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RESEARCH ARTICLE

Dimensionality and psychometric properties of the Greek version of the Type 1 Diabetes Stigma Assessment Scale (DSAS-1-Gr)

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ABSTRACT

Type 1 Diabetes Mellitus (T1D) is one of the most common chronic diseases affecting children and adolescents. The daily management of T1D requires continuous insulin therapy, as well as the inevitable adjustment of daily activities according to glycaemic control, both of which may result in experiencing T1D related stigma. A significant proportion of people with T1D have been shown to experience social discrimination and stigma, which can lead to emotional distress and act as a barrier to help-seeking behavior. This study presents the psychometric properties of the Greek translation of the Diabetes Stigma Assessment Scale-1 (DSAS-1), which assesses self-perceived stigma in people with T1D. A sample of 105 adults with T1D, mostly females (70.5%), with a mean age of 34.3 years (± 11.1), and mean disease duration of 19.4 years (± 10.5), completed the translated in Greek DSAS-1 (DSAS-1-Gr). Exploratory and confirmatory factor analyses were used to investigate the construct validity of the scale. In line with the original version, the results of the present study supported the three-factor model of the scale 'identity concerns', 'different treatment', 'blame and judgment'. The internal consistency indices (Cronbach alpha) of the three subscales were above $\alpha = .80$ and $.88$ for the whole scale. Moderate correlations were found between the DSAS-1-Gr and the Diabetes Distress scale for type 1 Diabetes (T1-DDS), the Rosenberg self-esteem scale, and the DASS-21 subscales (depression, anxiety, and stress), which is indicative of convergent validity. DSAS-1-Gr correlated negatively with the diabetes duration (in years), which was indicative of discriminant validity. Finally, females presented higher total DSAS-1-Gr score than males. DSAS-1-Gr is a valid and reliable tool to be used in clinical practice to assess stigma in Greek people with T1D.

KEYWORDS: Type 1 diabetes mellitus, stigma, validity, reliability, factor analysis.

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Introduction

The incidence of diabetes mellitus (DM) has rapidly increased in recent decades, with the global prevalence rate estimated to be about 10.5%.¹ Type 1 diabetes mellitus (T1D) is a chronic disease with increasing rates, which accounts for 5% to 10% of the total DM incidence.^{2,3} The main cause of T1D is the autoimmune destruction of β -pancreatic cells.² Exogenous insulin administration is the only treatment for T1D patients.⁴ Lifelong glycaemic control is one of the main goals in the management of T1D in order to avoid diabetic ketoacidosis and to prevent future macrovascular and microvascular complications of the disease, which can lead to disability or even premature death.⁵ The social and psychological burden on people with T1D is significant, regardless of the type of DM (type 1 or 2) and the method of therapy used, whether it is multiple daily injections (MDI) or continuous subcutaneous insulin injection (CSII).⁶⁻⁹

Social discrimination is an aspect of the broad and complex construct of stigma experienced by 14% to 28% of the T1D patients.¹⁰ Weiss and Ramakrishna¹¹ suggested that health-related stigma can be understood as 'a social process characterized by exclusion, rejection, blame, or devaluation, which involves a person or group identified with a particular health problem, resulting in an experience of an adverse social judgment'. Studies have revealed that T1D patients reported perceiving and experiencing aspects of stigma, such as feelings of being judged negatively when they fail to fully control their glycaemic levels, as well as diabetes-related discrimination.^{10,12} The discriminatory social judgment related to the disease or designated health problem is a form of stigma which results from adverse social judgments (such as race, ethnicity, and sexual preferences), which may also affect the health of the affected person.¹³ Discrimination and chronic stress have been suggested to influence health outcomes and self-management of chronic diseases.¹⁴ Perceived discrimination may define the behavioural management of the disease by leading to particular health behaviours that can lead to unhealthy behaviours, such as failure to seek preventative services like hemoglobin A1c testing.¹⁵ Stigma has been studied in relation to epilepsy, weight, mental illness, and other health conditions.^{16,17}

To date, there is no instrument in Greek to measure diabetes-related stigma among people with type 1 diabetes. Thus, the aim of this study is to translate and examine the dimensionality and the psychometric properties of the DSAS-1 in Greek (hereafter referred to as DSAS-1-Gr).

