
PUBLIC HEALTH RESEARCH

Weight Perception among Non-pregnant Urban Malaysian Women: Is It Reliable?

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ABSTRACT

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Introduction In maternal healthcare, pre-pregnancy weight is used to predict pregnancy outcomes. Since no recorded data on pre-pregnancy weight, perceived weight is used alternatively. This study examines the relationship between perceived and actual weight among non-pregnant urban Malaysian women of childbearing age and identifies differences in perceived and actual weight by selected socio-demographic characteristics.

Methods A cross-sectional study was conducted between April and June 2013 among urban Malaysian women attending public health clinics in the Klang Valley. Information on height, perceived current weight and time when their weight was last taken were obtained and actual weight was the average of two measurements (TANITA-HD-323-digital-scale). Socio-demographic data collected were age, ethnicity, education level, marital and employment status and total household income.

Results Mean age of 371 women in this study was 28.81±5.65, 82.2% were Malays, 62.8% had tertiary education, over 75% were married and employed, with more than half from middle-income households. Overall, the mean perceived and actual weight was 59.29±11.59 and 59.20±11.90 respectively. Pearson's Correlation test showed a very strong positive correlation between perceived and actual weight ($r=0.957$; $p<0.0001$), ranging between 0.852 to 0.994 among subgroups; 258 (69.5%) perceived their weight accurately (± 2.0 kg of actual weight), 49 (13.2%) under and 64 (17.3%) overestimated their weight. Main outliers were among younger women, Malays, tertiary educated, employed, middle-income and had weight last measured a month or more ago.

Conclusion Strong correlation between perceived and actual weight among women in this study reassured weight perception can be used more confidently in patients' history taking and future research among urban Malaysian women using public health services.

Keywords Reliable - urban - weight - perception - women.

INTRODUCTION

Pre-pregnancy weight has been identified as risk factor to predict pregnancy outcomes such as intrauterine growth retardation (IUGR), stillbirth and neonatal death.¹⁻³ Often this information is illusive since we do not have a record of the pre-pregnancy weight. Alternatively, perceived weight is used in many studies. Weight perception is defined as the perception of one's body weight⁶. Burns et al.⁷ described body weight perception (BWP) as the image of body weight figured within our mind. Accurate Body Weight Perception (ABWP) is termed as the compatibility between the perceived and measured body weight and exhibits consciousness of health risks associated with weight status⁸. Inaccurate Body Weight Perception (IBWP) (incompatibility between the perceived and measured body weight) is strongly observed among overweight and obese adults. Overweight and obese population perceiving themselves as having ideal and healthy weight, hence resulting in reduced effort to lose weight and may be less enthusiastic to control their diet and be physically active⁹. Weight perception is important in controlling and sustaining a suitable body weight. Hence, promoting people to perceive weight correctly may help them attain ideal body weight.¹⁰

How good and reliable is the perceived weight, is still debatable. Some studies pointed out that body weight perception has association with specific factors including gender, race, real body weight and socio-economic status.^{11,12} Females, are conscious about body weight even at a very young age, and thus is significantly influenced by the media portrayal of the ideal look or body shape.¹³ A foremost theme conveyed from most of the teen magazine websites is essentially to be beautiful.¹⁴ However, after leaving secondary schools, most women managed to get their weight documented only when they get pregnant. In maternal healthcare, women do not have recorded weight data accessible from the time of conception and so it is difficult to acquire a reliable initial body weight.¹⁵ For this reason, it is not easy to obtain the pre-pregnancy weight, an important variable in research because no record system is available.

Often the alternative is to ask women in the childbearing age their pre-pregnancy weight, and this report will most likely be their perceived weight or recall of the most recent weight taken. To our knowledge, no local study has been conducted to look into the correlation between weight perception and actual weight among women. We want to know if there is any difference among older and younger women and between educated and non educated women for example. This article examines the relationship between perceived and actual body weight among Malaysian women, to get better sense whether perceived weight is well correlated with actual weight among our Malaysian

women. If the perceived weight has high reliability and can be used, this supports the basis of its utilization in research. If they are under or overestimated, the question is to know whether they differ by the women's characteristics. Although weight perception study has been done in many other countries, its utility in the local context may not be valid thus requiring a local profiling of the reliability of perceived weight.

