

Impact of Self-Reported Weight Change on Quality of Life among Individuals with Type 2 Diabetes Mellitus

Susan Grandy, PhD¹, Kathleen M. Fox, PhD², Elise Hardy, MD¹, for the SHIELD Study Group
¹AstraZeneca LP, Wilmington, DE; ²Strategic Healthcare Solutions, LLC, Monkton, MD

ABSTRACT

Objective: Weight loss, a key component of diabetes self-management, may lead to improved well-being. This study examined the association between self-reported weight change and quality of life (QOL) among individuals with type 2 diabetes mellitus (T2DM).

Methods: In the US Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) 2008 survey, respondents indicated whether they had lost or gained weight (any amount) compared with 1 year earlier and completed the SF-12 questionnaire and the SHIELD WQ-9 questionnaire indicating how weight change affected (improved or not improved) 9 aspects of their daily life (physical health, interactions with family, work performance, interactions with co-workers/friends, social activities, daily activities, self-esteem, emotional health, overall QOL). Respondents who reported gaining weight were compared with respondents who reported losing weight; those not reporting weight change were excluded.

Results: Over 1 year, 16% of respondents reported gaining weight (n=460), and 30% reported losing weight (n=895). For all 9 aspects of daily life, a significantly greater proportion of respondents who reported losing weight reported improved well-being versus respondents who reported gaining weight (12%-44% vs. ≤5%, respectively, p<0.0001 for each). For respondents reporting losing weight, the greatest proportions indicating improvement were for physical health, self-esteem, and overall QOL. SF-12 mental health scores but not physical health scores were significantly higher among respondents who reported losing weight than among those who reported gaining weight (p<0.001).

Conclusions: Self-reported weight loss, compared with self-reported weight gain, was associated with improved QOL among individuals with T2DM.

BACKGROUND

- The number of Americans who are overweight has reached epidemic proportions and is still rising; 66% are overweight, and 32% are obese^{1,2}
- Over 85% of patients with T2DM are overweight or obese³
- Excess body weight is associated with exacerbation of diabetes and insulin resistance⁴
- Conversely, weight loss is associated with reduced insulin resistance and improvements in glycemic control.⁵ The American Diabetes Association guidelines recommend weight counseling and weight management⁶
- Despite the recommendations, information on health outcomes associated with weight change is limited for individuals with T2DM

OBJECTIVE

- To examine the association between self-reported weight change and QOL among individuals with T2DM

This research was funded by AstraZeneca LP

Presented at the 2011 World Congress on Insulin Resistance, Diabetes & Cardiovascular Disease, Los Angeles, CA, November 3–5, 2011

METHODS

Study Design

- Cross-sectional analysis of data collected in 2008 among SHIELD respondents with T2DM
- Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes (SHIELD) is a 5-year population-based survey conducted to better understand the risk for the development of diabetes, as well as diabetes disease burden
 - Based upon a screening questionnaire mailed to 200,000 nationally representative households (TNS NFO Household Panel), responses for 211,097 adults from 127,420 households were obtained (64% response rate)
 - A baseline survey was sent in 2004 to 22,001 selected individuals derived from the screening respondents. Since 2005, annual SHIELD surveys have captured self-reported information on health status, attitudes and behaviors, QOL, and anthropometry from this representative sample of the US population
 - The 2008 survey collected information from 14,921 individuals (71% response rate), and 2,969 respondents had T2DM (20%)

Study Population

- Respondents were 18 years of age or older
- Self-reported diagnosis of T2DM was based on being “told by a doctor, nurse or other healthcare professional that you have type 2 diabetes”

Study Measures

- For weight change, respondents were asked to compare their current weight with their weight 1 year ago and to indicate if they had gained weight, lost weight, stayed the same, lost weight then gained it back, or gained weight and lost it again
- SHIELD-WQ9 questionnaire asked respondents: “Thinking about your weight change or lack of weight change over the past year, how did this change affect you in the following areas? worsened, improved, or stayed the same”
 - How I feel physically – physical health
 - My interactions with family
 - My work performance
 - My interactions with co-workers and friends
 - My social activities
 - My daily activities
 - My self-esteem
 - How I feel emotionally – emotional health
 - My overall quality of life
- SF-12 questionnaire was used as a generic measure of QOL using 8 domains of health with a recall period of the past 4 weeks⁷
 - Responses were scored from 0 to 100, with higher scores indicative of better QOL
 - Physical Component Summary scale included physical functioning, role limitations because of physical health, bodily pain, and vitality
 - Mental Component Summary scale included general health perceptions, social functioning, role limitations because of emotional problems, and mental health
 - Norm-based scoring was used to linearly transform scores to a scale with a mean of 50 and standard deviation of 10 for comparisons with the general population

