Body weight perception among Sri Lankan cardiac patients

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Abstract

Background: Misperception of body weight by individuals is a known occurrence. However, it is a potential target for implementing obesity reduction interventions in patients with cardiovascular and metabolic diseases. The aim of this study was to describe the association between self-perception of body weight and objectively measured body mass index (BMI) among cardiac patients in a specialist cardiology institution in Sri Lanka.

Method: During the study period, 322 (61 %) males and 204 (39 %) females were recruited from consecutive admissions to the Institute of Cardiology, National Hospital, Colombo, Sri Lanka. An interviewer-administered questionnaire was used to assess demographic characteristics, medical records and body weight perception. Weight, height and waist circumference (WC) were measured and Asian anthropometric cut-off points for BMI and WC were applied.

Results: The mean BMI of the study population was 23.61 kg/m². Body size misperception was seen in a significant proportion of the cohort. 85.2 % of overweight patients reported themselves to be ‘normal weight’ or even ‘underweight’. Moreover, 36 % of obese patients misperceived body weight as being of ‘normal weight’ while 10.9 % considered themselves to be ‘underweight’. 61.9 % of males and 68.8 % of females with central obesity reported themselves to be ‘underweight’ or ‘normal weight’. Among a subgroup with co-morbid metabolic diseases, significant under-perception of body size was seen.

Conclusions: Significant body size misperceptions were noted in this group of cardiac patients. The disparity of perception was seen increasingly with increasing BMI. More than two thirds of overweight and more than half of obese patients believed themselves to have normal or less than normal weight.

Keywords: Weight perception, Cardiac, Body mass index, Sri Lankan, Overweight, obese

Background

Obesity is currently considered to be a global epidemic [1]. The World Health Organisation (WHO) estimates that the worldwide prevalence of obesity has more than doubled between the years of 1980 and 2014 [2]. In the latest estimate in 2014, 1.9 billion adults were expected to be overweight, among whom over 600 million were projected to be obese [2]. Obesity is a major determinant of cardiovascular disease and such associations between them have been widely studied. Profound links have been established between hypertension, dyslipidaemia and obesity [3]. Obesity is known to be a major modifiable risk factor for coronary artery disease [4]. According to the WHO cut-off values for Asians, 25.2 %, 9.2 % and 26.2% of Sri Lankan adult population are in the overweight, obese and centrally obese categories respectively [5]. In Sri Lanka, the level of obesity has increased 3 fold during the last two decades. (5). The nation suffers notably from obesity associated metabolic diseases such as diabetes [6], hypertension [6], and metabolic syndrome [5] on an epidemic level.

In order to implement weight reduction strategies with the ultimate goal of reducing adverse health outcomes, it is important that the patients truly perceive their excess body weight as a modifiable risk factor. It is known that
obese individuals with misperception of the body size are less aware of their lifetime risks associated with the disease and have overly optimistic beliefs regarding their health [7]. This issue is further complicated by lower health seeking behaviour and less active participation in health promoting lifestyle interventions[7]. The implication of these is the invariable impact on success or otherwise of preventive measures. Body size misperception has been identified as a challenge and a potential target for implementing obesity reduction interventions [7]. However, such misperceptions are likely to have detrimental effects on measures to be taken towards primary prevention of the above listed metabolic and cardiovascular disorders.

There are several reports from different healthy populations, where significant misperceptions of weight have been recognized [8–10]. The changes in public perception of weight and improvement in public awareness of the significance of this parameter over the years has also been studied. These have concluded that despite the increasing awareness programmes, public perceptions have not improved satisfactorily [11]. Association between body weight perception and metabolic disorders has also been studied. Significant discrepancies have been found between self-perceived and objectively measured body weight status in type 2 Diabetes patients [12]. Clinical outcomes with regard to blood pressure and blood sugar control in diabetic patients are also known to be affected by this distortion of body weight perception [12]. Similar studies have revealed significant weight misperceptions in hypertensive patients as well [13].

The importance of studying this area of interest in the subgroup of cardiac patients is because their perception may differ from that of the general population. As cardiovascular disease is known to be prevalent among patients with diabetes [14] and dyslipidaemia, which in turn have established associations with obesity [15], the perception of body weight in relation to these comorbidities in cardiac patients should also be studied.