Method

Participants

Participants were recruited from the Diabetes Center of the 'AHEPA' General University Hospital of Thessaloniki in Greece. One hundred and five adults with T1D mellitus, aged 34.3 (± 11.1) years, mostly females (70.5%), with a mean diabetes duration of 19.4 (± 10.5) years, completed the survey. Exclusion criteria were 17 years or younger and non-Greek-speaking type 1 diabetes mellitus patients. A subsample of 15 participants was interviewed for the cognitive debriefing procedure and re-tested four weeks later for assessing the test-retest reliability of the scale. The detailed sociodemographic characteristics of the whole sample and subsample can be seen in **Table 1**.

Measures

The *Type 1 Diabetes Stigma Assessment scale (DSAS-1)* is a 19-item self-report scale of T1D patients' perceptions and experiences of T1D stigma. DSAS-1 is scored using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). It has three subscales: 'treated differently' (six items), 'blame and judgement' (six items), and 'identity concerns' (seven items). The total score ranges from 19 to 95, with higher scores indicating more perceived

and/or experienced diabetes stigma.^{18,19} In this study, Cronbach alpha coefficient for the unidimensional structure of DSAS-1-Gr was $\alpha_{\text{total score}} = 0.88$, and for the subscales were $\alpha_{\text{identity concerns}} = 0.89$, $\alpha_{\text{treated differently}} = 0.84$, and $\alpha_{\text{blame and judgment}} = 0.8$.

The *Diabetes Distress scale for type 1 Diabetes (T1-DDS)* is a 28-item self-report questionnaire used to identify the specific sources of diabetes-related distress for adults with T1D.^{20,21} The T1-DDS is scored using a 6-point Likert scale ranging from 1 (not a problem) to 6 (a very significant problem). The Greek version includes 23-item and is both reliable and valid.²⁰ In this study, the Cronbach alpha coefficient of the T1-DDS was $\alpha = 0.95$.

The *Rosenberg Self-Esteem Scale (RSES)* is a 10-item self-report, one-dimensional questionnaire that measures both positive and negative feelings about self. RSES is scored using a 4-point Likert scale ranging from 1 (strongly agree) to 4 (strongly disagree). The negative statements (2, 5, 6, 8, 9) are reverse scored. Higher scores indicate higher self-esteem.²² The Greek translation is both reliable and valid.²³ In this study, the RSES Cronbach alpha coefficient was $\alpha = 0.80$.

The *Depression Anxiety Stress Scale (DASS-21)* is a 21-item self-report scale that assesses depression, anxiety, and stress. It is scored on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time) and each scale contains seven items. Higher scores indicate a higher frequency of symptoms.²⁴ The Greek translation is both reliable and valid.²⁵ In this study, Cronbach alpha coefficients were: $\alpha_{\text{depression}} = 0.81$; $\alpha_{\text{anxiety}} = 0.77$; $\alpha_{\text{stress}} = 0.89$.

Procedure

The DSAS-1 was translated into Greek using the translation guidance by Mapi Research Trust (2018), which necessitated the following four steps: forward translation by two bilingual persons, backward translation, cognitive interview, and proofreading. Permission to access and use DSAS-1 is granted by Mapi Research Trust <https://eprovide.mapi-trust.org>. Initially, two bilingual persons (Greek and English) carried out two independent forward translations. Then, a native English-speaking psychologist proceeded with the backward translation. Cognitive debriefing was assessed through interviews with 15 adult patients with T1D. Participants first completed the translated DSAS-1-Gr and were then interviewed to assess the clarity and comprehensiveness of the scale instructions and items. The cultural adaptation process was reviewed by all authors. Face validity was carried out by two experts, a psychologist and a psychiatrist, who, based on their expertise, were asked to examine the degree to which the items of the DSAS-1-Gr reflected the construct of stigma in relation to T1D mellitus. The study has been approved by the Ethics Committee of the Aristotle University of Thessaloniki with reference number: 5.585 12/04/2022 and has been carried out in accordance with the Declaration of Helsinki.

