

Nurses' misperceptions of weight status associated with their body weight, demographics and health status

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Abstract

Objective: To assess the agreement between self-perceived weight status and BMI status, calculated from self-reported height and weight, in nurses and to evaluate the relationship between weight status misperceptions and personal body weight, demographics and health status.

Design: Cross-sectional questionnaire survey.

Setting: A large university in London, UK.

Subjects: Four hundred and fifty-six student nurses and 588 qualified nurses attending university were surveyed; 355 student nurses and 409 qualified nurses completed questionnaires representing a response rate of 78% and 70%, respectively.

Results: The respondents were mainly female (90.0%), 66.5% were white and their mean age was 31 years. Sixty-eight per cent of qualified nurses and 77% of student nurses correctly perceived their weight status. In logistic regression, (mixed) black ethnicity (OR = 2.53, 95% CI 1.01, 6.32), overweight by BMI (OR = 3.10, 95% CI 1.31, 7.33) and ≥ 3 family histories of obesity co-morbidities (OR = 2.51, 95% CI 1.04, 6.08) were significantly associated with misperceptions in the sample of student nurses, whereas overweight by BMI (OR = 5.32, 95% CI 2.66, 10.67) was the only significant variable in the sample of qualified nurses.

Conclusions: A substantial proportion of nurses misclassified their weight status. Nurses' misperception of weight status was related to their own BMI status, ethnic background and obesity-related family histories. Being aware of this may help nurses not only promote their own healthy weight, but also fulfil their public health role to practise weight management successfully with both patients and the public. While limitations of the sample mean that the study findings cannot be generalized, they do provide grounds for future larger-scale research.

Keywords

Weight status misperceptions
Weight perception
BMI
Nurses

Health promotion, i.e. the process of enabling people to increase control over and to improve their health, is an increasingly important role of nurses and other health professionals. Weight management is a frequent focus for health improvement and the extent to which health professionals correctly identify their own body weight status may indicate their ability to correctly identify the weight status of their patients. In particular, overweight or obese health professionals who fail to recognize their own weight status may do the same with patients.

The discrepancy between self-perceived weight and actual weight has been revealed by many studies of the lay population from different countries^(1–11). A nationally representative sample of the US adult population, the National Health Interview Survey (NHIS, 1991), reported that 29% of respondents misclassified their weight status relative to medical standards⁽¹⁾. Subsequently, a series of

National Health and Nutrition Examination Surveys (NHANES)^(2,3,7,10,11) found that weight misperception had been highly prevalent in the US population, with the latest evidence from NHANES 2003–2008⁽¹¹⁾ finding that 23% of overweight women and 48% of overweight men perceived themselves as having the right weight. Similar results were observed in two nationally representative surveys from the UK, conducted in 1999 and in 2007⁽⁸⁾, which showed that 19% and 25% of overweight and obese people inaccurately perceived themselves to be of normal weight. Also, a randomly selected sample of Greek adults confirmed that the proportion of true positives for correct obesity identification was 62%⁽⁴⁾. Consistent with the above findings from Western countries, the prevalence of misperception of weight status in East Asian samples has become evident from recent studies. The MY Health Up study conducted in Japan in 2004

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found that the percentage of inaccurate weight perception was 39% in men and 46% in women⁽⁵⁾. This latter finding is very similar to that of the 2001 Seoul Citizens Health Indicator Survey (SCHIS) in South Korea, which found that 43% of women perceived their weight inaccurately⁽⁶⁾.

According to a cross-sectional survey of 1614 Chinese female undergraduates, inaccurate perception of weight status is more frequent in women who are underweight than in those who are of normal weight, 83% and 57% respectively⁽⁹⁾. Moreover, this disparity in inaccuracy of perception of body weight correlates with demographic and socio-economic variables. Generally, those who are female, younger, white, with a higher than average BMI, higher income or higher education are more likely to overestimate their body weight. In addition, individuals' occupation and health status may be related to weight status misperception^(1–5,10–15). For example, those in managerial or professional occupations were estimated to have lower odds of under-assessing their weight than those in other occupational groups, even after controlling for income and education⁽¹⁾.

It could be, of course, that the people surveyed in these studies feel that their weight is actually the 'right' weight and therefore there is no misperception on their part. This possibility should be considered especially in the light of research which shows that the health of those who are slightly overweight does not differ significantly from those of 'healthy' weight⁽¹⁶⁾ and also in the light of what is known about BMI and its tendency to overestimate weight status for those who are muscular⁽¹⁷⁾.