With obesity being a contributory factor for development and progression of chronic diseases including cardiovascular disease, weight reduction has proven to be effective in prevention and treatment [16]. Cardiac patients may be expected to have a higher level of awareness and involvement with body weight control. Accurate weight perception is a motivating factor for weight reduction and is identified to correlate with weight control practices rather than the actual body weight [9].

Accurate body weight perception can be influenced by several socio-demographic factors including age, gender, level of education, occupation and past medical history [13]. Having medical disorders such as diabetes and dyslipidaemia increases the accuracy of own body weight perception [13]. The current study aims to describe weight perception in the context of general cardiac patients and patients with co-morbid metabolic diseases.

Method
The cardiology unit of a tertiary care hospital was selected as the study setting and data was collected from consecutive admissions between March 2012 and July 2012. From these, patients with certain circumstances precluding accurate anthropometric measurements, those who were unable to respond to questions administered and those who were admitted for a specific investigation or intervention were excluded. Furthermore pregnant or lactating women, patients with acute oleander poisoning were not recruited. Details of another different aspect of the same the study have been reported elsewhere [17].

A custom designed, interviewer-administered questionnaire was used. This included socio-demographic data, medical history of current illness, co-morbidities, subjective assessment of the body weight and objective assessment through standard anthropometric measurements. Data was collected by a trained medical officer. Only patients giving informed written consent were included. This study protocol was approved by the Ethical Review Committee of National Hospital of Sri Lanka.

Individual body weight perception was inquired into and it was described in terms of “underweight”, “right weight”, “overweight” and “very overweight”. Body weight was measured to the nearest 100 grams using an electronic scale (Seca 815, Seca GmbH. Co. kg, Germany) and height was measured to the nearest millimetre using a stadiometer (Seca 217, Seca GmbH. Co. kg, Germany). Body Mass Index (BMI) was calculated as weight in kilograms divided by height squared in meters. Waist circumference (WC) was measured midway between the iliac crest and lower rib margin at the end of normal expiration using a standard measuring tape to the nearest 0.1 cm.

Patients were classified into four groups according to their measured BMI values, and cut-off values from Sri Lankan guidelines were used for this categorisation; underweight <18.5 kg/m²; normal weight 18.5–22.9 kg/m²; overweight 23–25 kg/m², obese >25 kg/m² [18]. WC values exceeding 90 cm in males and 80 cm in females were used as the cut-off values for central obesity [18]. Patients with obesity associated diseases such as diabetes mellitus, hypertension and dyslipidaemia were defined as co-morbid diseases.

Data entry and analysis was done using SPSS Version 20.0 statistical package.

Results
Total number of patients enrolled were 526 (response rate 100 %), out of which 322 (61 %) were males. Mean age was 58.5 years (±12.0). Majority of the population were Sinhalese (n = 438, 83 %), whereas Muslims (n = 43, 8 %), Sri Lankan Tamils (n = 34, 7 %), Indian Tamils (n = 4, 1 %) and other ethnic groups (n = 7, 1 %) constituted the remainder of the group. About half of the population (n = 296) had secondary
or higher education and 10.5% \( (n = 55) \) had no formal education. From these patients, the largest proportion \( (n = 275, 52\%) \) presented with Acute Coronary Syndrome. Arrhythmias accounted for 13% \( (n = 67) \), heart failure and cardiomyopathies accounted for 11% \( (n = 59) \), representing the other common diagnostic category. Socio-demographic characteristics of the study population are summarized in Table 1.

The mean value with the Standard Deviation (SD) of the BMI of the study population was 23.6 \( \pm 4.2 \) kg/m\(^2\). Over one third of the subjects population \( (35\%, n = 183) \) had normal weight and an almost equally high percentage \( (n = 175, 33\%) \) were obese as well. 22% \( (n = 115) \) were overweight and 10% \( (n = 52) \) were underweight. More than half of the study sample \( (58\%, n = 306) \) had central obesity which constituted \( 43\% \) \( (n = 139) \) males and \( 82\% \) \( (n = 167) \) females.