Statistical Analysis

For assessing the content validity of the DSAS-1-Gr, the translated version was sent to a panel consisting of three independent experts (specialized physicians in diabetes mellitus), who were asked to evaluate each item of the DSAS-1-Gr for content equivalence on a three-response Likert scale (1 = necessary, 2 = useful but not necessary, and 3 = unnecessary). A total content validity index (CVI) was calculated by dividing the total number of items ranked as 1 (necessary) by the total number of items. A forced three-factor exploratory factor analysis (EFA) with principal axis factoring and varimax rotation was conducted to investigate the construct validity of the 19-item DSAS-1-Gr. The adequacy of the sample was assessed with the Kaiser-Meyer-Olkin test (KMO) and Bartlett's test of sphericity.²⁶ A confirmatory factor

analysis (CFA) with maximum likelihood was carried out to determine whether the three-dimensional or the unidimensional model proposed by EFA provided a good fit. Model fit was assessed with the chi-square (χ^2), the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMSR), the Tucker-Lewis Index (TLI), and the comparative fit index (CFI).²⁷ Test-retest reliability was assessed with the intraclass correlation coefficient (ICC) 2-way mixed-effects model for measurements. In addition, the internal consistency of the unidimensional structure of DSAS-1-Gr and its subscales was assessed with Cronbach's alpha coefficient, composite reliabilities, and average variance extracted (AVE) reliability of the final CFA model. The construct validity was examined by calculating the two-tailed Spearman's correlation coefficient among the DSAS-1-Gr and its three subscales with T1-DDS, DASS-21 and its subscales (depression, anxiety, and stress), RSES, and years of diabetes duration. Medium-to-large correlations ($r_s > \pm 0.4$) were taken as evidence for convergent validity, and small correlations ($r_s < \pm 0.3$) were taken as evidence of discriminant validity, according to Cohen's guidelines.²⁸ Finally, a t-test for independent samples was used to assess differential validity (known groups method) between genders.²⁹⁻³¹ The significance level was set at $p < 0.05$. All analyses were conducted using SPSS statistical software version 26 (SPSS Inc., Chicago, IL, USA). The confirmatory factor analysis (CFA) was carried out using AMOS version 20 and the parallel analysis was carried out using Monte Carlo PCA for Parallel Analysis.

Results

Translation, face validity, cognitive debriefing, and cultural adaptation

During the translation process, jargon was replaced, a few discrepancies were resolved, and a consensus was reached between the three translators. Based on their knowledge of theory and practice, experts who conducted face validity found that the items of DSAS-1-Gr reflected the construct of stigma in relation to T1D. All participants that were interviewed during the cognitive debriefing phase replied that the scale was readily understandable.

Descriptive statistics and gender differences

The mean scores for the total DSAS-1-Gr scale and its subscales 'identity concerns', 'treated differently', and 'blame and judgment' were 44.9 (SD = 12.5), 12.7 (SD = 5.9), 16.2 (SD = 5.8) and 15.9 (SD = 4.5) respectively. Gender differences were found, with females scoring significantly higher than males in the DASS-21 anxiety subscale ($M = 4.8$, $SD = 4.4$ vs. $M = 3.1$, $SD = 3.3$; $U = 864$, $z = -2.0$, $p = 0.045$, $r = -0.19$) and in the unidimensional DSAS-1-Gr scale ($M = 47$, $SD = 11.7$ vs. $M = 39.8$, $SD = 13.3$; $t(103) = -2.7$, $p = 0.007$, $d = 0.57$), whereas males scored significantly higher than females in the RSES ($M = 31.1$, $SD = 4$ vs. $M = 28.7$, $SD = 4.3$; $t(103) = 2.6$, $p = 0.01$, $d = 0.78$).