We are aware of only three published research reports which describe the accuracy of self-perceived weight status in health professionals^(18–20), and only one of these examined variables associated with health professionals' misperceptions of weight status. A cross-sectional survey of 355 US paediatricians reported that 49% of overweight paediatricians did not identify themselves as overweight; of the covariates examined, only gender and BMI influenced the odds of paediatricians misclassifying themselves as overweight⁽¹⁸⁾. Another study of a sample of 138 physicians found that 73% in the normal weight range accurately perceived their weight status and 76% of overweight or obese physicians perceived themselves as overweight⁽¹⁹⁾. A similar small study of nurses' weight perceptions found that fifteen out of thirty-three nurses (45%) accurately rated their weight categories compared with twelve out of sixty-nine members of the general public (17%)⁽²⁰⁾.

The research described in the current paper builds on previous studies to investigate (i) nurses' agreement between their self-perceived weight status and BMI status and (ii) the relationship between weight status misperception and personal body weight, demographics and health status. It investigates two research questions:

1. Is there agreement between nurses' perceived weight status and their estimated BMI status?

2. What demographic and other personal profile variables are associated with misperceptions of weight status?

Methods

Study design and participants

A cross-sectional survey was undertaken with a convenience sample of 456 student nurses (May–June 2010) and 588 qualified nurses (October–November 2010) attending one large university in London, UK. A self-report questionnaire was distributed to potential participants, who were recruited on a voluntary basis during scheduled class times. Individuals who self-reported pregnancy or breast-feeding were excluded from the study because of the possible impact of this on their perceived body weight. A total of 764 respondents (355 student nurses and 409 qualified nurses) completed questionnaires with a response rate of 73% (78% in student nurses; 70% in qualified nurses).

Study measures

The questionnaire included the following measures, the results of which we report in the current paper.

Sociodemographics

Included in the present analyses were gender, age, ethnicity, height and weight (for calculation of BMI as kg/m²), enrolment programme (only for student nurses), highest education qualification (only for qualified nurses), clinical speciality (only for qualified nurses), work place (only for qualified nurses) and years in practice (only for qualified nurses).

Weight status

This was assessed in two ways. (i) BMI status was calculated from self-reported weight and height data, which were used to categorize participants as underweight (BMI < 18.5 kg/m²), normal weight (18.5 ≤ BMI < 25.0 kg/m²), overweight (25.0 ≤ BMI < 30.0 kg/m²) or obese (BMI ≥ 30.0 kg/m²)⁽²¹⁾. (ii) Perceived weight status was collected using the question: 'How would you describe yourself: thin, normal, overweight or obese?'

Weight status misperceptions

This was defined as the difference between perceived weight status and BMI status. Two types of misperceptions were identified here: (i) underestimation and (ii) overestimation of weight status. Underestimation occurred when individuals' perceived weight status was less than their BMI status. Overestimation occurred when individuals' perceived weight status was more than their BMI status. In contrast to weight status misperceptions, correct perception occurred when individuals' perceived weight status was concordant with their BMI status.

Physical activity

Physical activity was measured by the General Practice Physical Activity Questionnaire (GPPAQ), a well-validated, seven-item, self-report measure⁽²²⁾. This generates a four-level Physical Activity Index (PAI) classifying participants into one of four categories: active, moderately active, moderately inactive or inactive. In the current analyses, two PAI categories ('moderately inactive' and 'inactive') were combined into one category ('inactive') because of a small number of cases.

Family histories of obesity co-morbidities

We collected histories of high blood pressure, hyperlipidaemia, stroke, CHD, diabetes, eating disorders, arthritis and cancer. Respondents were classified into one of three groups according to the number of obesity co-morbidities identified: 0, 1–2 or ≥ 3 .

Testing and reliability of the questionnaire

The questionnaire was pilot tested in two small samples, both of which were independent of the main study sample: fourteen qualified nurses were recruited to test the acceptability of the questionnaire and minor syntax and formatting modifications were made subsequently; and thirty-four qualified nurses were recruited to assess the test–retest reliability over a 2-week period.

Ethical approval

The study was approved by the Psychiatry, Nursing & Midwifery Ethics Committee of King's College London, London, UK.