- Overweight was defined as a BMI of 25.0–29.9 kg/m², and obese was defined as a BMI ≥30 kg/m²

Statistical Analyses

- T2DM respondents reporting weight loss were compared with T2DM respondents who reported weight gain over the past year. Respondents who reported no change (stayed the same) in weight or fluctuating weight were excluded from the analysis
- Comparisons between T2DM respondents reporting weight loss and those reporting weight gain were conducted using chi-square test for categorical variables and t-tests for continuous variables
- Statistical significance was set *a priori* as p <0.05

- A total of 2,969 respondents had T2DM as reported in the 2008 survey

- Of these T2DM respondents, 30% (n = 895) reported weight loss and 16% (n = 460) reported weight gain over the past year (Figure 1)

Figure 1. Distribution of T2DM respondents by self-reported weight change or lack of change

Proportion of T2DM respondents with weight change over past year (n = 2,969)

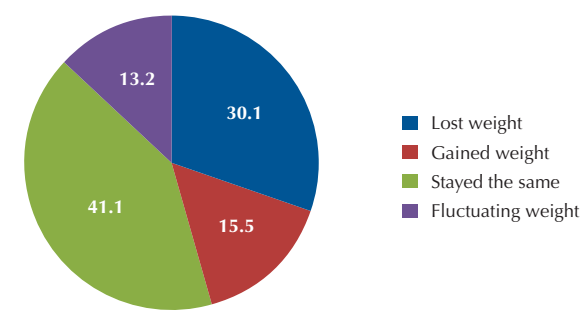


Table 1. Characteristics of SHIELD T2DM respondents who reported losing or gaining weight in the past year, n = 1,355

Characteristic	Reported weight loss (n = 895)	Reported weight gain (n = 460)
Age, years, mean (SD)	63.0 (11.8)*	60.0 (10.6)
Women, %	61.1	63.9
White, %	74.6	70.7
Education, high school degree or less, %	31.7	36.4
Household income <\$35,000, %	34.9	36.1
Weight, lbs, mean (SD)	209.7 (54.7)*	230.9 (60.8)
Body mass index (BMI) category, %	*	
Normal weight (BMI <25.0 kg/m ²)	11.8	3.8
Overweight (BMI = 25.0 – 29.9 kg/m ²)	25.6	19.6
Obese (BMI ≥30.0 kg/m ²)	62.6	76.7
Calculated weight change from 2007 to 2008, lbs, mean (SD)	-9.2 (17.0)*	7.1 (16.7)

*p <0.05 for comparison of reported weight loss vs. weight gain; 1lb (pound) = 0.4536 kg

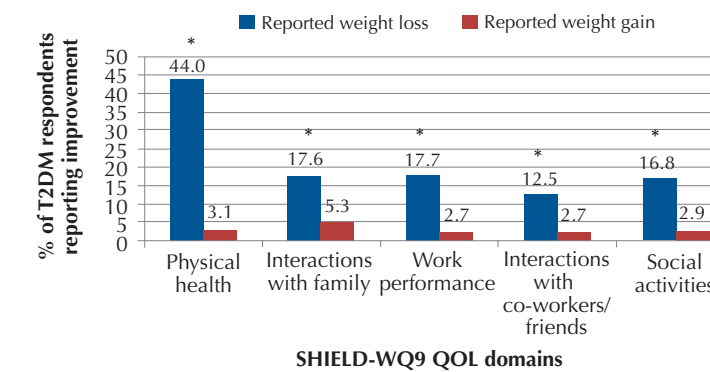
- T2DM respondents who reported weight loss were older and weighed less at the time of the survey than respondents who reported weight gain (p <0.05) (Table 1)
- A greater proportion of respondents who reported weight gain were obese, compared with respondents who reported weight loss (p <0.001)

RESULTS

Quality of Life and Weight Change

- The proportion of T2DM respondents reporting improvement in QOL are shown in Figures 2 (first 5 domains) and Figure 3 (last 4 domains)

Figure 2. Proportion of T2DM respondents who reported improvement in QOL for 5 domains, n = 1,355



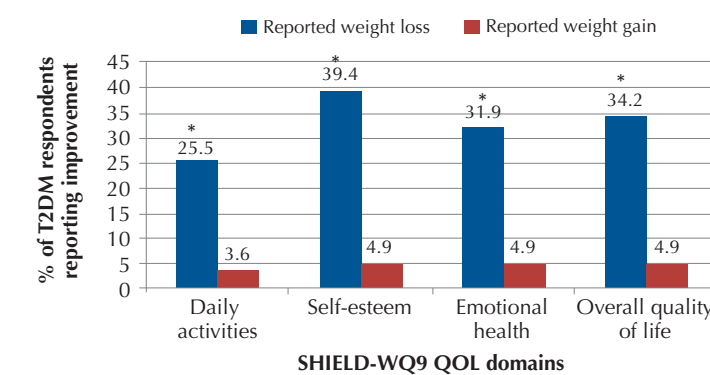
*p <0.001 for comparison of reported weight loss vs. weight gain