METHODS

A cross-sectional study was conducted from April to June 2013 among Malaysian women who attended 6 purposively chosen government clinics in the Klang Valley, Malaysia. This study was approved by the Medical Research Ethics Committee (NMRR-12-965-13772) and UKM Research and Ethics Committee (FF-425-2012). The subjects have given informed consent and anonymity was preserved. Questionnaires were distributed to 475 women who consented to participate in this study and fit the inclusion criteria (Malaysian, of childbearing age between 18 to 49 years of age and not pregnant). From the 475 women initially recruited among women who attended Maternal Child Health Clinic or Outpatient Department in the selected clinics, 104 were excluded because of incomplete data leaving a total sample of 371 included in the final analysis. Demographic data collected included age, ethnicity, level of education, marital status, employment status and total household income. Women were asked to report their height, perceived current weight and when their last weight was taken (either a month or longer, or less than a month). Subjects' weight perception was assessed by the question, "How much do you think is your current weight?". Then their actual weight was measured to the nearest 0.1 kg, using a TANITA digital weighing scale (Tanita HD-323, *Japan*). They were asked to remove their shoes and empty their pockets before weighing. Two measurements were taken and the average of the two values was used in the analyses. The instrument was calibrated daily prior to usage.

The data was analysed by using IBM SPSS (Statistical Package for Social Sciences) software version 22.0. Data cleaning was done to detect any missing values, coding error or any illogical data values. The analysis of qualitative variables such as ethnicity, level of education, marital status, employment status and total household income were presented in number and percentage. While the analysis of quantitative variables such as age, perceived weight and actual weight were presented in mean and standard deviations (SD). Pearson's Correlation test was used to examine the relationship between perceived weight and actual weight in all as well as subgroups of women. The significant level was set

at $p < 0.01$. We also calculated the degree of over or underestimation in percent and calculated the prevalence of over, under and accurately (± 2.0 kg) perceived body weight of different subgroups.

RESULTS

Study Population

Of these 371 women, the ages were between 18 to 45 years and their mean age was 28.81 (SD = 5.65) years. For ethnicity: 305 (82.2%) were Malays, 32 (8.6%) Indians, 29 (7.8%) Chinese, and 5 (1.3%) reported their ethnicity as "Others". The majority of them, 233 (62.8%) completed tertiary education followed by 129 (34.8%) who had secondary and only 9 (2.4%) with primary education. With regard to marital status, 278 (74.9%) were "Married", 90 (24.3%) were "Never married" and only 3 (0.8%) were either "divorced" or "widowed". Most, 290 (78.2%) of these women were employed while 147 (39.6%) reported that their total household income was less than RM 2300 (1RM = 0.32USD), 198 (53.4%) reported income of RM 2300–5599 and only 26 (7.0%) reported income of RM 5600 and above. Among these women, 202 (54.4%) reported having their last weight taken within less than a month, while the rest had their weight last measured a month or more ago.

Perceived Weight and Actual weight

Overall, the mean for perceived weight was 59.29 (SD = 11.59) and for actual weight was 59.20 (SD = 11.90) [Column 2 and 3]. Pearson's Correlation test showed a very strong and statistically significant correlation between perceived and actual weight ($r = 0.957$, $p < 0.0001$) [Column 4]. We subsequently analyzed the correlation between perceived weight and actual weight by subgroups essentially by age, ethnicity, education level, marital status, employment status, total household income and time last weighed. Pearson's Correlation test demonstrated high positive correlation in subgroups which range from 0.852 to 0.994. Findings from this study showed that there is a very strong positive correlation between perceived weight and actual weight among these women and this is true for all subgroups.

The mean difference between perceived and actual weight was generally less than 0.5 kg except for mean overestimate of 2.46 ± 4.23 kg among groups who reported their ethnicity as "Others", $+0.88 \pm 2.69$ kg (for those with high income) and those non-employed (mean = $+0.58 \pm 2.81$) [Column 5]. The standard deviation (SD) is highest among younger, other ethnicity, those with tertiary education, employed, middle-income and single women. However, none of the SD was more than 5 kg.

Accurate Estimation of Body Weight

Estimate of body weight was considered accurate in this study if the difference between perceived and actual body weight is -2.0 and $+2.0$ kg. In this study, 258 (69.5%) women perceived their weight accurately [Column 9]. Among older women (35 years old and above), 83.9% reported accurate body weight compared to 67.0% doing so among younger women. By ethnicity 75.9% of Chinese reported accurate body weight as compared to other ethnicities; 69.2% of Malays, 68.8% of Indians and 60.0% of "Others". Contrary to expectation, 88.9% of women with primary education reported accurate body weight compared to 76.7% among women with secondary education and 64.8% with tertiary education. Those ever married women, 71.2% reported accurate body weight compared to 64.4% among single. Employed women, 70.0% also found to report accurate body weight as compared to 67.9% among non-employed women. There were not much difference in prevalence of accurate estimation of body weight observed by income and time last weighed.