Statistical analyses

All analyses were performed using the statistical software package SPSS for Windows version 17.0. Continuous variables are presented as means and standard deviations and were compared using *t* tests, while categorical variables are presented as frequencies and percentages and were compared using χ^2 tests.

The intra-class correlation coefficient (ICC) and 95% confidence interval were used to determine the test–retest reliability of the Likert scales in the questionnaire. Frequency distribution and κ statistics were calculated to assess the agreement between perceived weight status and BMI status. Binary logistic regression (Enter method) analysis was used to evaluate associations between weight status misperception and personal profile variables including gender, age, ethnicity, BMI, perceived weight, education background and health status. The 95% confidence intervals on the odds ratios for each category (as compared with the reference category) were calculated.

The data did not allow for the further analyses of overestimation and underestimation of weight status because of the relatively small number of over-assessors and under-assessors in the sample.

Results

Test–retest reliability for the measures

The test–retest reliabilities indicated satisfactory stability of the measures (Table 1). Test–retest reliability coefficients for self-reported weight, self-reported height and self-perceived weight status were 0.99, 0.98 and 0.97, respectively. The lowest ICC was 0.67 for the PAI of the GPPAQ.

Sample characteristics

The sample (Table 2) comprised mainly females (90.0%), 66.5% were white and their mean age was 31 years. Based on self-reported height and weight, the participants' mean BMI was 24.1 kg/m²; 20.4% were classified as overweight with 11.0% as obese, compared with 24.5% who perceived themselves to be overweight and 3.3% who perceived themselves to be obese. Nearly three-quarters of participants reported moderate (19.2%) or active (52.9%) exercise levels. Also, almost three-quarters of participants (74.1%) reported one or more co-morbidities of obesity in their family history. Regarding educational background, 68.0% of student nurses were enrolled in the general adult nursing programme; most of the qualified nurses had achieved a diploma (40.1%; which takes 2 years of full-time study) or a bachelor's degree (44.1%; which takes 3 years of study). In addition, most qualified nurses worked in hospitals (88.5%) within a variety of clinical specialties, and over half (61.0%) had more than 5 years of nursing experience.

Compared with the student nurses, the qualified nurses were significantly older (36.3 years *v.* 25.0 years) and heavier, either by actual weight (BMI) or by perceived weight. More ethnic diversity was observed in the qualified nurses than in the student nurses: 56.3%, 17.9% and 25.8% of the qualified nurses were white, (mixed) Asian and (mixed) black, respectively. Differences between the two sub-samples in physical activity levels and family histories of obesity co-morbidities were not significant. The remaining characteristics were measured only in qualified nurses.

In summary, the characteristics of the convenience sample were broadly similar to those of the population of student and qualified nurses studying or working in London. Both groups comprised predominantly women and were studying or working in adult general nursing

Table 1 Indices of test–retest reliability for the measures

	ICC	95% CI	<i>P</i>	Valid <i>n</i>
Self-reported weight	0.99	0.99, 1.00	<0.001	25
Self-reported height	0.98	0.96, 0.99	<0.001	30
Self-perceived weight status	0.97	0.94, 0.99	<0.001	31
PAI by GPPAQ	0.67	0.24, 0.85	0.005	25

ICC, intra-class correlation coefficient; PAI, Physical Activity Index; GPPAQ, General Practice Physical Activity Questionnaire.

Table 2 Sample characteristics: student nurses and qualified nurses attending a large university in London, UK, 2010