- Among individuals with T2DM, a significantly greater proportion who reported weight loss reported improved QOL in physical health, interactions with family, work performance, interactions with co-workers/friends, and social activities versus respondents who reported weight gain (p <0.001 for each domain) (Figure 2)

- For T2DM respondents reporting weight loss, the greatest proportion indicating improvement was for physical health (44%)

- Only 3%–5% of T2DM respondents reporting weight gain indicated improvement in these QOL domains

Figure 3. Proportion of T2DM respondents who reported improvement in QOL for 4 other domains, n = 1,355



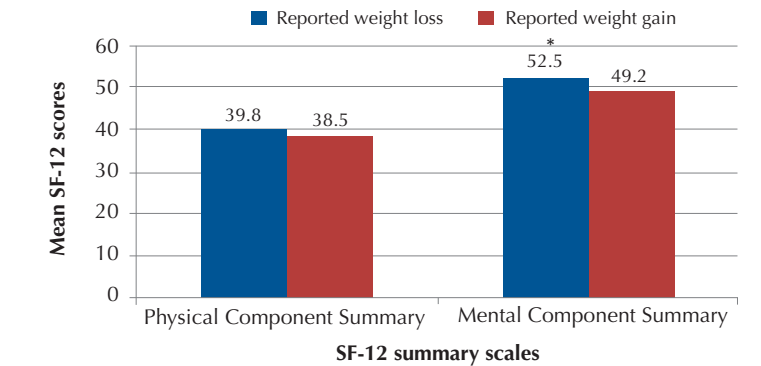
*p <0.001 for comparison of reported weight loss vs. weight gain

- Among individuals with T2DM, a significantly greater proportion who reported weight loss reported improved QOL in daily activities, self-esteem, emotional health, and overall QOL versus respondents who reported weight gain (p <0.001 for each domain) (Figure 3)

- For T2DM respondents reporting weight loss, the greatest proportions indicating improvement were for self-esteem (39%) and overall QOL (34%)

- Only 4%–5% of T2DM respondents reporting weight gain indicated improvement in these QOL domains

Figure 4. SF-12 scores for T2DM respondents who reported weight loss or weight gain, n = 1,241



*p <0.001 for comparison of reported weight loss vs. weight gain

- Among T2DM respondents, SF-12 physical health scores were numerically higher but not statistically different for respondents who reported weight loss compared with those of respondents who reported weight gain (p = 0.09) (Figure 4)

- Respondents who reported weight loss had significantly higher scores for the Mental Component Summary (better mental health QOL) than respondents who reported weight gain (p <0.001)

LIMITATIONS

- Diagnosis of diabetes, weight, height, and weight change were self-reported and could not be validated with laboratory tests, medical records review, or administrative claims data. However, this bias is similar between the groups compared in this study
- Household panels, like the TNS NFO panel, tend to under-represent the very wealthy and very poor segments of the population and do not include military or institutionalized individuals

CONCLUSIONS

- Self-reported weight loss, compared with self-reported weight gain, was associated with improved QOL among adults with T2DM
- A significantly greater percentage of respondents reporting weight loss indicated improvement in all 9 aspects of daily life than respondents reporting weight gain
- Additionally, respondents reporting weight loss had significantly better mental QOL (SF-12) than respondents reporting weight gain

References

- Mokdad AH, et al. *JAMA* 2001;286:1195–1200
- Prevalence of overweight and obesity among adults: United States 2003–2004. http://www.cdc.gov/nchs/products/pubs/pubd/hestats/overweight/overweight_adult_03.htm
- Campbell RK. *J Am Pharm Assoc* 2009;49:53–59
- World Health Organization. <http://www.who.int/dietphysicalactivity/publications/facts>
- Mukherjee J. Relationship between weight change and glycemic control in patients with type 2 diabetes. *EASD* 2011
- ADA. Standards of Medical Care in Diabetes – 2010. *Diabetes Care* 2010;33(Suppl 1):S11–S61
- Ware JE, et al. How to score version of the SF-36 health survey. QualityMetrics, Inc, 2000

List of Abbreviations

BMI	Body mass index	T2DM	Type 2 diabetes mellitus
QOL	Quality of life	TNS NFO	Taylor Nelson Sofres National Family Opinion
SD	Standard deviation	SHIELD-WQ9	SHIELD Weight Questionnaire 9 items
SF-12	Short Form – 12 questions		
SHIELD	Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes		