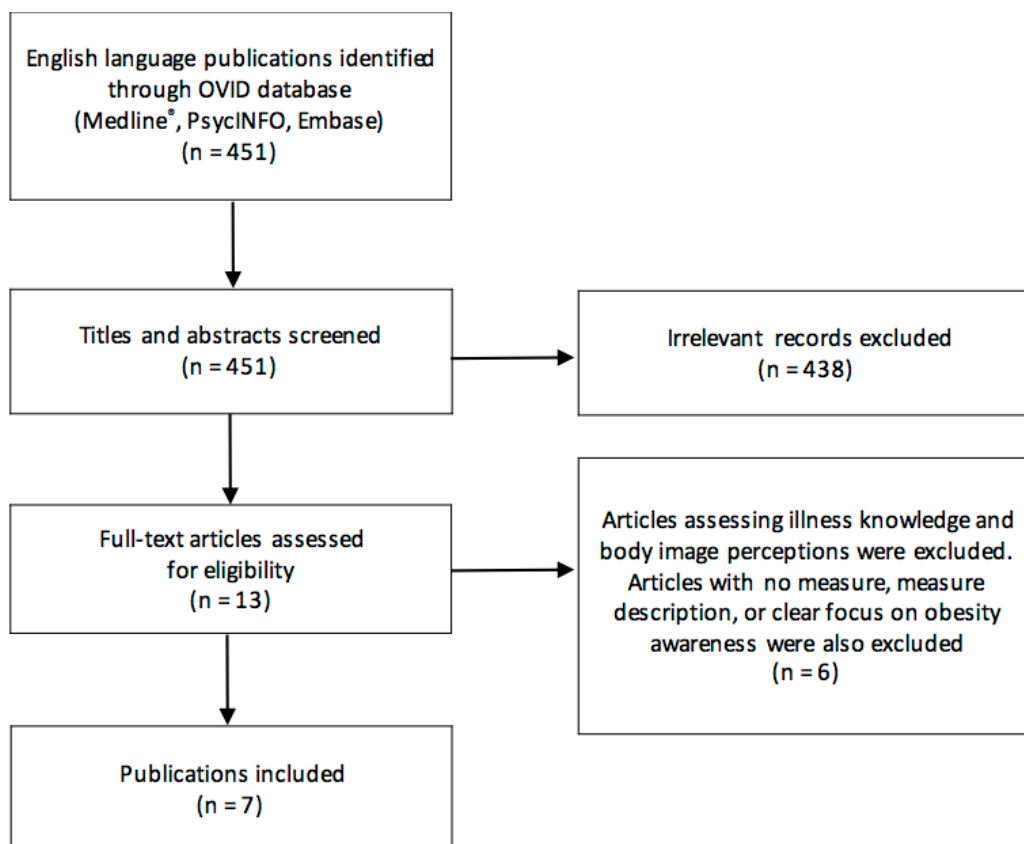


Supplemental Materials

Supplemental Material 1. Systematic OVID database (Medline[®], PsycINFO, and Embase) search methodology for reviewing the measures of impaired illness awareness in obesity



Measures of Obesity Awareness	Authors, Year, Journal	Illness Awareness Domains			
		General Illness Awareness	Symptom Attribution	Awareness of Need for Treatment	Awareness of Negative Consequences
B-IPQ	Broadbent <i>et al.</i> , 2006, J Psychosom Res	X e.g., "How concerned are you about your illness?"	X e.g., "How much do you experience symptoms from your illness?"	X e.g., "How much do you think your treatment can help your illness?"	X e.g., "How much does your illness affect your life?"
B-IPQ (Adapted Version)	den Engelsen <i>et al.</i> , 2015, BMC Public Health	X e.g., "How concerned are you about your overweight?"	X e.g., "How much do you experience symptoms from your overweight?"	X e.g., "How much do you think physical activity can help to improve your overweight?"	X e.g., "How much does your overweight affect your life?"
"A Study on Body-Weight Perception..."	Agrawal <i>et al.</i> , 2014, Public Health Nutr	X e.g., "How do you feel about your current weight?"		X e.g., "If given a chance, would you prefer to reduce your weight or increase your weight or maintain as it is?"	
"Do Weight Perceptions Among Obese Adults in Great Britain..."	Johnson <i>et al.</i> , 2014, BMJ Open	X e.g., "Select a descriptor for [your] own body weight from the following list of options: very underweight, underweight, about right, overweight, very overweight"			
"Ethnic Differences in the Self-Recognition of Obesity..."	Sivalingam <i>et al.</i> , 2011, J Gen Intern Med	X e.g., "Do you think you are obese?"	X e.g., "Does your weight limit your physical activity?"	X e.g., "Would you be interested in medical treatment for obesity, if offered by your doctor?"	X e.g., "Do you feel that your weight has affected your health?"
"The Perception of Obese Persons"	Okselet <i>et al.</i> , 2015, Holistic Nursing Practice	X e.g., "How would you describe yourself?"	X e.g., "Does your weight affect your daily life?"	X e.g., "Have you ever consulted a doctor about your obesity?"	X e.g., "Do you think your weight is a threat to your health?"
"Overweight and Obese Adults Have Low Intentions..."	Tolet <i>et al.</i> , 2014, BMC Public Health	X e.g., "To what extent do you agree with 'I am too heavy'?"		X e.g., "Do you plan to start losing weight?"	
"Do the Obese Know They Are Obese?"	Truesdale <i>et al.</i> , 2008, North Carolina Medical Journal	X e.g., "Would you consider yourself now [underweight, normal weight, overweight, or obese]?"			

