International Journal of Community Medicine and Public Health
Shaikh A et al. Int J Community Med Public Health. 2024 Dec;11(12):4839-4843
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20243652

Original Research Article

Accuracy of self-reported height and weight measurements in elderly in Pune: a cross-sectional study

Atiya Shaikh*, Shweta Thakar

DES Brijlal Jindal College of Physiotherapy, Pune, Maharashtra, India

Received: 18 September 2024
Revised: 15 November 2024
Accepted: 16 November 2024

***Correspondence:**
Dr. Atiya Shaikh,
E-mail: atiya.shaikh@despune.org

ABSTRACT

Background: As age increases the height and weight of the person may change. The perceived height and weight may be different than actual measurements thus, may lead to faulty reporting. Hence, it is important to find the accuracy of self-reported measures. Aim was to compare self-reported and measured height and weight in elderly of Pune region. To do gender-wise comparison of self-reported and measured height and weight in elderly of Pune region. To find influence of age on these measurements by finding correlation between age and difference in self-reported and measured values.
Methods: Self-reported and measured data for height and weight of 465 individuals above 65 years chosen according to set inclusion criteria was gathered and compared using paired t-test.
Results: There was a significant difference in self-reported and measured readings of height and weight in elderly (0.01, <0.0001 for height and weight respectively). Height being over estimated and weight being underestimated. Both genders over estimated height (p=0.0001, <0.0001 for males and females respectively). Females under estimated weight (p=0.2692 for male and <0.0001 for females). As age increases the difference in reporting goes on increasing (Spearman's correlation coefficient 0.120 and -0.167 for height and weight respectively).
Conclusions: Gender influences reporting of height and weight adversely in elderly. Thus, it is better to take actual measurements of height and weight instead of relying on self-reported values in elderly of Pune region.

Keywords: Elderly, Height, Self-report measures, Weight

INTRODUCTION

Obesity is major health concern in elderly as it leads to several complications. Body mass index (BMI) is widely used as a measure of obesity due to its simple derivation from height and weight. Self-reported height and weight are very commonly used in many studies and health surveys as it is easy to collect. It saves time and data from large number of people can be collected at a given time with ease.[1] Self-reported height and weight estimates have been used in many international studies.[2]

Obesity management and exercise prescription for lifestyle disorders related to obesity is an emerging focus in physiotherapy. In Maharashtra, 8.6% of the population is elderly, and among them, 21.6% suffer from obesity and related lifestyle disorders.[3] Physiotherapy interventions can play a crucial role in promoting their well-being through tailored exercises. Often, physiotherapists rely on self-reported data for height and weight when assessing patients and prescribing exercises. However, this information may not always be accurate, leading to potential discrepancies in treatment plans. The precision of self-reported measures is vital not only for effective exercise prescription but also for other purposes such as health surveys, obesity prevalence studies, clothing sizing, and ergonomic design. By becoming more aware of their true obesity status, individuals can take more informed steps toward improving their health.

It has been well established that, anthropometric measures are subject to systemic reporting biases which may lead to differences between self-reported and measured height and weight.[2,4] Some studied have found the height and weight reported by elderly significantly differed from the measured values. Studies have identified a greater discrepancy in self-reported and measured height and weight among certain groups, including overweight or obese individuals compared to healthy or underweight individuals, females, dieters compared to non-dieters, non-smokers compared to smokers and older individuals.[5-10] The recent review by Connor and colleagues indicates that, most evidence on the relationship of self-reported to measured height and weight comes from young adults and from the majority non-Hispanic white population.[8] This may vary based on sex, race/ethnicity, and age.[1,11-14] Literature finding also suggest that it is, insufficiently explored and its influence seems to be due to racial/ethnic differences.[6] Individual's perception of themselves has been suggested to be the key factor affecting the validity of self-reported body weight and height values.[6] Since ethnicity, race and culture would make a difference in self-perception due to society desirable phenomenon it becomes important to explore this field in detail especially for the older population who is more traditional.[2,15] Thus, it becomes important to know if self-reported data of given elderly population is accurate or not.