Content validity

An agreement of 84% was found among the panel of experts, which is an acceptable index.³² Items No.8 and No.17 were unanimously assessed as 'useful but not necessary'.

Structural validity

Exploratory Factor Analysis (EFA)

A cut-off of ≥ 0.40 to identify meaningful factor loadings resulted in the deletion of item No.16 due to low factor loading (< 0.4). The forced three-factor solution of the remaining 18-item DSAS-1-Gr was confirmed by the parallel analysis results. KMO coefficient was equal to 0.836 and Barlett χ^2 value was 992.6 ($p < 0.001$). The final communality estimates after rotation were high for all items, except item No.1 (< 0.30). The proportion of the total variance explained was 60.1%. Finally, the rotated component pattern demonstrated a cross-loading of item No.4 in both 'Treated differently' and 'Blame and judgment' factors. A forced one-factor,

unidimensional solution, was also conducted and all factor loadings were ≥ 0.40 . Both the unidimensional and three-dimensional structures of DSAS-1-Gr are presented in **Table 2**. The 18 items were allocated in three factors, similar to those of the original version of DSAS-1: 'identity concerns' (2,5,7,10,13,18); 'treated differently' (3,4,6,8,12,15,19) and 'blame and judgment' (1,9,11,14,17).

Confirmatory Factor Analysis (CFA)

Both the three-dimensional and unidimensional models were examined with CFA to assess which one provided the better fit. After the improvements suggested by modification indices, the three-dimensional model provided a better fit ($\chi^2 = 144.8$ (121), $p = 0.06$, $CMIN/DF = 1.197$, $RMSEA = 0.043$, $SRMR = 0.0744$, $TLI = 0.967$ and $CFI = 0.974$). Despite the improvements by modification indices, the unidimensional structure did not provide an adequate fit ($\chi^2 = 125.2$ (84), $p = 0.002$, $CMIN/DF = 1.491$, $RMSEA = 0.069$, $SRMSR = 0.0972$, $TLI = 0.917$ and $CFI = 0.955$).

Test-retest reliability

ICC was 0.923 ($p < 0.001$), which indicates excellent reliability³³ for the DSAS-1-Gr.

Internal consistency, split-half, and composite reliability

Cronbach's alpha coefficient of the 18-item DSAS-1-Gr was 0.88 (whereas for the 19-item DSAS-1 was 0.89) and for its subscales 'identity concerns', 'treated differently', and 'blame and judgment', 0.89, 0.84, and 0.80 respectively. The Guttman Split-half coefficient was 0.90. Composite reliabilities and AVEs of the final CFA model were low for the total score (0.3) and the 'treated differently' subscale (0.43). Internal consistency reliabilities are presented in **Table 2**.

Construct validity

The unidimensional DSAS-1-Gr showed moderately positive correlations with the three subscales of DASS (i.e., depression, anxiety, stress) and the T1-DDS total score, while it moderately negatively correlated with the Rosenberg Self-Esteem Scale. Finally, it negatively correlated, though low, with the years of diabetes duration. The correlations are presented in **Table 3**.

