Body weight misperception among Malaysian adults in rural area

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ABSTRACT

Introduction: Distorted perceptions of body weight pose negative influences on weight management and predispose subjects to the development of eating disorders and their complications. This study describes the prevalence of misperception of body weight, and its influencing factors. **Materials and Methods**: A cross sectional study among 225 Malaysian adults in rural area was conducted from June to August 2010. Structured self administered survey questionnaire were used to examine misperception of body weight and the influencing factors such as socioeconomic factors, family factors, Body Mass Index (BMI) and lifestyle. **Results**: Respondents were mainly more than 45 years old (47.1%), Malay (86.2 %) and employed (45.8%). Findings showed that 52.5% of respondents had incorrect perceptions of their body weight. Result implies that in rural area, underestimation, rather than overestimation, of weight status is more prevalent among respondents above 45 years old and overweight or obese. **Conclusion**: Body weight awareness and promotional campaigns should be strategised and catered according to target groups. Public health authorities and health care professionals need to be given access to correct information pertaining to our society's nutritional status and weight management.

Keywords: Body mass index, obesity, misconception, misperception, knowledge

INTRODUCTION

Over the past few decades, overweight and obesity become an increasingly serious public health concern globally. Obesity poses serious health consequences, heightening the risk of contracting five out of ten leading causes of death and disability including cardiovascular diseases, diabetes, cancer, hypertension and stroke. Globally, 2.3 billion adults are predict-

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Over the past few decades, overweight and obesity become an increasingly serious public health concern globally. Obesity poses serious health consequences, heightening the risk of contracting five out of ten leading causes of death and disability including cardiovascular diseases, diabetes, cancer, hypertension and stroke. Globally, 2.3 billion adults are predicted to be overweight and more than 700 million obese by 2015. [1] In Asia, there is evidence that the risk of obesity related diseases among Asians increases with a lower body mass index (BMI) of 23 kg/m^2. This new

benchmark for Asians, would trigger major revisions of health programme and control approaches across Asia where a significant proportion of the populace already has a mean BMI of 23.4 kg/m^2. [2]

In Malaysia, the increasing overweight problem is occurring amidst prevailing nutritional deficiencies. The rapid increase in socio-economic growth and access to technology has contributed much too overweight and obesity as being a continuous major public health concern. In 1996, 4.4% and 16.6 % of the Malaysian population were obese and overweight respectively. [3] However, in 2003, based on the Malaysian Adult Nutrition Survey, 12.15% and 29.7% of Malaysian adults, aged 18 to 59 years, were reported to be obese and overweight respectively. [4] The National Health Morbidity Survey 2006 reported that in Selangor, [5] 16% of its population were obese and 31.7% overweight (as per WHO classification), making it among the top two obese states in Malaysia. However, there appears to be little difference in prevalence between rural and urban populations despite differences in ethnicity and gender.

Meanwhile, it is now clear that many overweight and obese individuals also misjudge their weight as being normal. This is partly due to the increasing prevalence of high weights in the community such that it has become an acceptable "normality" of body weight. [6] Unfortunately, a distorted perception of weight poses a negative influence on weight management and predisposes the development of disordered eating behaviours and their complications. The majority of weight reduction and weight maintenance programmes are geared towards lifestyle strategies that combine controlled energy diet, increased physical activity and behavioural therapy including self empowerment. [7]

There is a lack of published studies that looks into discrepancies of body weight in our local population. With obesity posing a major health problem, and as obesity is more likely to be identified, the population that are mildly or moderately overweight may be overlooked and will be at risk of obesity if they continue to perceive themselves as having normal weight.

Failure to recognise a growing overweight situation may result in a false sense of security and contribute to persistence of an unhealthy lifestyle. Therefore, this study aims to determine the prevalence of misperception of body weight status and factors influencing misperception of body weight among Malaysian adults in rural area.

MATERIALS AND METHODS

Data pertaining to perceptions of body weight were collected from 225 adults from Kampung Bukit Belimbing, Tanjung Karang, Selangor from June to August 2010. Individuals who were only 18 years of age and above, Malaysian and residing in the village for more than six months were included in the study. Those who did not provide verbal informed consent or was non-contactable after three attempts or visits were excluded from the study. Respondents were recruited via simple random sampling from name list obtained from the head of villages. Data was collected using a structured self administered questionnaire. All interviewers were given a briefing and training on interview and parameter measurement methodology by the principal

investigator, prior to conducting the survey, in order to ensure consistency in data collection and to reduce measurement bias. Written consent from respondents and head village was obtained prior to data collection.

"Misperception of body weight" was defined as the discrepancy between respondent's perception of body weight and the actual measured BMI. Perception of body weight was defined as the way the respondent classifies themselves with respect to their body size – either "very thin/ thin", "normal weight", "obese" or "very obese". Classification category for "misperception of body weight" is either "discrepancy not exist" whereby perception of body weight corresponds to actual BMI level and "discrepancy exist" where perception of body weight differs from actual BMI level.

Variables factors include age, gender, ethnicity, education level, marital status, level of BMI, dietary pattern and level of leisure physical activity. Cut off points for BMI categories are as per the WHO Classification: underweight (BMI: <18.50 kg/m^2), normal (BMI: 18.5-24.99), overweight (BMI: 25.0-29.99) and obese (BMI: ≥30.00). [8] Dietary pattern was defined as weekly intake of a combination of food consisting of chicken/fish, red meat, vegetables/fruits and alternative sources of carbohydrate (apart from rice). Scores were given based on intake frequency (very regularly, regularly, rarely/seldom and never). Dietary pattern categories were later classified as good dietary pattern and poor dietary pattern. "Level of Leisure Physical Activity" was classified as good or poor physical activity. Good physical activity is defined as engagement of any one of the following physical activities by the respondent; jogging at least 16 km in a week, extreme sports for at least five hours a week, swimming for at least 3.2 km a week, cycling for at least 80.5 km a week, aerobics or music related activities at least twice a week, gardening or any other similar activities.

Calculation for sample size using the Fleiss formula with prevalence of misperception of body weight of 50% and 26% respectively. [9, 10] A sample size of 225 subjects was required for a precision of 0.05, power of 0.8 and 95% confidence coefficient. Statistical analysis was performed using SPSS 17.0. Descriptive analysis was performed describing the demographic characteristic of respondents and "misperception of body weight". Simple logistic regression analysis was done to see the prevalence crude odds ratio between misperception and influencing factors. *p* value less than 0.05 and 95% confidence interval was considered statistical significance.

RESULTS

The respondents consisted of 103 males (45.8%) and 122 females (54.2%). The mean age of respondents in the study is 43.69 (15.37) years old, with a mean of 42.42 (14.92) years old for males and 44.77 (15.72) years old for females. Most of the respondents were from the "more than 45 years" age group (47.1%) Malay, received their education up to secondary level (55.6%), employed (45.8%) and were married (69.8%). Although the majority of the subjects showed good dietary patterns (94.2%), most of the respondents (61.8%) had poor level of leisure physical activity.

Four respondents (two males and two

Table 1: Respondents profile by genders.

Respondent Profile	Males n = 225 (%)	Females n = 225 (%)
Age (years)	42.42 (14.92)[a]	44.77 (15.72)[a]
18 – 34	34 (50.7)	33 (49.3)
35 – 44	26 (50.0)	26 (50.0)
>45	43 (40.6)	63 (59.4)
Ethnicity		
Malay	88 (45.4)	106 (55.6)
Chinese	5 (50.0)	5 (50.0)
Indian	10 (47.6)	11 (52.4)
Education level		
No formal	2 (8.7)	21 (91.3)
Primary	34 (50.7)	33 (49.3)
Secondary	62 (49.6)	63 (50.4)
Higher education (diploma and above)	5 (50.0)	5 (50.0)
Employment status		
Unemployed	14 (15.1)	79 (84.9)
Employed	69 (67.0)	34 (33.0)
Retired	9 (69.3)	4 (30.7)
Others	11 (68.8)	5 (31.2)
Marital status		
Single	26 (56.5)	20 (43.5)
Married	76 (48.8)	81 (51.6)
Divorced/Widowed	1 (4.5)	21 (95.5)
Dietary Pattern		
Good	98 (46.2)	114 (53.8)
Poor	5 (38.5)	8 (61.5)
Level of physical activity		
Good	34 (39.5)	52 (60.5)
Poor	69 (46.0)	70 (54.0)
Level of BMI [b]		
25.04 (7.46) [c]		
Underweight	9 (39.1)	14 (60.9)
Normal	51 (57.3)	38 (42.7)
Overweight	25 (37.9)	41 (62.1)
Obese	16 (37.9)	27 (62.1)
Perception of body weight		
Thin	13 (37.1)	22 (62.9)
Normal	66 (56.9)	50 (43.1)
Overweight	24 (32.9)	49 (67.1)
Obese	0 (0.0)	1 (100.0)
Misperception of body weight [b]		
Exist	53 (45.7)	63 (54.3)
Not exist	48 (45.7)	57 (54.3)

females) had outlier BMI values and were excluded from the analysis of discrepancy of body weight. Based on the measured BMI, 49.3% of total respondents were classified as either overweight or obese (39.8% males; 55.7% females). However, only 32.8% perceived themselves as being either overweight or obese (23.3% males; 41.0% females) which is most of respondents (52.5%) had demonstrated discrepancies in their body weight status. Of those that had misjudged their actual body weight status, 54.3% were females compared to 45.7% males (Table 1).