The elderly population in Maharashtra differs from previously studied groups in terms of ethnic, cultural, socio-economic, and geographical factors. With these differences in mind, the current study was designed to assess the accuracy of self-reported height and weight among the elderly in the Pune region, while also examining whether factors such as gender and age influence the accuracy of these self-reports. This study was part of a larger research project, the full details of which will be published at a later time.

METHODS

This was a cross-sectional study which was done over 6 months in community. The duration was from September 2021 to February 2022. The study design and procedure were approved by institutional ethics committee of DESBJCOP, Pune. Elderly above 65 years of age were approached for the study.

Sample size was 461 (decided by pilot study using the formula $N= Z_{(\propto/2)} \times Z_{(\propto/2)} \times \text{variance}/ (\text{bound})^2$. Any elderly with a known cognitive impairment/difficulty in recall, any neurological impairment (where individual not able to stand independently), bed bound patients, any orthopedic lower limb deformity which will affect independent standing, spinal/lower limb fractures in last 6 months which will affect standing independently were excluded from study. Procedure was explained and written consent was taken from participants. Self-reported data of height and weight estimates were collected orally from the participants. The measurements of actual weight and height were taken using standardized procedures.

Materials used were as follows- 1) weighing scale: Health Sense Ultra-Lite PS126 digital personal body weighing scale, weighing capacity is 5 kg to 180 kg, it costs around Rs.1399, made up of material tempered glass and graduation 100 gm, with 1 year warranty. 2) Measuring tape-Stanleys 36127-812 plastic 5 m tape, product dimension 190 gm, durable with no warranty. Collected data was analysed statistically using SPSS 22.0.

RESULTS

A significant difference was found between the height and weight measurements reported by the participants.

Table 1: Gender distribution.

Gender	Number	Percentage
Male	216	46.15
Female	252	53.85

When analyzed by gender, there was also a statistically significant difference in the reported height and weight.

Table 2: Comparison of self-reported and measured height and weight in elderly.

Height	Self-reported	Measured
Mean (cm)	154.96	152.35
SD	10.373	8.807
Test	Paired t-test	
P value	0.01	
Inference	Extremely Significant difference	
Weight		
Mean (kg)	63.61	64.21
SD	11.32	10.37
Test	Paired t-test	
P value	<0.0001	
Inference	Extremely significant difference	

Table 3: Gender wise comparison of self-reported and measured height and weight in elderly.

Height		Self-reported	Measured
Male	Mean (cm)	163.81	158.27
	SD	7.29	7.2
	Test	Paired t-test	
	P value	<0.0001	
	Inference	Extremely significant difference	
Height		Self-reported	Measured
Female	Mean (cm)	147.95	147.31
	SD	6.83	6.68
	Test	Paired t-test	
	P value	0.0001	
	Inference	Extremely significant difference	
Weight		Self-reported	Measured
Male	Mean (kg)	67.4	67.14
	SD	10.08	10.3
	Test	Paired t-test	
	P value	0.2692	
	Inference	Not significant difference	
Weight		Self-reported	Measured
Female	Mean(kg)	58.7	61.44
	SD	11.05	10.5
	Test	Paired t-test	
	P value	<0.0001	
	Inference	Extremely significant difference	

As age increases, the discrepancy between self-reported and measured height and weight also increases.

Table 4: Correlation of difference in self-reported and measured height and weight in elderly.

Difference correlation	Spearman's correlation coefficient value	P value	Inference
Age (years) with height (cm)	0.1204	0.0094	Very significant difference
Age (years) with weight (kg)	-0.1655	0.0003	Extremely significant difference

DISCUSSION

Accurate knowledge of height and weight is a crucial component of physiotherapy for proper analysis and exercise prescription. In the elderly, as age advances, height tends to decrease and weight may fluctuate. The perception of their own height and weight may not align with their actual measurements, as these figures often change over time. This can lead to discrepancies between self-reported and measured height and weight in older adults. Such discrepancies can result in inappropriate analysis and exercise prescriptions. Given this concern, the current study was designed to assess the accuracy of self-reported versus measured height and weight in the elderly population.

