

# Influence of Obesity on Health Attitudes and Behaviors Among Individuals with or at Risk for Type 2 Diabetes Mellitus

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## BACKGROUND

- The burden of type 2 diabetes mellitus (T2DM) and obesity is substantial, including increased mortality, higher risk of cardiovascular disease, and economic costs<sup>1,2</sup>
- Diabetes mellitus and obesity are largely self-managed conditions. Thus, patient attitudes and behaviors are important to achieving good health outcomes
- Previous studies have shown that individuals with T2DM or cardiometabolic risk factors were aware of the behaviors necessary to maintain or improve their health but were not implementing the behaviors in their daily lives<sup>3</sup>
- It is important to understand how **health attitudes and behaviors** interact with disease state and obesity to drive positive and negative health outcomes

## OBJECTIVE

- Evaluate the association between health attitudes and behaviors and obesity among individuals with T2DM and those at high risk for diabetes mellitus

## 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, as well as disease burden
  - Based upon a screening questionnaire mailed to 200,000 nationally representative households (part of the TNS NFO consumer household panel), responses were obtained for 211,097 adults from 127,420 households (64% response rate)
  - A 64-item survey was sent to 22,001 individuals from the screening respondents, a representative, stratified, random sample, to understand health status, health knowledge and attitudes, and current behaviors and treatments (response rate of 72%, n = 15,794)

- This investigation is a cross-sectional analysis of the association of obesity with health attitudes and behaviors between T2DM and high cardiometabolic risk groups

### Study Population

- Respondents were categorized as having T2DM or high risk for diabetes based upon self-report of having been told by a doctor, nurse or other healthcare professional that they have the condition
  - T2DM was defined as a diagnosis of type 2 diabetes and age of onset > 21 years of age
  - High risk was defined as self-report of ≥ 3 of the following risk factors, based on epidemiologic studies and national guidelines
    - Abdominal obesity (waist circumference ≥ 97 cm for men, ≥ 89 cm for women)
    - BMI ≥ 28 kg/m<sup>2</sup>
    - Dyslipidemia (“cholesterol problems”)
    - Hypertension
    - History of cardiovascular disease, defined as “heart disease/heart attack, narrow or blocked arteries, stroke, heart bypass surgery, or angioplasty/stents to clear arteries”

- The determination of T2DM and high risk was made based upon self-report rather than clinical or laboratory measures

- 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

## Study Measures

- Health attitudes regarding current and future health included responses to the following questions
  - My health is excellent - respondents who 'agreed strongly' or 'agreed somewhat'
  - Overall, how concerned are you that your health problems might get worse over time - respondents who were 'very concerned' or 'moderately concerned'
- Attitudes and behaviors regarding regular exercise included responses to current exercise routine
  - "I currently do not exercise and I do not intend to start exercising"
  - "I currently do not exercise, but I am thinking about starting to exercise"
  - "I currently exercise some, but not regularly"
  - "I currently exercise regularly"
- Weight management was assessed by a series of questions
  - "During the last 12 months, have you tried to lose weight?"
  - "During the last 12 months, have you done anything to keep from gaining weight?"
  - "Are you seriously considering trying to lose weight to reach your goal in the next 6 months?"
  - "Have you maintained your desired weight for more than 6 months?"
- Body mass index (BMI) was stratified into 3 categories
  - Underweight and normal weight: BMI < 25.0 kg/m<sup>2</sup>
  - Overweight: BMI 25.0 - 29.9 kg/m<sup>2</sup>
  - Obese: BMI ≥ 30 kg/m<sup>2</sup>
  - Weight and height for BMI calculation were self-reported and not validated by clinical measure due to the survey approach

## RESULTS

**Table 1. Characteristics of SHIELD respondents with T2DM or “High Risk” of developing T2DM**

Characteristics	T2DM n=3,918	High Risk n=5,464
Age, years, mean (SD)	60.3 (13.1)*	59.0 (14.7)
Men, %	42	43
Race, % white	85*	88
Education, (% with some college or higher)	64*	68
Income, % <\$40,000/year	53*	47
Underweight or normal weight (BMI < 25), %	11	5
Overweight (BMI 25.0-29.9), %	27	27
Obese (BMI ≥ 30), %	62*	68