Characteristic	Student nurses		Qualified nurses		All		Total <i>n</i>	<i>P</i>
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Gender								
Female	318	91.4	354	88.7	672	90.0	747	0.228
Male	30	8.6	45	11.3	75	10.0		
Age (years)								
Mean		24.95		36.30		30.92	724	<0.001
sd		6.75		9.04		9.83		
Age group								
≤21 years	135	39.4	4	1.0	139	19.2	724	<0.001
22–31 years	157	45.8	111	28.1	268	37.0		
32–41 years	38	11.1	149	39.1	187	25.8		
≥42 years	13	3.8	117	30.7	130	18.0		
Ethnicity								
White	263	78.5	220	56.3	483	66.5	726	<0.001
Asian and mixed Asian	30	9.0	70	17.9	100	13.8		
Black and mixed black	42	12.5	101	25.8	143	19.7		
BMI (kg/m ²)								
Mean		23.05		24.97		24.07	662	<0.001
sd		4.07		4.78		4.56		
BMI status								
BMI < 18.5 kg/m ²	24	7.7	14	4.0	38	5.7	662	<0.001
18.5 ≤ BMI < 25.0 kg/m ²	220	70.3	196	56.2	416	62.8		
25.0 ≤ BMI < 30.0 kg/m ²	46	14.7	89	25.5	135	20.4		
BMI ≥ 30.0 kg/m ²	23	7.3	50	14.3	73	11.0		
Perceived weight status								
Thin	26	7.7	13	3.4	39	5.4	721	<0.001
Normal	240	71.0	241	62.9	481	66.7		
Overweight	61	18.0	116	30.3	177	24.5		
Obese	11	3.3	13	3.4	24	3.3		
Physical activity level								
Inactive	78	26.0	99	29.6	177	27.9	635	0.094
Moderately active	50	16.7	72	21.5	122	19.2		
Active	172	57.3	164	49.0	336	52.9		
Family histories of obesity co-morbidities								
None	85	25.8	99	26.1	184	26.0	709	0.852
1–2	145	43.9	159	42.0	304	42.9		
≥3	100	30.3	121	31.9	221	31.2		
Student nurse programme								
Adult nursing	236	68.0	–	–	–	–	347	–
Mental health nursing	57	16.4	–	–	–	–		
Child nursing	54	15.6	–	–	–	–		
Highest education								
Dip HE	–	–	149	40.1	–	–	372	–
Bachelor degree	–	–	164	44.1	–	–		
PG Dip	–	–	17	4.6	–	–		
Masters or higher	–	–	24	6.5	–	–		
Others	–	–	18	4.8	–	–		
Specialities								
Medical	–	–	160	44.0	–	–	364	–
Surgery	–	–	73	20.1	–	–		
Mental health	–	–	24	6.6	–	–		
Paediatrics	–	–	41	11.3	–	–		
Midwifery	–	–	18	4.2	–	–		
Others	–	–	48	13.9	–	–		
Work place								
Hospital	–	–	322	88.5	–	–	364	–
Community	–	–	42	11.5	–	–		
Years in practice								
Mean	–	–	–	9.95	–	362	–	–
sd	–	–	–	8.06	–	–	–	–
Years in practice groups								
≤5.0	–	–	141	39.0	–	–	362	–
5.1–10.0	–	–	92	25.4	–	–		
10.1–15.0	–	–	53	14.6	–	–		
>15.0	–	–	76	21.0	–	–		

Dip HE, diploma of higher education; PG Dip, postgraduate diploma.

Total numbers may not add to 762 because not all respondents completed all items.

Table 4 Variables correlated to weight status misperception in student nurses and qualified nurses attending a large university in London, UK, 2010

Variable	Misperceptions of weight status					
	Student nurses			Qualified nurses		
	<i>n</i>	%	<i>P</i>	<i>n</i>	%	<i>P</i>
Gender						
Female	60	21.5	0.046	92	30.5	0.041
Male	11	37.9		19	46.3	
Age group						
≤21 years	29	24.4	0.003	0	0.0	0.020
22–31 years	24	16.8		24	22.9	
32–41 years	10	28.6		43	33.1	
≥42 years	6	66.7		40	41.2	
Ethnicity						
White	47	19.6	0.018	54	27.0	0.007
Asian and mixed Asian	7	25.9		17	29.8	
Black and mixed Black	13	41.9		37	46.3	
BMI status						
BMI < 25.0 kg/m ²	39	16.3	<0.001	34	16.3	<0.001
BMI ≥ 25.0 kg/m ²	33	47.8		78	56.9	
Perceived weight status						
Non-overweight	46	18.6	<0.001	56	24.3	<0.001
Overweight	26	41.9		56	48.7	
Physical activity level						
Inactive	18	26.5	0.509	37	40.2	0.244
Moderately active	9	20.0		20	29.9	
Active	32	19.8		45	30.6	
Family histories of obesity co-morbidities						
None	11	14.3	0.096	29	33.3	0.924
1–2	35	26.7		45	31.5	
≥3	23	25.8		36	33.6	
Student nurse programme						
Adult nursing	44	21.3	0.521	–	–	
Mental health nursing	15	28.3				
Child nursing	12	25.0				
Highest education						
Dip HE	–	–		48	35.3	0.376
Bachelor degree				45	31.3	
PG Dip				4	25.0	
Masters or higher				4	18.2	
Others				8	44.4	
Specialities						
Medical	–	–		43	29.7	0.454
Surgery				20	30.8	
Mental health				9	40.9	
Paediatrics				12	32.4	
Midwifery				8	44.4	
Others				18	43.9	
Work place						
Hospital				96	33.1	0.935
Community				12	32.4	
Years in practice groups						
≤5.0	–	–		36	29.0	0.435
5.1–10.0				27	33.3	
10.1–15.0				21	42.0	
>15.0				23	32.4	

