

ABSTRACT

BACKGROUND: Obesity is associated with an increased risk of type 2 diabetes mellitus (T2DM). Obesity is objectively measured by body mass index (BMI). Body image can be subjectively assessed using the Figure Rating Scale. Because self-perception may influence health-related behavior, this study seeks to determine perception of body image in subjects with various levels of BMI. Based upon a literature review, the correlation between the self-perception of body image and BMI in individuals with and without T2DM has not been reported.

METHODS: Respondents (n = 13,887) to the US Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) 2006 survey reported their weight and height for BMI calculation. On the gender-specific Figure Rating Scale, respondents selected a figure most closely resembling their body image. Pearson correlation was computed between perceived body image and BMI for men and women separately. Comparisons of median BMI per figure between T2DM respondents and respondents without T2DM were made using t-tests.

RESULTS: The illustration below details the median BMI of respondents self-selecting a body image. Men with T2DM did not significantly differ from men without T2DM except at the extremes in body image (Figures 1, 2, and 9; p<0.05 for these figures). Women with T2DM had a significantly higher BMI for the same body image compared to women without T2DM, p<0.05 for all images (except Figures 11 and 18 were higher but p>0.05).

CONCLUSION: Objectively, many patients do not know their BMI. Subjectively, self-perceptions of body image may influence behavior. Patients with T2DM differ in their perception of body image compared with those without T2DM. These subjective differences may be a factor in the development of and influence the management of T2DM.

BACKGROUND

- The increase in body fat in the US population is increasing, with over 64% of the adult population classified as being overweight or obese¹

Increase in Prevalence (%) of Overweight (BMI > 25), Obesity (BMI ≥ 30) and Severe Obesity (BMI ≥ 40) Among U.S. Adults			
	Overweight (BMI ≥ 25)	Obesity (BMI ≥ 30)	Severe Obesity (BMI ≥ 40)
1999 to 2000	64.5	30.5	4.7
1988 to 1994	56.0	23.0	2.9
1976 to 1980	46.0	14.4	No Data

Source: CDC, National Center for Health Statistics, National Health and Nutrition Examination Survey, Health, United States, 2002. Flegal et al. JAMA. 2002;288:1723-7. NIH, National Heart, Lung, and Blood Institute, Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults, 1998.

- An increase in body fat often causes adipose tissue to become pathogenic (“adiposopathy”), and increases the risk of metabolic diseases such as type 2 diabetes mellitus (T2DM), hypertension, and dyslipidemia – all of which are major cardiovascular disease risk factors²⁻⁴
- Perception of body image may also influence health-related behaviors such as exercise and weight management
- Obesity is objectively measured by body mass index (BMI)
- Body image is subjectively assessed using the Figure Rating Scale⁵

STUDY OBJECTIVE

- Correlate the Figure Rating Scale images with various levels of BMI among individuals with and without diabetes mellitus

Perceived Body Image in Men and Women with Type 2 Diabetes Mellitus: Correlation of Figure Rating Scale with BMI

Harold E. Bays, MD¹, Debbra D. Bazata, RD², Kathleen M. Fox, PhD³, Susan Grandy, PhD⁴, James R. Gavin III, MD, PhD⁵, for the SHIELD Study Group

¹Louisville Metabolic and Atherosclerosis Research Center, Louisville, KY; ²St. Luke’s Primary Care South, Overland Park, KS; ³Strategic Healthcare Solutions, LLC, Monkton, MD;

⁴AstraZeneca LP, Wilmington, DE; ⁵Emory University School of Medicine, Atlanta, GA

METHODS

Study Design

- Data were derived from the Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD), a 5-year population-based survey conducted to better understand the risk for the development of diabetes mellitus, as well as disease burden
 - Survey responses for 211,097 adults from 127,420 households (64% response rate) were obtained, based upon a screening questionnaire mailed to 200,000 nationally representative households
 - A 64-item survey was sent to 22,001 selected individuals derived from the screening respondents. Since 2004, sequential (“longitudinal”) SHIELD surveys have captured self-reported information on health status, attitudes and behaviors, quality of life and anthropometry from this representative sample of the US population
- This investigation is a cross-sectional analysis of the relation between body image perception and BMI among SHIELD respondents to the 2006 survey (n = 13,877), which included the Figure Rating Scale

Study Population

- Respondents (n = 13,877) were categorized as having T2DM or no diabetes mellitus based upon self-report of having been told by a doctor, nurse or other healthcare professional of this diagnosis
 - T2DM was defined as a physician diagnosis of T2DM and age of onset >21 years of age
 - No diabetes mellitus was defined as no physician diagnosis of type 1, type 2, or gestational diabetes mellitus

Study Measures

- Self-report of height and weight were used to calculate BMI
 - BMI was calculated as weight/height² in kg/m²
- Body image was assessed using the Figure Rating Scale⁵
 - Figure Rating Scale consists of two gender-specific scales that contain nine schematic figures of women and nine figures for men, ranging from underweight to overweight
 - On the gender-specific scale, respondents selected a figure that most closely resembled their body image

Statistical Analyses

- Pearson correlation was computed between perceived body image and BMI for men and women separately
- Comparisons of median BMI per figure between respondents with T2DM and those with no diabetes mellitus were made using t-tests

RESULTS

- For men, 1,304 respondents had T2DM and 2,924 had no diabetes mellitus
- For women, 1,979 respondents had T2DM and 4,763 had no diabetes mellitus

