

## RESEARCH ARTICLE

# Body self-esteem is related to subjective well-being, severity of depressive symptoms, BMI, glycosylated hemoglobin levels, and diabetes-related distress in type 2 diabetes

Andrzej Kokoszka<sup>1\*</sup>, Agata Pacura<sup>2</sup>, Barbara Kostecka<sup>1</sup>, Cathy E. Lloyd<sup>3</sup>, Norman Sartorius<sup>4</sup>

**1** Department of Psychiatry, Medical University of Warsaw, Warsaw, Poland, **2** SWPS University of Social Sciences and Humanities, Warsaw, Poland, **3** Faculty of Wellbeing, Education and Language Studies, The Open University, Milton Keynes, United Kingdom, **4** Association for the Improvement of Mental Health Programmes (AIMH), Geneva, Switzerland

\* [andrzej.kokoszka@wum.edu.pl](mailto:andrzej.kokoszka@wum.edu.pl)



## OPEN ACCESS

**Citation:** Kokoszka A, Pacura A, Kostecka B, Lloyd CE, Sartorius N (2022) Body self-esteem is related to subjective well-being, severity of depressive symptoms, BMI, glycosylated hemoglobin levels, and diabetes-related distress in type 2 diabetes. *PLoS ONE* 17(2): e0263766. <https://doi.org/10.1371/journal.pone.0263766>

**Editor:** Chung-Ying Lin, National Cheng Kung University College of Medicine, TAIWAN

**Received:** March 23, 2021

**Accepted:** January 26, 2022

**Published:** February 15, 2022

**Copyright:** © 2022 Kokoszka et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Data Availability Statement:** All relevant data are within the paper and its [Supporting Information](#) files.

**Funding:** This study was carried out as an addition to the aegis of the Association for the Improvement of Mental Health Programmes (AIMH) and supported by AIMH and the collaborating institutions. The investigators of the study from Poland have not received any funding. The meetings of the investigators and data entry were

## Abstract

### Background

There are limited data on the role of body image in patients with type 2 diabetes. The purpose of this study was to compare body self-esteem in this group with norms for the general Polish population and to investigate the relationship between body self-esteem and the psychological and clinical characteristics of the course of diabetes.

### Methods

A group of 100 consecutive adult patients with type 2 diabetes (49 women and 51 men) aged 35 to 66 years were assessed using the Body Esteem Scale (BES), World Health Organization-Five Well-Being Index (WHO-5), Problem Areas in Diabetes Scale (PAID), and Hamilton Rating Scale for Depression (HAM-D).

### Results

In comparison to norms for the general population, women with type 2 diabetes had lower body self-esteem only in the dimension of Physical Condition ( $M = 30.71$ ;  $SD = 7.11$  versus  $M = 32.96$ ;  $SD = 5.69$ ;  $P = 0.003$ ), whereas men in the dimensions of Physical Condition ( $M = 42.43$ ;  $SD = 9.43$  versus  $M = 48.30$ ;  $SD = 8.42$ ;  $P < 0.001$ ) and Upper Body Strength ( $M = 32.16$ ;  $SD = 6.60$  versus  $M = 33.97$ ;  $SD = 5.86$ ;  $P = 0.015$ ). There were moderate or weak positive correlations between the overall BES score and/or its dimensions and subjective well-being, and negative correlations between the overall BES score and/or its dimension and the severity of depression symptoms, level of glycosylated hemoglobin ( $HbA_{1c}$ ), body mass index (BMI), and diabetes-related distress among women. Among men, BES scores were positively correlated with well-being, and negatively, with BMI and diabetes-related distress. A correlation of  $r = 0.39$  between BES scores and  $HbA_{1c}$  levels was relatively high compared

in part supported by unrestricted grants by Eli Lilly and Sanofi companies.

**Competing interests:** The authors have declared that no competing interests exist.

with values for other psychosocial factors. Both in women and men, a high Physical Condition score was a significant predictor of better well-being, less severe depression, and milder diabetes-related distress. Among men, it was also a significant predictor of lower BMI, whereas among women, BMI was predicted by Weight Concern.

## Conclusions

Persons with diabetes seem to have lower body self-esteem than the general population, which is significantly associated with clinical and psychological characteristics of the diabetes course. The observed differences and relationships are gender-specific.

## Introduction

Achievement and maintenance of optimal blood glucose level in individuals with type 2 diabetes remains a challenge for modern medicine. The authors of the American Diabetes Association (ADA) position paper on psychosocial care for people with diabetes concluded that, in the light of the available research, management with a psychosocially sensitive treatment regimen improves the level of glycated hemoglobin (HbA<sub>1c</sub>), but this effect is negligible [1]. Conversely, some empirical studies have shown that improvement in psychological well-being may reduce the risk of disease complications and helps achieve better metabolic control (e.g. [2–4]). According to the current ADA treatment guidelines, “Psychosocial care should be integrated with a collaborative, patient-centered approach and provided to all people with diabetes, with the goals of optimizing health outcomes and health-related quality of life” [5, p.57].

The impact of body image on the course of diabetes has not been considered among numerous factors covered in those guidelines; however, research has shown that body image may be significantly related to both mental and physical health (e.g. [6–9]). Weight dissatisfaction, regardless of body mass index (BMI), is a potentially important psychophysiological modifier of relationships between BMI and risk of type 2 diabetes [10]. In a study by Carroll et al. [11], conducted in a large sample of 125 people with type 2 diabetes, a relevant correlation between body dissatisfaction and perceived blood glucose control was identified. In addition, participants (especially females) had a higher level of body dissatisfaction, which was associated with discrepancy between current and desired body perceptions (e.g. [12–14]). It is important to pay attention to the cultural context. For example, among people of Latino and African American origins, a very slim body often preferred in Europe is considered unattractive, and having the perfect body means being slightly larger in size, which is not marked by negative emotions [15, 16]. Research into body image and related constructs (e.g., weight-related self-stigma) has been conducted also in other regions (e.g. [9, 17–19]). However, the majority of available studies are limited to assessing body perception in terms of weight (normal weight/overweight) (e.g. [20]) and its potential negative impact on mental and physical well-being, without exploring its role and implications in the context of diabetes. Of note, research indicates that body image is a much more complex and multifaceted construct than expected [21].

Body image is “a system of beliefs and self-esteem with one’s appearance (cognitive aspect), built on internalized fashion patterns and information from the environment (social aspect), accompanied by specific emotions (affective aspect) and behavior (behavioral aspect)” [22, p.20]. Perceived as an internal mental structure, body image is relatively constant during the life cycle; however, intense and chronic somatic or sociocultural stimuli may contribute to its