Dip HE, Diploma of higher education; PG Dip, postgraduate diploma.

misperceptions at significant levels of $P < 0.05$ in the sub-sample of student nurses, whereas overweight by BMI (OR = 5.32, 95% CI 2.66, 10.67) was identified as the only significant variable in the sub-sample of qualified nurses. We did not find weight status misperceptions to be associated with perceived weight status in either of the two sub-samples. Neither gender nor age was associated with weight status misperceptions in either sub-sample.

Discussion

The present study investigated the agreement between self-perceived weight and BMI based on self-reported weight and height in a sample of predominantly female, white nurses attending a London university in the UK. Overall, about one in four student nurses and one in three qualified nurses misperceived their own weight status, in

Table 5 Predictors of weight status misperceptions through logistic regression modelling (Enter method) in student nurses and qualified nurses attending a large university in London, UK, 2010

Variable	Student nurses (n 286)			Qualified nurses (n 329)		
	OR	95% CI	P	OR	95% CI	P
Gender						
Male	1.77	0.65, 4.81	0.265	1.81	0.84, 3.90	0.131
Female	1.00	Ref.		1.00	Ref.	
Age group						
≤21 years	0.32	0.06, 1.75	0.190	–	–	
22–31 years	0.20	0.04, 1.10	0.064	0.67	0.34, 1.33	0.254
32–41 years	0.34	0.06, 2.04	0.237	0.70	0.38, 1.29	0.252
≥42 years	1.00	Ref.		1.00	Ref.	
Ethnicity						
Asian and mixed Asian	1.34	0.46, 3.94	0.593	1.40	0.66, 2.96	0.383
Black and mixed Black	2.53	1.01, 6.32	0.047	1.43	0.76, 2.71	0.267
White	1.00	Ref.		1.00	Ref.	
BMI status						
BMI < 25.0 kg/m ²	3.10	1.31, 7.33	0.010	5.32	2.66, 10.67	<0.001
BMI ≥ 25.0 kg/m ²	1.00	Ref.		1.00	Ref.	
Perceived weight status						
Overweight	1.28	0.52, 3.17	0.589	1.16	0.58, 2.30	0.677
Non-overweight	1.00	Ref.		1.00	Ref.	
Family histories of obesity co-morbidities						
≥3	2.51	1.04, 6.08	0.041	–	–	
1–2	2.06	0.91, 4.65	0.082			
None	1.00	Ref.				

Ref., referent category.

that there was a substantial discrepancy between their self-perceived weight status and their BMI status based upon self-reported weight and height. Moreover, weight status misperception resulted mainly from underestimating their body weight. Most obese nurses did not distinguish between being overweight or obese, while most underweight nurses inappropriately classified themselves as of normal weight.

When compared with the data from the three studies of weight status misperception in health professionals^(18–20), the percentage of correct classification (67.5%) was higher in our sample of qualified nurses than in those surveyed in Tonga (45.5%)⁽²⁰⁾. Within the overweight and obese categories, 69.3% of our respondents correctly identified their weight status; higher than a sample of overweight US paediatricians (51%)⁽¹⁸⁾, but lower than a sample of overweight Mexican physicians (76%)⁽¹⁹⁾.

Overall the correct rate of perceived weight status by our student and qualified nurses appeared no better than that in the lay population. Among all BMI categories, 73.6% and 71.0% of participants accurately classified their own weight status according to the NHANES 1999–2006⁽¹⁰⁾ and the 1991 NHIS⁽¹⁾, respectively. This is consistent with 72.5% of women and 70.2% of men in the NHANES study⁽²⁾. Among the overweight and obese categories, two representative surveys in the UK in 1999 and 2007⁽⁸⁾ found that 81% and 75% of overweight participants (BMI ≥ 25.0 kg/m²) correctly identified their weight status.

