temporal change in the bias of self-reported BMI [11–14]. The Surveys of Lifestyle Attitudes and Nutrition (SLÁN) conducted in Ireland between 1998 and 2007 found that the bias in self-reported BMI increased over time [13]. The self-reported BMI and obesity bias stayed relatively constant in the US between 1976 and 2004 [11]. In Canada, however, the bias increased over the time period between 1986 and 2005 [11]. Analysis of the NHAHES survey data from 1999 to 2008 did not reveal a temporal change in self-reported bias [12]. Furthermore, another US study compared the NHANES surveys conducted between 1988 and 1994 with surveys conducted between 2005 and 2008. This study revealed that the bias in self-reported BMI had increased slightly over this time period [14]. However, among obese individuals, self-reporting bias in BMI had declined, though the bias was still highest among obese individuals when compared with normal and underweight individuals.

Furthermore, our review indicated that underestimation of self-reported weight was lower and overestimation of height was higher among Asian studies than those from studies conducted on the other continents. Asian studies also showed a lower underestimation of BMI by self-report than studies from the other continents. This may be due to cultural differences. Asian people tend to be shorter than people from western; obesity is also not as common in Asia as it in western countries. Most of the previous studies were conducted in Europe and in North America, while only a few studies were conducted in Asia, Australia, and Africa.

During the past decade, a number of studies have been published on the bias of self-reported anthropometrics, which reflects the significance of this matter. The authors of the systematic review [6] emphasized the need for common criteria for data analysis and for reporting anthropometric results from studies. However, some of the studies included in the present review lacked vital information that may have had an effect on the results, such as elapsed time between measurements or order of the measurements. Self-reported information should always be collected before objective measurements are conducted. Uniformity concerning the study procedures facilitate comparison of the studies.

Furthermore, it should be noted that because the literature search for this review was conducted solely on PubMed (as this is the largest available data resource) and because this review was not a systematic review, there is a possibility that we may have missed some relevant publications.

In conclusion, consistent with previous literature this review showed a tendency for underestimation of self-reported BMI and consequently the prevalence of overweight and obesity. The self-reporting bias was higher among overweight and obese individuals than among underweight or those of normal weight. Overweight and obese individuals are a high risk group with regards to NCDs. Thus, with globally growing obesity rates it is of utmost importance to obtain accurate information on the prevalence of overweight and obesity to assess whether the global targets for NCD prevention and for stopping obesity increases will be reached. Therefore, measured anthropometrics may provide a more reliable tool for assessing the prevalence of obesity.

Acknowledgements

The authors are grateful to the information specialist Mari Mäkinen for her help with planning the database search and for Derek Ho for polishing the English.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the European Commission, DG SANTÉ through BRIDGE Health project (grant number 664692), the Finnish Cultural Foundation, and The Juho Vainio Foundation.

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