\*p < 0.001 for comparison of T2DM vs. High Risk

### Key Findings

- T2DM respondents were older, with fewer whites, and on average had lower education and lower household income, compared with High-Risk respondents (p < 0.001)
- More High-Risk respondents were obese than T2DM respondents (p < 0.001)

## RESULTS (Continued)

**Table 2. Health attitudes and behaviors among T2DM and High-Risk respondents**

Attitudes and behaviors	T2DM	High Risk
<b>Health Status</b>		
“My health is excellent”: % 'agree strongly' or 'agree somewhat'	23.4**	33.3
“Concerned that health might get worse over time”: % 'very concerned' or 'moderately concerned'	71.2**	59.8
<b>Exercise</b>		
Currently exercise regularly, %	26.4	26.8
Currently exercise some, but not regularly, %	44.3	42.0
Currently do not exercise, but am thinking about starting, %	15.9	18.0
Currently do not exercise and do not intend to start, %	13.3	13.2
<b>Weight management</b>		
Tried to lose weight in past 12 months, %	69.6*	71.5
Tried to keep from gaining weight in past 12 months, %	74.9	74.0
Seriously considering trying to lose weight to reach goal in next 6 months, %	57.3**	61.0
Maintained desired weight for more than 6 months, %	33.7**	27.0

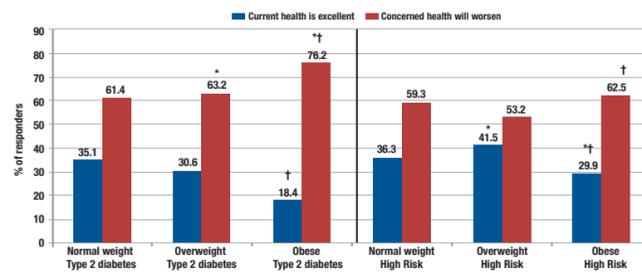
\*p < 0.05 and \*\*p < 0.001 for comparison of T2DM vs. High Risk

### Key Findings

- Fewer T2DM respondents agreed that their current health was excellent compared with high-risk respondents, p < 0.001
- 71% of T2DM respondents were concerned that their health problems will worsen over time compared with 60% of high-risk respondents, p < 0.001
- There was no difference between T2DM and high-risk respondents in exercising regularly or thinking about starting to exercise, p = 0.48
- Fewer T2DM respondents tried to lose weight or were seriously considering trying to lose weight compared with high-risk respondents, p < 0.05
- A greater proportion of T2DM respondents reported that they maintained desired weight than high-risk respondents, p < 0.001

### Impact of Overweight and Obesity

**Figure 1. Attitudes toward current and future health by BMI category**

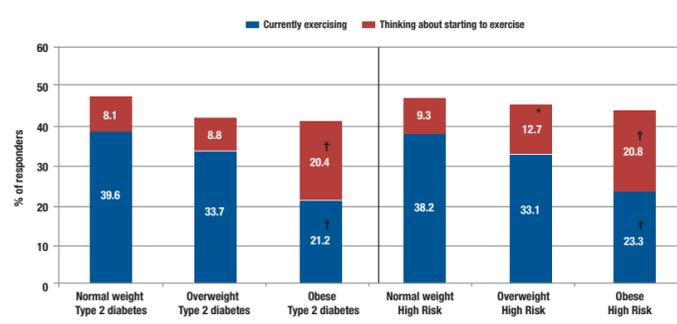


†p < 0.001 for comparison across BMI categories within the same group; \*p < 0.001 for comparison of T2DM vs. High Risk within the BMI category  
Underweight/normal weight: BMI < 25.0; overweight: BMI 25.0 - 29.9; obese: BMI > 29.9

### Key Findings

- Being overweight or obese had a negative impact on attitudes toward current and future health
- Fewer obese respondents, both T2DM and high risk, agreed that their current health was excellent
- More obese respondents, both T2DM and high risk, were concerned that their health problems would worsen over time