B-IPQ, *Brief Illness Perception Questionnaire*.

Supplemental Material 3. Description of findings from each study identified through systematic review

The Brief Illness Perception Questionnaire, B-IPQ.(1) The psychometrically validated B-IPQ is a shorter version of the Illness Perception Questionnaire–Revised (IPQ-R).(2) It consists of 8 items rated on a 10-point scale, which assess illness perceptions, including: consequences, timeline, personal control, treatment control, symptom identity, concern, emotional response, and understanding of the illness. B-IPQ was psychometrically tested in a number of chronic illnesses, demonstrating good predictive, concurrent, and discriminant validity, and test-retest reliability.(1, 3) B-IPQ partially assesses all four illness awareness domains; however, the scale items are not specific to obesity.

Although not validated for use in these populations, B-IPQ was used in three studies of overweight/obese individuals. In a cross-sectional study, B-IPQ was employed to examine self-esteem and its relationship with self-efficacy and illness perception in persons with morbid obesity and chronic obstructive pulmonary disease.(3) In obese participants, higher self-esteem was associated with less negative emotional response to illness, shorter perceived timeline of the illness, and higher self-efficacy. In a second study, the same sample was used to examine illness perception trajectories in relation to illness education classes provided over a 1-year period.(4) The authors found that obese participants perceived fewer illness consequences, shorter illness timeline, fewer symptoms, less concern, and less emotional response in relation to increased personal control following the education courses. However, no changes were observed in the understanding of illness. It is unclear whether B-IPQ items were tailored for use in the above studies. In a third study, an adapted version of B-IPQ that modified treatment control and understanding items, was administered to assess obesity perception between obese adults with or without cardiometabolic risk or weight loss over 3-years.(5) Participants who were no longer obese at follow-up

experienced greater personal control over their weight and perceived their obesity to be of shorter duration. Interestingly, none of the groups reportedly considered their obesity to be very serious.

“A Study on Body-Weight Perception...”(6) This survey, administered in the form of a structured interview, was developed to understand participants’ self-perception of body weight, intention for obesity management, and actual weight management pursuits among normal weight, overweight, and obese women in India.(6) The survey consists of Yes/No and multiple-choice items that partially cover *General Illness Awareness* and *Awareness of Need for Treatment* domains. Self-perception of body weight and weight-management behavior were positively associated with participants’ BMI status, education, and media exposure (i.e., how frequently one reads the newspaper) after controlling for socioeconomic status and demographic factors.

“Do Weight Perceptions Among Obese Adults...”(7) This survey, administered in the form of a structured interview, was developed to understand self-perception of weight status among obese adults in Great Britain and identify factors associated with accurate perceptions.(7) The survey consists of Yes/No, multiple-choice, and open-ended questions. It partially assesses the *General Illness Awareness* domain. A regression analysis found that self-perceived weight was positively associated with both BMI and knowledge about BMI (i.e., “Do you know what BMI is considered to be obese?”).