The study included 216 males (46.15%) and 252 females (53.83%), as shown in Table 1, with participants aged between 65 and 90 years. The largest group of participants was from the 65-70 years age range (66.45%), representing the "young old" category, as shown in Figure 1. As shown in Table 2, when comparing self-reported and measured height in the elderly population, the average self-reported height was 154.96 cm, while the average measured height was 152.35 cm. The paired t-test revealed a p value of <0.0001, indicating a highly significant difference between self-reported and measured height, with the elderly participants tending to overestimate their height. Similarly, when comparing self-reported and measured weight, the average self-reported weight was 63.61 kg, and the average measured weight was 64.21 kg, with a p value of <0.0001, again showing a highly significant difference. In this case, the elderly participants tended to underestimate their weight.

This discrepancy can be attributed to several factors. As people age, vertebral shrinkage occurs due to the natural wear and tear of the spine, with discs drying out and shrinking due to degeneration. Osteoporosis is another common condition in the elderly that contributes to a reduction in height.[16] Additionally, the accuracy of self-reported height is influenced by memory, as elderly individuals often recall their height from earlier in life.[16]

This can lead them to perceive themselves as taller than they actually are, resulting in an overestimation of their height.

Another reason for such difference in self-reported and measured height and weight may be "socially desirable self-image". In particular, tall men are perceived as more attractive, dominant and of higher status than short, resulting in a greater lifetime reproductive success. Even in females tall and slender figure is considered as a desirable trait. Hence the elderly male and female might have taller self-image stored in their memory leading to faulty reporting.[2,4]

According to study done by Neidzweidzka et al errors in self-reported height were seen as persons ages. Bias and unreliability in self-reported measures increased directly after age 45 years.[4] Krul et al, who performed similar studies in Italy, Netherland and North America, also found similar results in their study.[2,4,16] Studies by Fillenbaun et al, Neidzweidzka et al, Dekkers et al, Gerda et al also suggest the same trend in elderly in different country populations.[2,4,15,16]

Another aim of this study was to find if gender has any influence on self-reporting of height and weight. Table 3 shows gender wise comparison of self-reported and measured height in elderly. When self- reported and measured height was compared it was seen that, p value for male was <0.0001 suggesting extremely significant difference in self-reported and measured height and for females it was 0.0001 suggesting extremely significant difference in self-reported and measured height in elderly females too. Thus, showing that both genders over estimated their height. Comparison for weight showed p value to be 0.2692 suggesting no significant difference in self-reported and measured weight in elderly males and p value 0.0001 suggesting extremely significant difference in self-reported and measured weight in elderly female, i.e. female understated their weight. Thus, it can be said that, the socially desirable ideal weight concept may be applicable for females more as compared to males in terms of weight. Similar findings were noted in old African Americans and in Italy, Netherland and North America.[6,15,16]

Another objective of the study was to determine whether age influences the accuracy of self-reported height and weight. When the correlation between age and the difference in reported versus actual height and weight was assessed using Spearman's test, the results showed a Spearman correlation of 0.1204 for height and -0.1655 for weight. These values suggest that as age increases, the discrepancy between actual and self-reported values also increases. Specifically, older individuals tended to overestimate their height more and underestimate their weight more as they aged.

Based on these findings, it can be concluded that physiotherapists should prioritize actual height and weight measurements rather than relying on self-reported data when assessing elderly individuals in the Pune region.

Clinical implication

A therapist should rely on measured readings of height and weight instead of self-reported height and weight values in elderly population of Pune region.

This study had few imitations, e.g. level of education, level of cognition/memory level of awareness of the participants about health and health parameters, ethnicity, BMI of the participants was not considered. Similar study can be repeated in elderly population by considering above factors.

CONCLUSION

There was a significant difference in self-reported and measured height and weight in elderly population of Pune region. Height was overestimated by males and weight was underestimated by females. As age increases the difference in reported and actual measures goes on increasing.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Shaikh A, Thakar S. Accuracy of self-reported height and weight measurements in elderly in Pune: a cross-sectional study. Int J Community Med Public Health 2024;11:4839-43.