Under and Overestimation of Body Weight

In this study, 49 (13.2%) underestimated their actual body weight (reported weight of less than 2 kg below actual body weight) [Column 8]. Among the younger women, 14.0% underestimated their actual body weight compared to only 8.9% doing so among the older women. Underestimation of actual body weight was 18.8% among Indians, 16.7% among singles, 15.0% of those with low-income and 14.2% among those with tertiary education and weighed a month or more, and 13.8% among employed.

Among all women, 64 (17.3%) overestimated their actual body weight (reported weight of more than 2 kg above actual body weight) [Column 10]. Among the younger women, 19.0% overestimated their actual body weight compared to 7.1% among the older women. Overestimation of actual body weight was 40.0% among those who reported their ethnicity as "Others", 26.9% among those with high-income, 21.0% among those with tertiary education, 18.9% among singles, 21.0% among non-employed and 18.3% of those weigh less than a month.

Degree of Under and Overestimation of Body Weight

Further analysis showed that 48 (13%) women in this study under or overestimated their body weight by more than 5 kg. The main outliers came from among younger women, Malays, those with tertiary education, employed, middle-income and those who had their weight last measured a month or more ago.

Table: Mean of Perceived and Actual Body Weight; Correlation, Min, Max and Mean Difference Between Perceived and Actual Weight, and Distribution of Accuracy of Estimated Body Weight among Respondents

Factor	N	Perceived Weight, kg		Actual Weight, kg		Pearson Correlation	Diff. Bet Perceived & Actual Weight (2)-(3)		Min Diff	Max Diff	Under-Estimate		Accurate		Over-estimate		
		Mean (SD)	[2]	Mean (SD)	[3]		r	Mean (SD)			[5]	kg	[7]	n	(%)	n	(%)
All	371	59.29 (11.59)		59.20 (11.90)		0.957**	+0.09 (3.46)	-20.0	+21.0	49	(13.2)	258	(69.5)	64	(17.3)		
Age. (28.81±5.65)																	
18-34	315	58.10 (11.29)		57.92 (11.54)		0.949**	+0.18 (3.64)	-20.0	+21.0	44	(14.0)	211	(67.0)	60	(19.0)		
35 and above	56	65.97 (11.03)		66.41 (11.43)		0.982**	-0.43 (2.15)	-10.0	+4.0	5	(8.9)	47	(83.9)	4	(7.1)		
Ethnicity																	
Malay	305	59.83 (11.75)		59.73 (12.08)		0.955**	+0.10 (3.58)	-20.0	+21.0	39	(12.8)	211	(69.2)	55	(18.0)		
Chinese	29	56.36 (10.52)		56.49 (11.18)		0.975**	-0.13 (2.52)	-5.0	+6.0	4	(13.8)	22	(75.9)	3	(10.3)		
Indian	32	55.85 (10.52)		56.01 (10.86)		0.966**	-0.16 (2.82)	-5.0	+9.0	6	(18.8)	22	(68.8)	4	(12.5)		
Others	5	65.80 (8.07)		63.34 (6.99)		0.852	+2.46 (4.23)	-1.3	+9.1	0	(0.0)	3	(60.0)	2	(40.0)		
Education Level																	
Primary	9	63.80 (12.17)		63.89 (12.62)		0.994**	-0.09 (1.40)	-2.8	2.0	1	(11.1)	8	(88.9)	0	(0.0)		
Secondary	129	61.79 (12.65)		61.78 (12.93)		0.980**	+0.01 (2.55)	-10.0	+9.1	15	(11.6)	99	(76.7)	15	(11.6)		
Tertiary	233	57.73 (10.67)		57.59 (11.01)		0.935**	+0.14 (3.93)	-20.0	+21.0	33	(14.2)	151	(64.8)	49	(21.0)		
Marital Status																	
Single	90	57.29 (12.13)		57.59 (13.02)		0.943**	-0.30 (4.32)	-20.0	+10.0	15	(16.7)	58	(64.4)	17	(18.9)		
Ever Married	281	59.93 (11.35)		59.72 (11.52)		0.962**	+0.22 (3.13)	-14.0	+21.0	34	(12.1)	200	(71.2)	47	(16.7)		
Employment Status																	
Employed	290	59.22 (11.65)		59.26 (11.99)		0.954**	-0.05 (3.61)	-20.0	+21.0	40	(13.8)	203	(70.0)	47	(16.2)		
Non-employed	81	59.55 (11.41)		58.97 (11.67)		0.971**	+0.58 (2.81)	-6.55	+10.0	9	(11.1)	55	(67.9)	17	(21.0)		
Total H.Hold Income																	
Low (< RM2,300)	147	57.96 (11.70)		58.07 (12.28)		0.964**	-0.10 (3.25)	-15.0	+10.0	22	(15.0)	102	(69.4)	23	(15.6)		
Middle (RM2,300-5,599)	198	59.91 (11.61)		59.77 (11.91)		0.951**	+0.13 (3.70)	-20.0	+21.0	26	(13.1)	138	(69.7)	34	(17.2)		
High (≥ RM5,600)	26	62.13 (10.20)		61.26 (9.26)		0.966**	+0.88 (2.69)	-5.0	+7.30	1	(3.8)	18	(69.2)	7	(26.9)		
Time last weighed																	
Less than 1 month	202	58.38 (11.00)		58.23 (11.56)		0.955**	+0.15 (3.42)	-15.0	+12.0	25	(12.4)	140	(69.3)	37	(18.3)		
1 month or more	169	60.38 (12.19)		60.36 (12.23)		0.958**	+0.02 (3.52)	-20.0	+21.0	24	(14.2)	118	(69.8)	27	(16.0)		