“Ethnic Differences in the Self-Recognition of Obesity...”(8) This self-report questionnaire consists of 31 items designed to assess beliefs about obesity among white, African-American, and Hispanic [sic] adults in the United States.(8) The questionnaire mainly consists of Yes/No and True/False questions. It partially assesses all illness awareness domains. A regression analysis found ethnic-based discrepancies in self-recognition of obesity. Specifically, whites (75%) were more likely to self-report obesity than African-American (44%) and Hispanics (58%); however, these differences disappeared with

BMI>35kg/m². Additionally, self-recognition of obesity was associated with higher BMI, but not education level, employment status, or age.

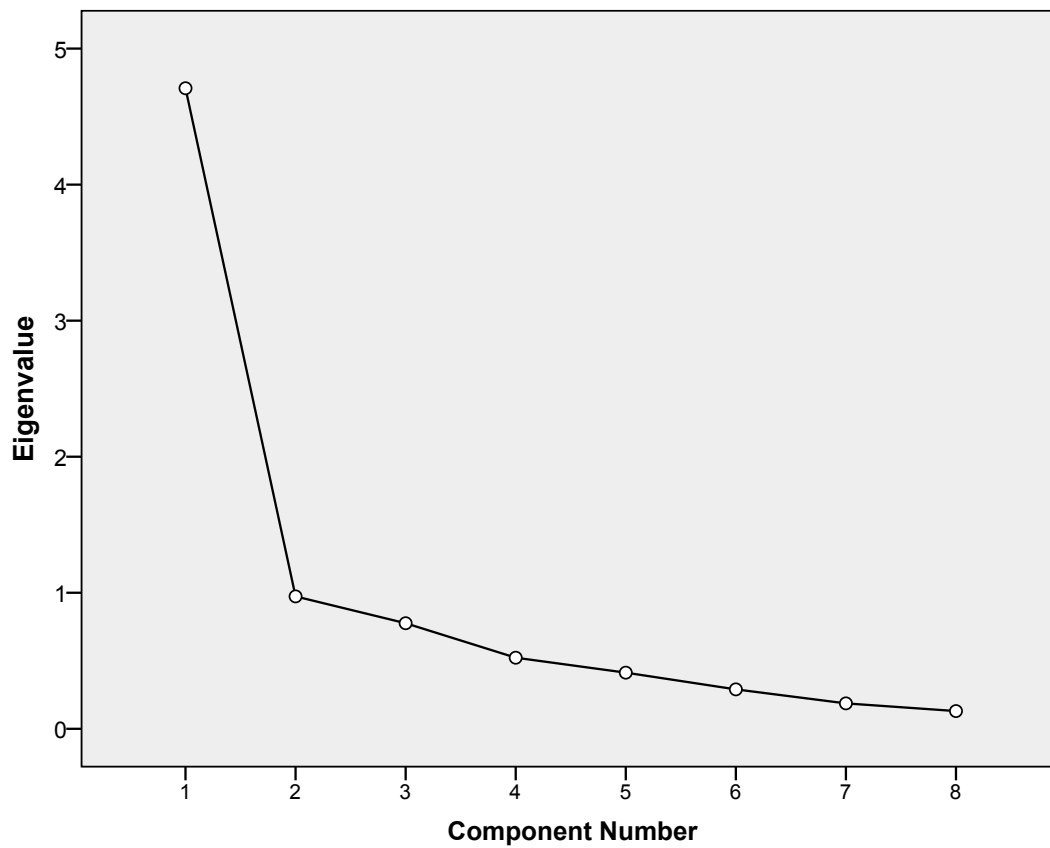
“The Perception of Obese Persons”.(9) This 22-item questionnaire administered in the form of a structured interview was developed to evaluate obesity perceptions in obese adults.(9) Seven items were related to obesity perceptions, with four Yes/No, and three multiple-choice items. The questionnaire partially assesses all illness awareness domains. A significant difference was reported between self-perception of obesity and BMI. That is, a large proportion of participants perceived they weighed less than their actual weight. The study also found no association between BMI and awareness of the negative consequences of excess weight.

“Overweight and Obese Adults Have Low Intentions...”.(10) This online self-administered questionnaire was developed to examine the factors that influence weight management help-seeking behavior among overweight/obese persons with increased weight-related health risks. The questionnaire assesses sociodemographic, general health information, self-perception of body weight, intention to lose weight, and perceptions of advice from health professionals (10). It consists of 18 multiple-choice and Likert-type items. However, only one item was created for each of the *General Illness Awareness* and *Awareness of Need for Treatment* domains. The study revealed an association between accurate weight perception and intention to lose weight among obese persons with mild/moderate weight-related health risks.