Among the total respondents with misperceptions of body weight, 78.5% underestimated their body weight status (73.6% males; 82.5% females) whilst approximately 21.5% of the respondents overestimated their weight status (26.4% males; 17.5% females). Discrepancies of body weight occur mostly among those who are actually overweight or obese (67.2%). Among those who are overweight or obese, 10.3% perceive themselves as underweight, 57.7% as normal whilst the rest perceive themselves as being overweight. Interestingly, among those who are BMI are actually overweight or obese but are normal weight perceivers, the distribution of male to female are fairly similar. The proportion of those who are obese but are overweight perceivers is higher in females (76%) than in males (24.0%). Similarly, the proportion of those who underestimated their body weight status, from being overweight or obese but perceive themselves as being underweight is also higher in females (62.5%) than in males (37.5%) (Table 2).

The data indicates that with increasing age, there is a higher tendency to misjudge body weight status as shown by the prevalence odds ratio values (Table 3). Although not statistically significant at age groups 18-34 and 35-44 years, the difference

Table 2: Distribution of misperception of body weight status by genders.

Misperception of body weight exist (n = 116)		**Males**	**Females**
Perception of body weight	Actual BMI	n (%)	n (%)
Underweight	Overweight/Obese	3 (37.5)	5 (62.5)
Underweight	Normal	7 (53.8)	6 (46.2)
Normal	Underweight	6 (66.7)	3 (33.3)
Normal	Overweight/Obese	23 (51.1)	22 (48.9)
Overweight/Obese	Normal	8 (50.0)	8 (50.0)
Overweight	Obese	6 (24.0)	19 (76.0)

is statistically significant at age group more than 45 years old. Similarly for the BMI category, the results indicates up to the overweight group, there was a higher tendency to develop misperceptions of body weight with increasing BMI, as shown by the increasing prevalence odds ratio. Differences in all other factors studied including age, gender, ethnicity, education level, employment status, marital status, dietary pattern and level of physical activity were found to be not statistically significant.

DISCUSSION

In this present study, underestimation of weight status is more prevalent among respondents who are above 45 years of age and overweight or obese. These findings concur with results of other studies that only a small proportion of obese men and women correctly classified themselves as obese. [10] Furthermore, a similar study on Dutch concluded that whilst adults were ready to describe themselves as too thin, too fat or just right, there is a reluctance to label themselves as being obese. However, a large majority (>90%) of adult Dutch men and women who were obese readily considered themselves as too fat. The two aforementioned studies found women particularly unwilling to accept the reality of obesity which is consistent with the findings here. [11]

Table 3: Relationship between misperception in body weight and the influencing factors.

Variable	Misperception		X^2	*p*	Prevalence Odd Ratio	95% Confidence interval
	Exist (n=116) n (%)	Not exist (n=105) n (%)				
Age (years)						
18 – 34	29 (42.6)	39 (57.4)	6.470	0.039	1.00	
35 – 44	35 (51.5)	33 (48.5)	0.301	0.583	0.84	0.46 - 1.56
>45	52 (61.2)	33 (38.8)	4.614	0.032	2.12	1.07 - 4.28
Gender						
Males	53 (52.5)	48 (47.5)	0.014	0.906	1.00	
Females	63 (52.5)	57 (47.5)	0.014	0.906	9.6	0.57 - 1.64
Ethnicity			0.804	0.669		
Malay	102 (53.7)	88 (46.3)			1.00	
Chinese	5 (50.0)	5 (50.0)	0.787	0.375	1.51	0.61 - 3.75
Indian	9 (42.9)	12 (57.1)	0.139	0.709	1.33	0.29 - 6.04
Education levels			3.026	0.554		
No formal	9 (39.1)	14 (60.9)			1.00	
Primary	38 (59.4)	26 (40.6)	0.038	0.846	1.29	0.10 - 16.34
Secondary	64 (51.6)	60 (48.4)	0.672	0.412	2.79	0.24 - 32.25

An earlier study involving Malaysian adolescents found that a much smaller proportion of its subjects had incorrect perception of their current weight status. [10] In fact, nearly 74% of overweight subjects in that study correctly perceived themselves as overweight. However, in that study obesity was not clearly defined in the study. The higher prevalence of misperception among overweight and obese adults in our present study may indicate their unreadiness to consider themselves as such.