The different prevalence of weight status misperception described by these studies may be explained by diversity in sample characteristics, such as age, gender, race/ethnicity and personal weight levels, which are

known to influence self-perceived weight appropriateness. Another probable reason was the use of different weight descriptors and the number of categories listed by these studies. Differences between the findings of our study and previous studies may be explained, in part, by differences in methodology across studies. Our participants were asked to select from four weight status categories (thin, normal, overweight, obese) as opposed to the three categories used by the NHANES studies (overweight, about right, underweight)^(2,7,10,11) and the three categories used by a study of US paediatricians (thin, average, overweight)⁽¹⁸⁾. We chose four categories to see if nurses were able to distinguish between overweight and obese categories. Additionally, the 'normalizing' of overweight in relation to an increasing prevalence of overweight or obesity over time may account for fewer overweight and obese individuals identifying themselves as overweight^(2,7,8,10,11,25). Desired weight has also increased over time in the USA⁽²⁶⁾, and nurses' underestimation of their body weight, which accounted for a large proportion of misperception in the present study, may reflect an upward trend in weight status misperception. Other potential reasons for the high percentage of misclassification among health professionals could be the desire to appear as role models, which may make either doctors or nurses reluctant to label themselves as overweight or obese.

Independent variables associated with weight status misperception

The findings from the present study further suggest that nurses' misperception of weight status varies by gender,

age, race/ethnicity, BMI status and perceived weight status, which is consistent with findings of studies of lay public samples^(3,4,10,13). In both the qualified and student nurses, those who were male, (mixed) black, older than average age, with a BMI ≥ 25.0 kg/m² or self-perceived overweight were more likely to misperceive their weight status. Of all covariates examined, race/ethnicity, BMI and obesity-related family histories independently influenced the odds of misperceptions of weight status among nurses. In contrast, a study of a sample of 355 US paediatricians found that only gender and BMI were independent predictors for misclassification of overweight status⁽¹⁸⁾.

There were some differences in predictors for misperceptions of weight status between the student and qualified nurse sub-samples. Among student nurses, the (mixed) blacks were more likely to misperceive their weight status than whites, as were those with three or more family histories of obesity co-morbidities relative to those without any related family history. In contrast, race/ethnicity and family histories did not independently predict misperceptions of weight status among qualified nurses. It is worth noting that BMI status was the most important predictor in the two sub-samples; that is, both student nurses and qualified nurses with BMI ≥ 25.0 kg/m² had more frequent misperception of their own weight status.

Ours is the first known study to evaluate the relationship between weight status misperception and family histories of obesity co-morbidities, with an interesting finding that student nurses with three or more family histories of obesity co-morbidities were more likely to misperceive their weight status than their counterparts without any family history. The reason for this is unclear but one possible explanation is that when family histories of obesity co-morbidities are present, fear of being labelled 'obesity prone' or 'unhealthy' may increase the motivation to deny being overweight.

No associations were found between weight status misperception and personal physical activity levels, education and work experiences. Regarding personal physical activity levels, the findings of our study contrast those of Miller *et al.*⁽²⁷⁾ that active overweight individuals may be more likely to incorrectly perceive themselves as being of normal weight. As for education variables (nurse programme or highest educational qualification), our findings differ from previous studies of the lay population^(1,10), which have revealed that education has a significant independent effect on the misperception of weight status. All work experience variables (specialty, work places and years in practice) were not associated with weight status misperceptions, in line with a study of paediatricians by Perrin *et al.*⁽¹⁸⁾. This is unsurprising since identification of body weight should be one of the basic skills of nurses, irrespective of their educational level and work experiences.

Prevalence of overweight and obesity among the nurses investigated

Finally, 22.0% of the student nurses and 39.8% of the qualified nurses surveyed were overweight or obese, which is less than the UK population's average of 42.7% in 1999 and 52.9% in 2007^(8,28,29). It is also substantially less than the 65% of men and levels in other health professional groups. For example, a survey of eleven European national colleges (*n* 2082) found that 31.76% of general practitioners were overweight and 7.13% were obese⁽³⁰⁾; similarly, Perrin *et al.* that found 40% of paediatricians were overweight⁽¹⁸⁾.