**significant at p < 0.05

DISCUSSION

The present research concentrates on the gap in the literature on the reliability of using perceived weight to estimate actual weight among urban Malaysian women using public health clinics by examining the socio-demographic factors that may influence the reliability of this measure. The socio-demographic factors explored were difference by age, ethnicity, education level, marital status, employment status and total household income.

Strong correlation was observed between perceived and actual body weight ($r = 0.957$) in this study. This strong correlation is quite consistent with the survey on health status of working community in Japan, by Inoue et al.¹⁰ which found correlation coefficient of 0.982 between the measured and stated weight. This shows perceived weight is reliable and can be used in research for urban women with more assurance.

In this study, 69.5% of women reported perceived weight ± 2.0 kg that of actual body weight. In general, the degree of underestimation is 13.2%. However, younger women tend to under and overestimate their actual body weight compared to older women. Among older women, social norm, higher frequency of self-weighing and more frequent visits to health centre due to escalating health problem might influence the higher correlation between perceived weight and actual weight among the older group.¹⁰ Misperception of body weight may be due to higher body image distortion among younger women.¹⁶

The largest source of over (+21 kg) and underestimation (-20 kg) of body weight was reported among Malay women [Column 6 and 7]. This might be explained by higher number of Malay women in this study leading to a more heterogenous population. Heterogeneity among respondents was also demonstrated by Dorsey et al.⁸ who studied racial or ethnic differences in weight perception.

Surprisingly, the inaccurate weights were reported by highly educated, ever married and employed women. Most women who underestimated their weight came from highly educated background. This finding was inconsistent with the study by Alwan et al.¹¹ who found that higher educational level is associated with better body weight perception and argued that if people have better knowledge about their own weight perception indicators, body weight control approach may be strategized more resourcefully.

We also found single women in this study have the tendency to underestimate their actual body weight compared to ever married women. This is contrary to our expectation that single women would be more concerned with their body weight given that appearance is important for this group.¹⁷

The finding of higher underestimation of body weight among employed women in this study is also unexpected. A study looking into the association between weight perception and socioeconomic status (SES) among adults in the Seychelles demonstrated association between appropriate self-perception of weight and high SES. Individuals with high SES tend to have greater access to health information which encourages healthy lifestyles, thus leading to more weight-conscious minded individuals.¹¹

Many studies on maternal and perinatal outcomes include weight measurements be it pre-pregnancy weight, maternal weight gain in mothers who do not comply with antenatal follow-up may need mothers' report of their weight. These reported weights strongly depend on their perception of their body weight.¹⁻⁴ Body weight perception also influence weight control behaviours such as diet or exercise control¹⁸ and is different from Body Mass Index (BMI). Body weight perception motivates more people to discipline themselves when engaging in weight control behaviours than actual BMI. For health and behavioural interventions, better understanding of weight perception among women of different groups would make it easier to plan for a more efficient weight management strategies for women¹⁹ including those who wanted to shed their pregnancy related weight gain.

Overall, perceived and actual weight have very good correlation and perceived weight can be reliable for usage in research when body weight information are difficult to obtain, for example in studies on pre-pregnancy weight in maternal and perinatal health.

The findings may be true for urban women who use public health services and may not reflect urban women in general, some of whom may receive services from the private sector. Similar studies should be done on other women, such as those in the rural areas.

CONCLUSION

Strong correlation between perceived and actual weight among women in this study reassured that weight perception can be used more confidently in the future. It is a good measure but existence and sources of outliers for this population had been identified and can come from groups those we least expect to give large difference or error.

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DISCLOSURE STATEMENT

There are no conflicts of interest to declare.

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