Discussion

This study reports the translation, cultural adaptation, and psychometric validation of the DSAS-1¹⁸ in the Greek language (i.e., DSAS-1-Gr). Furthermore, this is the first study that investigates the stigma among people with type 1 diabetes mellitus in Greece. The DSAS-1-Gr was rigorously validated, and the 18-item scale with three subscales was proved to be an acceptable, reliable, and valid tool for the assessment of stigma among people with T1D in Greece. Consistent with the English and Danish versions, the overall score can also be used.^{18,19}

Consistent with the original release and the Danish validation,^{18,19} EFA supported the three-factor structure of the DSAS-1-Gr scale, which was also confirmed by the parallel analysis. The three factors included the same items as the English and Danish versions and were named similarly 'identity concerns', 'treated differently', and 'blame and judgment'. The subscale 'identity concerns' (with six items) describes identity threats, such as worries about being erroneously considered an illicit drug user when injecting insulin, and feelings of embarrassment about what others might think if one has a hypoglycaemic episode in public.¹⁸ The 'treated differently' subscale (with seven items) includes items relative to stigma and discrimination experienced in the workplace, social exclusion, and social/romantic rejection. The 'blame and judgment' subscale (with five items) includes items about perceived inabilities,

irresponsible diabetes self-management, and judgments about eating too much sugar.¹⁸ However, item No.16 (*'If I were to inject insulin in public, people would think I was taking drugs'*) was excluded, due to the strict cut-off scores of the loadings enacted. Excluding No.16 did not significantly decrease Cronbach's alpha coefficient of the unidimensional scale (it only decreased by 0.01 points), whereas it slightly increased Cronbach's alpha coefficient of the best-fitting subscale "identity concerns" (i.e., 0.01 point). Furthermore, EFA results suggested that item No.4 fitted better on the 'treated different' subscale than 'blame and judgment', where it was included in both versions.^{18,19} CFA supported the three-factor model with adequate fit indices, whereas the single-factor model (i.e., the unidimensional scale) was not confirmed. The findings of poor single-factor model indices align with those of both the original release of the DSAS-1¹⁸ and the Danish validation.¹⁹ We agree with the authors of these studies that stigma is a complex and multifaceted construct, which is best represented by three latent factors, rather than a single one.^{18,19} Poor indices of the single-factor model were also found in the validation of the ISMI questionnaire, which measures the subjective experience of stigma related to mental illness.¹⁷

The moderately positive correlations with DASS-21 and T1-DDS were indicative of the convergent validity of DSAS-1-Gr. Stigmatization has been found to be strongly and consistently associated with negative psychological conditions, and it has been suggested that DM stigma is likely to have pervasive emotional, social, and cognitive impacts.^{8,34} Also, as expected,^{18,19} small negative correlations were found with the years of diabetes duration, which was evidence of the discriminant validity. In addition, the internal consistency of the scale was satisfactory, ranging from 0.80 to 0.89, and is in line with that of the original DSAS-1¹⁸ and the Danish version of it.¹⁹ Furthermore, the DSAS-1-Gr showed differential validity as overall females scored significantly higher than males. Similar results have shown that women experience higher stigma related to obesity^{35,36} and psoriasis³⁷ than men. Women also had higher scores on depression and anxiety than men.^{38,39} Since studies have found depression and anxiety to be associated with stigmatization,⁴⁰⁻⁴² and perceptions of diabetes are associated with more guilt, shame, embarrassment, and isolation,⁴³ it can be assumed that females' high scores on DSAS-1-Gr, depression, and anxiety are intercorrelated. Further research is needed to identify any potential gender-related or biosocial risk factors. Finally, the 18-item unidimensional structure of the DSAS-1-Gr presented a slightly higher mean score than the Danish validation ($M= 43.33$),¹⁹ both of which are lower than the one ($M = 53$) found in the original version,¹⁸ suggesting potential cultural differences.

The findings of the present study suggest that the DSAS-1-Gr is a valid and reliable measure for assessing stigma among people with type 1 diabetes mellitus. Key strengths of the present study are the rigorous validation process, the longitudinal design that allowed test-retest reliability, and the use of validated psychometric instruments that allowed the examination of the convergent and discriminant validity. There are, however, several limitations that need to be acknowledged, such as the relatively small sample size comprising patients of relatively young age with advantageous backgrounds (e.g., high educational level), and the fact that more women with T1D than men responded to the survey.

The consequences of stigma among people with T1D span many domains such as the emotional, behavioural, and social, leading to unhealthy behaviours and contributing to poorer diabetes control and management. The validated DSAS-1-Gr is an important assessment tool for monitoring and research in T1D, which can be used to improve people-centered health care and reduce negative self-care. A practitioner can promptly identify elevated scores and seek additional support for T1D people who need it. In addition, it can be used to improve diabetes-related outcomes among more vulnerable subgroups that are more likely to perceive or experience diabetes-related stigma.

Conclusion

In conclusion, this study resulted in the linguistic translation and rigorous psychometric validation of the DSAS-1 for use in Greek. Psychometric validation of the DSAS-1-Gr indicated that both the 18-item unidimensional structure and three-factor construct ('treated differently', 'blame and judgment', and 'identity concern') were valid, had high internal consistency reliability, and satisfactory convergent and discriminant validity. Whereas the single-factor model showed poor fit indices, it can be timidly used for research purposes. Overall, the DSAS-1-Gr meets the psychometric requirements of a valid and reliable self-report measure of type 1 diabetes mellitus stigma in Greece.

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References

1. Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB et al. IDF diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. *Diabetes Res Clin Pract* 2021, 109119, doi: 10.1016/j.diabres.2021.109119
2. American Diabetes Association Professional Practice Committee. 2. Classification and diagnosis of diabetes: Standards of Medical Care in Diabetes-2022. *Diabetes Care* 2022, 45: S17–S38, doi: 10.2337/dc22-S002
3. Ogle GD, James S, Dabelea D, Pihoker C, Svensson J, Maniam J et al. Global estimates of incidence of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Atlas, 10th Edition. *Diabetes Res Clin Pract* 2021, 109083, doi: 10.1016/j.diabres.2021.109083
4. International Diabetes Federation. *IDF Diabetes Atlas*. 10th ed. International Diabetes Federation, Brussels, Belgium, 2021
5. Dariya B, Chalikonda G, Srivani G, Alam A, Nagaraju GP. Pathophysiology, Etiology, Epidemiology of Type 1 Diabetes and Computational Approaches for Immune Targets and Therapy. *Crit Rev Immunol* 2019, 39:239-265, doi: 10.1615/CritRevImmunol.2019033126
6. Hood KK, Beavers DP, Yi-Frazier J, Bell R, Dabelea D, Mckeown RE et al. Psychosocial burden and glycemic control during the first 6 years of diabetes: results from the SEARCH for Diabetes in Youth study. *J Adolesc Health* 2014, 55:498-504, doi: 10.1016/j.jadohealth.2014.03.011
7. Barnard KD, Lloyd CE, Skinner TC. Systematic literature review: quality of life associated with insulin pump use in Type 1 diabetes. *Diabet Med* 2007, 24:607-617, doi: 10.1111/j.1464-5491.2007.02120.x
8. Browne JL, Ventura AD, Mosely K, Speight J. Measuring the Stigma Surrounding Type 2 Diabetes: Development and Validation of the Type 2 Diabetes Stigma Assessment Scale (DSAS-2). *Diabetes Care* 2016, 39:2141-2148, doi: 10.2337/dc16-0117
9. Pirart J. Tight glycaemic control prevents diabetic complications. *Acta Clin Belg* 1995, 50:321-325, doi: 10.1080/17843286.1995.11718471
10. Nicolucci A, Kovacs Burns K, Holt RI, Comaschi M, Hermanns N, Ishii H et al. Diabetes Attitudes, Wishes and Needs second study (DAWN2[™]): cross-national benchmarking of diabetes-related psychosocial outcomes for people with diabetes. *Diabet Med* 2013, 30:767-677, doi: 10.1111/dme.12245
11. Weiss MG, Ramakrishna J. Stigma interventions and research for international health. *Lancet* 2006, 367:536-538, doi: 10.1016/S0140-6736(06)68189-0