**Figure 2. Current exercise and contemplation of starting to exercise by BMI category**

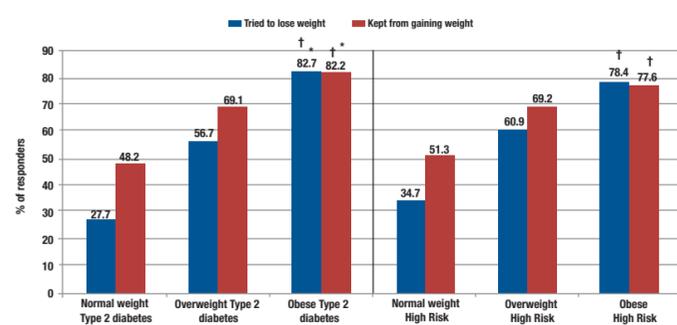


†p < 0.001 across BMI categories within the same group; \*p = 0.003 for comparison of T2DM vs. High Risk within the BMI category

### Key Findings

- More overweight high-risk respondents (12.7%) than overweight T2DM respondents (8.8%) were contemplating exercising, p=0.003
- Obese respondents in both T2DM and high-risk groups were more likely to be thinking about starting to exercise and less likely to be engaged in regular exercise than the overweight and normal weight groups, p < 0.001

**Figure 3. Weight management in the past 12 months by BMI category**

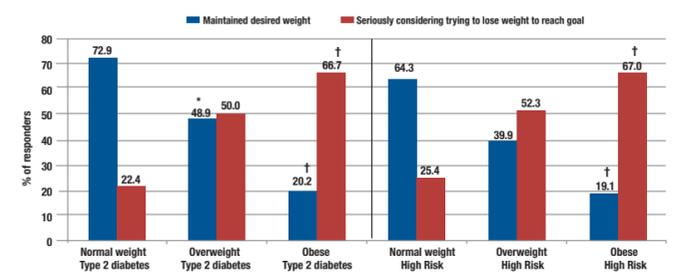


†p < 0.001 across BMI categories within the same group; \*p < 0.001 for comparison of T2DM vs. High Risk within the BMI category

### Key Findings

- A greater proportion of obese T2DM respondents tried to lose weight or maintain their weight compared with obese high-risk respondents, p < 0.001
- More obese respondents, both T2DM and high risk, tried to lose weight or keep from gaining weight compared with overweight and normal weight respondents, p < 0.001

**Figure 4. Weight maintenance and considering weight loss by BMI category**



†p < 0.001 across BMI categories; \*p < 0.001 for comparison of T2DM vs. High Risk

## Key Findings

- Fewer obese respondents, both T2DM and high risk, maintained their desired weight compared with normal weight or overweight respondents, p < 0.001
- More obese respondents, both T2DM and high risk, were seriously considering trying to lose weight compared with overweight or normal weight respondents, p < 0.001

## SUMMARY

- Health attitudes of individuals with T2DM or high risk for diabetes were similar
- BMI category (obesity) is the factor most closely associated with attitudes and behaviors regarding exercise and weight management
- Moving from normal weight to overweight to the obese groups, views of current health declined, views of future health became more pessimistic, but the self-reported intention or desire to lose or maintain weight and to exercise regularly was stronger
- However, obese subjects showed the lowest percentage who currently exercised or did maintain desired weight

## CONCLUSIONS

- Despite positive attitudes for better health, reported outcomes achieved for exercise and weight management were poorer among obese individuals
- Differences in concern about health, exercise and weight management between T2DM and high-risk respondents were almost entirely explained by BMI differences rather than the presence of diabetes mellitus *per se*
- Clinicians need to be aware of this impact of obesity when instructing patients to initiate and maintain healthy behaviors

## References

- Thom T et al. *Circulation* 2006; 113:e85-e151
- Thorpe KE. *Health Affairs* 2005; 24:1436-1445
- Green et al. *Int J Clin Pract* 2007; 61:1791-1797

## List of Abbreviations

<b>BMI</b>	Body mass index
<b>SHIELD</b>	Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes
<b>T2DM</b>	Type 2 diabetes mellitus
<b>TNS NFO</b>	Taylor Nelson Sofres National Family Opinion

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