Body weight perception varied with the objectively measured BMI category and between males and females (Table 2). More than a two third proportion of patients with BMI in the underweight category \( (n = 52, 71.2\%) \) accurately recognized themselves to be underweight. Nearly half of the patients with normal BMI, considered themselves to be ‘underweight’. A majority of patients who were overweight \( (85.2\%; M: 80.5\%, F: 93.2\%) \) reported themselves as being of normal weight. Over 53% of obese patients considered themselves to be ‘overweight’ or ‘obese’. However, only 15% correctly identified the weight category as being ‘very overweight’. More than one third of obese patients misperceived their body weight as being of ‘normal weight’. Moreover, 11% considered themselves to be ‘underweight’. Overall with the increase in the BMI, lower percentages of patients correctly perceived their body weight.

A total of 62% males and 69% females with central obesity, reported themselves to be ‘underweight’ or ‘normal weight’. Those who perceived their weight to be ‘overweight’ or ‘very overweight’ constituted about one third of the total number of patients with central obesity (Table 3).

Table 4 summarizes body weight perception variations in cardiac patients with co-morbid metabolic diseases. A total of 85% overweight patients and 50% obese patients in this sub-category identified their weight as ‘underweight’ or ‘normal weight’.

### Discussion

There is limited evidence in the world literature on weight perception variability in cardiac patients. The current study sample showed a representative distribution of socio-economic characteristics of a Sri Lankan population. The mean age of the study sample recruited is 58.5 years and this reflects the fact that cardiac patients are usually older. However, this study cohort is likely to be representative of Sri Lankan cardiac patients. Furthermore, with a large subject population of varying cardiovascular diagnoses, it provides an accurate representation of cardiac patients.
Having been conducted in a group of patients who have direct implications of obesity on the causation and progression of their cardiovascular disease [3], and related co-morbidities, this study provides information which is important from the perspective of managing these types of patients.

A majority of the study population (55%, n = 290) had higher than normal BMI values. This is perhaps to be expected considering their possible disease associations. Similarly, a high percentage (58%, n = 306) had central obesity. This is in contrast to the 34% of abdominally obese subject percentage noted in a Sri Lankan general population [19]. But in both studies, the prevalence of central obesity is higher among female participants compared to male counter part.

Body weight perception in this study group showed a clear tendency of under-estimation of their weight by the patients. This is evident by nearly half of the normal weight patients considering themselves to be ‘underweight’, 85% of overweight reporting their weight as ‘normal’ or even ‘underweight’ and 85% of obese patients failing to identify that they are ‘very overweight’. Similar weight misperceptions have been elicited in the Sri Lankan general population as well [19]. Yet for all that, the percentages of under-perception are higher in the current study sample. This 34% of abdominally obese subject percentage noted in a Sri Lankan general population [19]. But in both studies, the prevalence of central obesity is higher among female participants compared to male counter part.

Table 3 Weight perception changes with Central obesity

| Weight perception category | "Underweight" (%) | "Right weight" (%) | "Overweight" (%) | "Very overweight" (%) |
|---------------------------|-------------------|-------------------|------------------|-----------------------|
| Males                     |                   |                   |                  |                       |
| Absent (183)              | 45.9              | 47                | 7.1              | 0                     |
| Present (139)             | 14.4              | 47.5              | 28.8             | 9.4                   |
| Females                   |                   |                   |                  |                       |
| Absent (37)               | 78.4              | 18.9              | 2.7              | 0                     |
| Present(167)              | 25.1              | 43.7              | 23.4             | 7.8                   |