Strengths and limitations

The present study is the first known to examine nurses' misperceptions of weight status associated with socio-demographic characteristics and health status and to compare findings for student nurses and qualified nurses. Our sample size is close to that of a study of US paediatricians by Perrin *et al.*⁽¹⁸⁾ and is the largest among the relevant studies of qualified nurses or university students studying health-related courses^(15,20,31–33). Moreover, in addition to frequently investigated sociodemographic variables, our study is the first to investigate the influence of family histories of obesity co-morbidities on the misperception of weight status.

Our cross-sectional study has several limitations. A limitation is the use of a convenience sample from a single university, which may have introduced bias through selective recruitment of nurses with particular views and interest in the subject. In addition, the sample included a very small subgroup of males, those of older age and non-white race, which limits detection of differences in weight misperception by gender, age and race/ethnicity and also means that the findings of the study should not be generalized. A further limitation is possible biases from missing responses. Missing value analysis demonstrated that the data were not missing completely at random. Female, self-perceived overweight and non-white race were variables that were closely related to missing responses, which might result in an underestimate of the impact of demographic factors on the misclassification of weight status. Like many studies, our study is also limited by calculation of BMI from self-reported weight and height, variables which have been demonstrated to be under- and over-reported respectively in previous studies^(34,35) although a satisfactory test-retest reliability of the measures was confirmed in our study.

Conclusions

The present study is limited by its sample which was drawn from a single London university, the great majority of whom were female and white. While the study findings

cannot be generalized, it contributes to the growing literature on the discrepancy between self-perceived weight and actual weight and highlights the need for further research, particularly in view of the increasingly important role played in health promotion by nurses and other health professionals in relation to obesity prevention.

We observed a substantial discrepancy between BMI and self-perceived weight status in both student and qualified nurses, particularly among the (mixed) blacks, the overweight (BMI ≥ 25.0 kg/m²) and those with three or more three family histories of obesity co-morbidities. Further research is needed to identify variables associated with underestimating or overestimating weight status among nurses and to further explore the impact of such misperceptions on nurses' approach to weight problems in practice; for instance, whether nurses' misperception of their own body weight is associated with their identification of overweight patients.