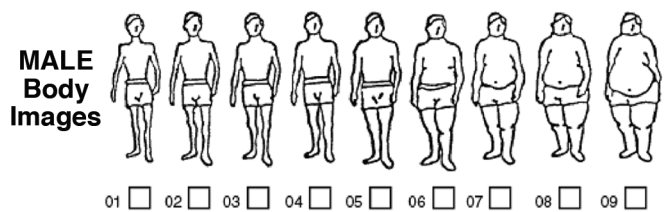
Table 1. Characteristics of SHIELD respondents with T2DM or no diabetes mellitus

Characteristics	T2DM (n = 3,283)	No diabetes mellitus (n = 7,687)
Age, years, mean (SD)	61.3 (12.3)*	55.5 (16.2)
Males, %	39.7	38.0
White, %	85.5*	89.0
Education, % with no more than a high school degree	35.2*	28.6
Income, % with <\$35,000	45.9*	34.9
BMI for men, mean (SD)	32.1 (7.1)*	30.1 (6.0)
BMI for women, mean (SD)	35.5 (9.0)*	30.4 (7.7)

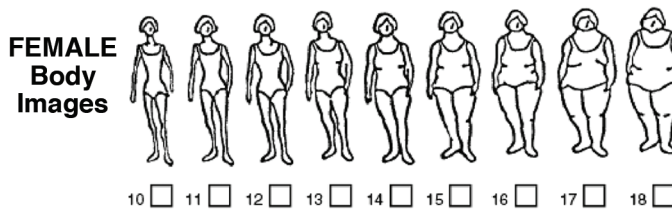
*p<0.001

- T2DM respondents had greater BMI, were older, had less education, and lower household incomes and were less likely to be white than respondents with no diabetes mellitus

Figure 1. Body image figures and median BMI for men and women with and without diabetes



T2DM BMI*:	24.7, (26)	23.4, (31)	23.6, (34)	25.1, (79)	27.8, (177)	29.6, (334)	33.0, (365)	37.4, (155)	44.5, (103)
No DM BMI*:	21.8, (60)	21.8, (111)	23.7, (141)	25.1, (232)	27.1, (546)	29.6, (761)	32.5, (754)	36.6, (225)	40.4, (94)

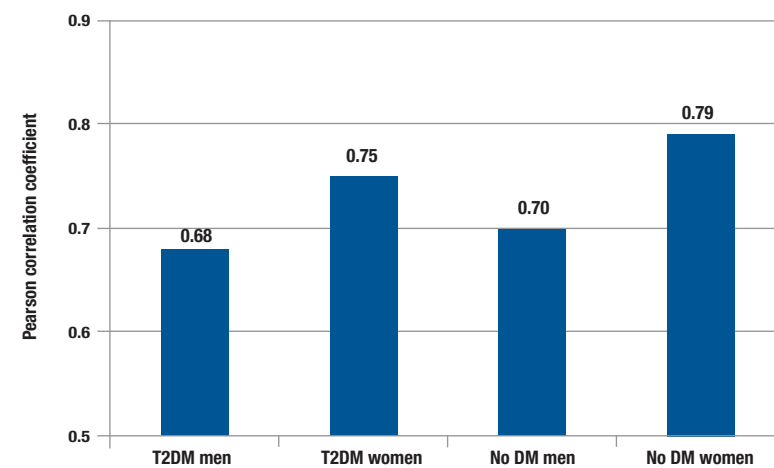


T2DM BMI*:	20.9, (6)	21.7, (18)	23.1, (52)	25.7, (145)	29.2, (414)	33.8, (560)	37.9, (335)	43.5, (259)	48.4, (190)
No DM BMI*:	18.3, (48)	20.1, (207)	22.0, (341)	24.2, (742)	28.2, (1275)	32.3, (1136)	36.0, (604)	41.0, (272)	47.0, (138)

* Median BMI

- Men with T2DM did not significantly differ from men without diabetes except at the extremes in body image (Body Image 1, 2, and 9; p <0.05 for these images)
- Women with T2DM had a significantly higher BMI for the same body image compared with women without diabetes (p <0.05, for all images except Images 11 and 18, which were higher but not statistically significant)
- For men, the two images with the greatest number of respondents (whether with or without diabetes mellitus) were figure rating images 6 and 7
- For women, the two images with the greatest number of respondents (whether with or without diabetes mellitus) were figure rating images 14 and 15

Figure 2. Correlation between Figure Rating Scale and body mass index



Correlation significant for each group (p < 0.0001)

T2DM = type 2 diabetes mellitus; DM = diabetes mellitus

- Body image perception for T2DM and no diabetes mellitus groups was significantly correlated with BMI for men and women (p < 0.0001)

LIMITATIONS

- Weight, height, and diabetes mellitus were self-reported and not validated by clinical measure due to the survey approach
- Body image may be influenced by age, gender, and place of residence, as well as race, cultural, and ethical standards and norms, but no adjustments were made
- Household panels, like the SHIELD study, tend to under-represent the very wealthy and very poor segments of the population and do not include military or institutionalized individuals

CONCLUSIONS

- Objectively, many individuals may not know their BMI
- Subjectively, as assessed by the Figure Rating Scale, individuals with T2DM may differ in their perception of body image compared with those without diabetes mellitus
- Inasmuch as perceptions may affect action, differences in the perception of body image among overweight or obese/severely obese respondents with T2DM, especially women, may ultimately affect their diabetes mellitus management, particularly a lack of urgency for any weight reduction
- Further research is needed to better understand the impact of body image perception on health behaviors and self-management of diabetes

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