Besides, tendency to misjudge body weight status were higher by the increasing of age. Each of these groups may possibly differ in socioeconomic circumstances. We consider that for the 18-34 age groups, the majority of respondents may not have settled down with family and social factors such as peer pressure and sociological trends hence may play a bigger role in influencing the misperception on body weight. Progressively, as respondents move to higher age groups of 35–44 years of age and above 45 years of age, respondents would have begun families and are increasingly settled down, both occupationally and with a progressively lower level of social activity or interaction outside the confines of the family or greater family.

Previous study also found that generally, females before the age of 60, has a propensity to under assess their weight, after which the tendency to do so declines rapidly. [12] Males, on the other hand, tend to overestimate their weight. For the males, this occurs at all ages but the tendency to overestimate is greater in the elderly. Although the study looked into self-reported measurements of heights and weights to determine the BMI, this mentality is likely to potentially influence the perceived body weight. [12]

Younger non-obese European men were less likely to report themselves as being too fat but instead, more likely to report themselves as being too thin. Younger European women, on the other hand, were as likely as the older Dutch sample to report themselves as overweight. [11] Only 17% of our female respondents are aged above 60 years whilst 27.9% are above 50 years of age. This would explain the high levels of misperception of body weight seen in our study population.

A study by Wardle and Johnson [13] found that perceived weight was strongly associated with BMI in men and women. The results of this study indicate that with increasing BMI, up to the overweight group, there is a higher tendency to develop misperceptions of body weight (as shown by the increasing crude odds ratio). For the purpose of this analysis, we considered the "overweight" and "obese" groups as one category, though it should be noted that respondents are able to distinguish themselves between being "overweight" and "obese". In this "overweight-obese" group, it is a good sign that they have acknowledged their condition irrespective of whether they are actively involved in reducing their weight.

This result consistent with a study by Mikolajczyk *et al.* where misperceptions of body weight were increased by the increasing of BMI especially among females. [14] Duncan *et al.* also found that overweight or obese men and women tend to misperceive their weight. Men and women who misperceived

were less likely to be insufficiently active and meet activity recommendation, respectively. [15] Zaccagni *et al.* found that even though mostly respondents in their sample had normal weight, women tend to overestimate their weight status while men had a tendency to underestimate their weight. [16]

Similarly, in study carried out by Ver Ploeg *et al.* found that overweight men and women underestimated their body weight as underweight or right weight. The misperception about body weight became a potential barrier to achieving healthy weight among overweight women. [17] Lynch *et al.* also found that there were relationship between misperception of body weight and BMI where obese women who perceived themselves as obese were lost their weight. While among obese women who perceived themselves as being normal were gained weight. [18]

The strength of this study is that it did not rely on self-reported weight and height information but instead, used measured values of these parameters to assess BMI thus allowing a more accurate assessment of misperception of body weight. In addition, the collected information on perceived weight status was based on self-reported interviewed survey questionnaire. Although the results for the majority of the variables being studied were not statistically significant, there is still value in this results that suggests underestimation, rather than overestimation, of misperception of body weight is more prevalent, and its magnitude, acts as an alarm in highlighting the potential problem that are currently facing locally.

As the section on dietary pattern and physical activity was self–reported, the element of recall bias may influence the findings pertaining to these factors. In addition, possible bias arising from selection bias whereby if the survey was conducted during office hours, those who are working at the time of the interview was conducted would have been excluded and this may influence the results of this study. Differences in culture, religion, belief, upbringing and type of influence should be considered specifically according to the social culture in this multi-racial country.

Motivation and drive for weight reduction in order to achieve and maintain optimum healthy weight and health status may be influenced by discrepancies in body weight. Therefore, public health interventions should focus motivating these respondents to reduce their weight. As such, body weight awareness and promotional campaigns should be strategised and catered according to target groups. Public health authorities and health care professionals need to be given access to correct information pertaining to our society's nutritional status and weight management preferences so that the strategies adopted could be incorporate in our multi-racial culture. In order to do this, further studies should be conducted to provide qualitative research information to understand in detail the influencing factors of overweight and its predictors.

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