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References

1. Chang V & Christakis N (2001) Extent and determinants of discrepancy between self-evaluations of weight status and clinical standards. *J Gen Intern Med* **16**, 538–543.
2. Chang VW & Christakis NA (2003) Self-perception of weight appropriateness in the United States. *Am J Prev Med* **24**, 332–339.
3. Bennett G & Wolin K (2006) Satisfied or unaware? Racial differences in perceived weight status. *Int J Behav Nutr Phys Act* **3**, 40.
4. Yannakoulia M, Panagiotakos DB, Pitsavos C *et al.* (2006) Correlates of BMI misreporting among apparently healthy individuals: the ATTICA Study. *Obesity (Silver Spring)* **14**, 894–901.
5. Inoue M, Toyokawa S, Miyoshi Y *et al.* (2007) Degree of agreement between weight perception and body mass index of Japanese workers: MY Health Up Study. *J Occup Health* **49**, 376–381.
6. Kim D-S, Kim H-S, Cho Y *et al.* (2008) The effects of actual and perceived body weight on unhealthy weight control behaviors and depressed mood among adult women in Seoul, Korea. *J Prev Med Public Health* **41**, 323–330.
7. Johnson-Taylor W, Fisher R, Hubbard V *et al.* (2008) The change in weight perception of weight status among the overweight: comparison of NHANES III (1988–1994) and 1999–2004 NHANES. *Int J Behav Nutr Phys Act* **5**, 9.
8. Johnson F, Cooke L, Croker H *et al.* (2008) Changing perceptions of weight in Great Britain: comparison of two population surveys. *BMJ* **337**, a494.
9. Zhang Xin-Ding, Wu H & Ting Z (2008) Research and analysis of female undergraduates' fat cognition and weight-loss behavior. *Matern Child Health Care China* **23**, 3017–3019.
10. Dorsey RR, Eberhardt MS & Ogden CL (2009) Racial/ethnic differences in weight perception. *Obesity (Silver Spring)* **17**, 790–795.
11. Yaemsiri S, Slining MM & Agarwal S (2011) Perceived weight status, overweight diagnosis, and weight control among US adults: the NHANES 2003–2008 Study. *Int J Obes (Lond)* **35**, 1063–1070.
12. Wong Y & Huang Y (1999) Obesity concerns, weight satisfaction and characteristics of female dieters: a study on female Taiwanese college students. *J Am Coll Nutr* **18**, 194–200.
13. Paeratakul S, White MA, Williamson DA *et al.* (2002) Sex, race/ethnicity, socioeconomic status, and BMI in relation to self-perception of overweight. *Obes Res* **10**, 345–350.
14. Gregory C, Blanck H, Gillespie C *et al.* (2008) Health perceptions and demographic characteristics associated with underassessment of body weight. *Obesity (Silver Spring)* **16**, 979–986.
15. Jaworowska A & Bazylak G (2009) An outbreak of body weight dissatisfaction associated with self-perceived BMI and dieting among female pharmacy students. *Biomed Pharmacother* **63**, 679–692.
16. Auyeung TW, Lee JSW, Leung J *et al.* (2010) Survival in older men may benefit from being slightly overweight and centrally obese – a 5-year follow-up study in 4,000 older adults using DXA. *J Gerontol A Biol Sci Med Sci* **65A**, 99–104.
17. Rothman KJ (2008) BMI related errors in the measurement of obesity. *Int J Obes (Lond)* **32**, Suppl. 3, S56–S59.
18. Perrin EM, Flower KB & Ammerman AS (2005) Pediatricians' own weight: self-perception, misclassification, and ease of counseling. *Obes Res* **13**, 326–332.
19. Jiménez-Cruz A & Bacardí-Gascón M (2006) Perception of overweight by Mexican physicians and teachers. *Diabetes Care* **29**, 1983.
20. Kirk SFL, Cockbain AJ & Beazley J (2008) Obesity in Tonga: a cross-sectional comparative study of perceptions of body size and beliefs about obesity in lay people and nurses. *Obes Res Clin Pract* **2**, 35–41.
21. National Institute for Health and Clinical Excellence (2006) *Obesity: Guidance on the Prevention, Identification, Assessment and Management of Overweight and Obesity in Adults and Children*. NICE Clinical Guideline no. 43. London: NICE.
22. Physical Activity Policy, Health Improvement Directorate (2009) *The General Practice Physical Activity Questionnaire (GPPAQ). A Screening Tool to Assess Adult Physical Activity Levels, Within Primary Care*. London: Department of Health.
23. Landis JR & Koch GG (1977) The measurement of observer agreement for categorical data. *Biometrics* **33**, 159–174.
24. Carletta J (1996) Assessing agreement on classification tasks: the kappa statistic. *Comput Linguist* **22**, 249–254.
25. Burke MA, Heiland FW & Nadler CM (2010) From 'overweight' to 'about right': evidence of a generational shift in body weight norms. *Obesity (Silver Spring)* **18**, 1226–1234.
26. Maynard LM, Serdula MK, Galuska DA *et al.* (2006) Secular trends in desired weight of adults. *Int J Obes (Lond)* **30**, 1375–1381.

27. Miller E, Schulz M, Bibeau D *et al.* (2008) Factors associated with misperception of weight in the stroke belt. *J Gen Intern Med* **23**, 323–328.
28. NHS Information Centre (2008) *Health Survey for England 2007 – Healthy Lifestyles: Knowledge, Attitudes and Behaviour*. Leeds: NHS Information Centre for Health and Social Care.
29. Cross-Government Obesity Unit (2009) *Healthy Weight, Healthy Lives: One Year On*. London: Department of Health.
30. Brotons C, Bjorkelund C, Bulc M *et al.* (2005) Prevention and health promotion in clinical practice: the views of general practitioners in Europe. *Prev Med* **40**, 595–601.
31. Requejo A, Ortega R, Quintas E *et al.* (1997) The control of body weight in young Spanish women: are they over-concerned? *Nutr Res* **17**, 439–449.
32. Kiefer I, Leitner B, Bauer R *et al.* (2000) Body weight: the male and female perception. *Soz Präventivmed* **45**, 274–278.
33. Malinauskas B, Raedeke T, Aeby V *et al.* (2006) Dieting practices, weight perceptions, and body composition: a comparison of normal weight, overweight, and obese college females. *Nutr J* **5**, 11.
34. Stewart AW, Jackson RT, Ford MA *et al.* (1987) Underestimation of relative weight by use of self-reported height and weight. *Am J Epidemiol* **125**, 122–126.
35. Nieto-García FJ, Bush TL & Keyl PM (1990) Body mass definitions of obesity: sensitivity and specificity using self-reported weight and height. *Epidemiology* **1**, 146–152.