“Do the Obese Know They Are Obese?”.(11) This self-report questionnaire was developed to assess the accuracy of weight perception among adults in North Carolina, with categories ranging from underweight to obese.(11) The self-administered 5-item questionnaire contains a single multiple-choice item that assesses the *General Illness Awareness* domain. The study revealed an underestimation of BMI: 10.5%

of overweight women and 42.9% of overweight men considered themselves normal weight, and 22.2% of obese women and only 6.7% of obese men correctly identified as being obese.

Supplemental Material 4. Scree plot displaying eigenvalues for OASIS



Supplemental Material 5. Obesity education provided prior to administration of scale

WHAT IS OBESITY?

Body Mass Index (BMI) is a measure that is typically used to see if an individual's weight is appropriate for his or her height. An individual will be categorized as overweight or obese based on the following BMI range:

- Normal weight: BMI between 18.5 and 24.9
- Overweight: BMI between 25 and 29.9
- Obese: BMI of 30 or greater

If an individual is overweight or obese, his/her weight is considered too heavy for his/her height.

WHAT ARE THE SYMPTOMS OF OBESITY?

Common symptoms of obesity include difficulties breathing (particularly with movement), trouble sleeping at night, regularly feeling fatigued or depressed, regularly having aches and pains, including chest pain, and occasionally losing control of one's bladder.

WHAT ARE THE CONSEQUENCES OF OBESITY?

Being obese increases a person's risk of developing several serious health issues, including diabetes, high blood pressure, high cholesterol, heart disease, stroke, asthma, sleep apnea, and cancer. Obesity may also contribute to a person dying younger than expected.

WHAT ARE THE TREATMENT OPTIONS FOR BEING OVERWEIGHT OR OBESE?

Lifestyle changes, including dietary modifications and increased physical activity, are important to losing weight. In severe obesity, for those who have not been able to lose weight through diet and exercise, medication and surgery are options.

References

1. Broadbent E, Petrie KJ, Main J, Weinman J. The brief illness perception questionnaire. *J Psychosom Res.* 2006;60(6):631-7.
2. Moss-Morris R, Weinman J, Petrie K, Horne R, Cameron L, Buick D. The Revised Illness Perception Questionnaire (IPQ-R). *Psychology & Health.* 2002;17(1):1-16.
3. Bonsaksen T, Fagermoen MS, Lerdal A. Factors associated with self-esteem in persons with morbid obesity and in persons with chronic obstructive pulmonary disease: a cross-sectional study. *Psychol Health Med.* 2015;20(4):431-42.
4. Bonsaksen T, Lerdal A, Fagermoen MS. Trajectories of illness perceptions in persons with chronic illness: An explorative longitudinal study. *J Health Psychol.* 2015;20(7):942-53.
5. den Engelsens C, Vos RC, Rijken M, Rutten GE. Comparison of perceptions of obesity among adults with central obesity with and without additional cardiometabolic risk factors and among those who were formally obese, 3 years after screening for central obesity. *BMC Public Health.* 2015;15:1214.
6. Agrawal P, Gupta K, Mishra V, Agrawal S. A study on body-weight perception, future intention and weight-management behaviour among normal-weight, overweight and obese women in India. *Public Health Nutr.* 2014;17(4):884-95.
7. Johnson F, Beeken RJ, Croker H, Wardle J. Do weight perceptions among obese adults in Great Britain match clinical definitions? Analysis of cross-sectional surveys from 2007 and 2012. *BMJ Open.* 2014;4(11):e005561.
8. Sivalingam SK, Ashraf J, Vallurupalli N, Friderici J, Cook J, Rothberg MB. Ethnic Differences in the Self-Recognition of Obesity and Obesity-Related Comorbidities: A Cross-Sectional Analysis. *Journal of General Internal Medicine.* 2011;26(6):616-20.
9. Oksel E, Gunduzoglu NC, Topcu S. The Perception of Obese Persons: Cross Cultural Considerations. *Holistic Nursing Practice.* 2015;29(4):225-31.
10. Tol J, Swinkels IC, De Bakker DH, Veenhof C, Seidell JC. Overweight and obese adults have low intentions of seeking weight-related care: A cross-sectional survey. *BMC Public Health.* 2014;14(1):582-.
11. Truesdale KP, Stevens J. Do the obese know they are obese? *North Carolina medical journal.* 2008;69(3):188-94.