*Central obesity = WC > 90 cm in males, >80 cm in females

Table 4 Weight perception changes in cardiac patients with co-morbid metabolic diseases

| BMI categories              | Weight perception |
|-----------------------------|-------------------|
|                             | "under weight" (%)| "right weight" (%)| "over weight" (%) | "very over weight" (%) |
| Underweight (<18.5 kg/m²)   | 70.6              | 23.5              | 5.9              | 0                     |
| Normal weight (18.5-22.9 kg/m²) | 54.4              | 41.1              | 4.4              | 0                     |
| Overweight (23-24.9 kg/m²)  | 21.8              | 62.8              | 15.4             | 0                     |
| Obese (>25 kg/m²)           | 10.8              | 39.2              | 35.4             | 14.6                  |
when they have already developed consequent metabolic or cardiovascular disease, should be aware of it. However the results indicate poor perception, with 62% of abnormally obese males and 69% of similar females reporting their weight status as ‘normal’ or ‘underweight’. Only one third of them considered themselves to have higher than normal weight. One could expect problems in them in a therapeutic attempt towards motivation towards weight loss in practices. This is in contrast to the Sri Lankan general population where two thirds of abdominally obese people accurately identified themselves to have an increased waist circumference [19].

The known medical complications of obesity include metabolic diseases such as diabetes, hypertension, hyperlipidaemia as well as ischaemic heart disease [3]. The selected sub-group of cardiac patients with co-morbid metabolic diseases showed an equal trend of body weight misperception with almost similar percentages in different self-perceived weight categories. This would lead one to the inevitable conclusion that weight misperception, especially under-perception when overweight, being a significant finding in the general cardiac patients as well as cardiac patients with co-morbid metabolic diseases. This is apparently more marked than misperceptions demonstrated in the general population from large-scale local studies [19]. Furthermore, this is quite important in view of the fact that this is the same patient population which is expected to be more vigilant about weight control. This misperception may be contributed to by several reasons. Unintentional weight loss is a symptom of diabetes. Furthermore, these patients may have already met health care personnel, including dieticians, from whom they may have received advice on diet and physical exercise, and may even have tried to comply with the suggestions to a certain extent. This could possibly have led to an impression formed within them that they have achieved some weight loss. However the negative impact of it is the failure to recognize that an optimal weight status has not been achieved yet. This subsequently results in under-perception of body weight. The results of this study bring out the notion that target populations should be given special attention in addressing weight status and clinicians should try to improve weight perception in these patients in order to enhance weight control practices.

Limitations
The present study did not specifically test for the understanding of the concept of central obesity in terms of perceived waist circumference. This could have been important to elucidate awareness of patients on this important clinical parameter. However, in a clinical perspective, weight loss practices that the patients are expected to follow would depend on the overall self-estimation of body weight. This study has not dealt with the association of self-perceived body weight with weight control practices in the cardiac patients and the effectiveness of such. Clearly, future studies would be needed in that respect.

Multiple logistic regression models were carried out for under-perception, correct perception and over perception of body weight. However clinically significant statistical associations were not elicited (Additional file 1). Probably, the existing knowledge on obesity and associated risk factors could be an associated factor. Further research is very important to identify the risk factors for the poor body weight perception in cardiac patients.

Conclusions
Body weight misperception was common in this cardiac patient population as well as the subgroup with co-existent metabolic diseases. Significant under perceptions were observed in higher BMI categories with 85% of overweight patients and about half of the obese patients reporting their weight as ‘normal’ or even ‘underweight’. Similarly, about two thirds of males and females with central obesity, considered themselves to have normal or less than normal weight. With incremental increase in the BMI, distortion in body weight perception was noted to be worse. More focused health sector approaches with emphasis given to making patients aware of their weight, waist circumference and their associations with disease conditions would help to improve this in the future. This should essentially lead to a better perception in the target patient population than that of the general population.

Additional file

Additional file 1: Multiple logistic regression models for under-perception, correct perception and over perception of body weight. (DOCX 17 kb)

Abbreviations
BMI, body mass index; WC, waist circumference

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Availability of data and materials
All data supporting the findings are presented within the main manuscript.

Authors’ contributions
RJ, AKP, NL and WSS have made substantial contribution to conception and design of the study. PP and RJ interpreted the data. PP analyzed the data. PP, IR and RJ were involved in drafting the manuscript. All authors read and approved the final script.

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Competing interests
The authors declare that they have no competing interests.

Consent for publication
Not applicable.

Ethics approval and consent to participate
Ethical approval for the study was obtained by the Ethics Review Committee, National Hospital of Sri Lanka. Only the patients giving informed written consent to participate in the study were recruited.

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