12. Browne JL, Ventura A, Mosely K, Speight J. 'I'm not a druggie, I'm just a diabetic': a qualitative study of stigma from the perspective of adults with type 1 diabetes. *BMJ Open* 2014, 4: e005625, doi: 10.1136/bmjopen-2014-005625
13. Weiss MG, Ramakrishna J, Somma D. Health-related stigma: rethinking concepts and interventions. *Psychol Health Med* 2006, 11:277-287, doi: 10.1080/13548500600595053
14. Walker RJ, Strom Williams J, Egede LE. Influence of Race, Ethnicity and Social Determinants of Health on Diabetes Outcomes. *Am J Med Sci* 2016, 351:366-373, doi: 10.1016/j.amjms.2016.01.008
15. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. *J Behav Med* 2009, 32:20-47, doi: 10.1007/s10865-008-9185-0
16. Hill B, Incollingo Rodriguez AC. Weight Stigma across the Preconception, Pregnancy, and Postpartum Periods: A Narrative Review and Conceptual Model. *Semin Reprod Med* 2020, 38:414-422, doi: 10.1055/s-0041-1723775
17. Paraskevoulakou A, Vrettou K, Pikouli K, Triantafillou E, Lykou A, Economou M. Mental Illness Related Internalized Stigma: Psychometric Properties of the Brief ISMI Scale in Greece. *Mater Sociomed* 2017, 29:211-215, doi: 10.5455/msm.2017.29.211-215
18. Browne JL, Ventura AD, Mosely K, Speight J. Measuring Type 1 diabetes stigma: development and validation of the Type 1 Diabetes Stigma Assessment Scale (DSAS-1). *Diabet Med* 2017, 34:1773-1782, doi: 10.1111/dme.13507
19. Hansen UM, Willaing I, Ventura AD, Olesen K, Speight J, Browne JL. Stigma Perceived and Experienced by Adults with Type 1 Diabetes: Linguistic Adaptation and Psychometric Validation of the Danish Version of the Type 1 Diabetes Stigma Assessment Scale (DSAS-1 DK). *Patient* 2018, 11:403-412, doi: 10.1007/s40271-017-0289-x
20. Griva F, Thomakos P, Kepaptoglou O, Ginieri-Coccosis M, Mitrakou A, Zoupas C et al. Internal structure and psychometric properties of Diabetes Distress Scale for Type 1 Diabetes. *Psychiatriki* 2020, 31:302-309, doi: 10.22365/jpsych.2020.314.302
21. Fisher L, Polonsky WH, Hessler DM, Masharani U, Blumer I, Peters AL et al. Understanding the sources of diabetes distress in adults with type 1 diabetes. *J Diabetes Complications* 2015, 29:572-577, doi: 10.1016/j.jdiacomp.2015.01.012
22. Rosenberg M. *Society and the adolescent self-image.*: Princeton University Press Princeton, NJ, 1965
23. Syropoulou A, Vernadakis N, Papastergiou M, Kourtessis T. Psychometric evaluation of the Rosenberg Self-Esteem Scale in primary school students with mild intellectual disability: First evidence. *Res Dev Disabil* 2021, 114:103964, doi: 10.1016/j.ridd.2021
24. Osman A, Wong JL, Bagge CL, Freedenthal S, Gutierrez PM, Lozano G. The Depression Anxiety Stress Scales-21 (DASS-21): further examination of dimensions, scale reliability, and correlates. *J Clin Psychol* 2012, 68:1322-1338, doi: 10.1002/jclp.21908
25. Lyrakos GN, Arvaniti C, Smyrnioti M, Kostopanagiotou G. Translation and validation study of the depression anxiety stress scale in the Greek general population and in a psychiatric patient's sample. *Eur. Psychiatry* 2011, 26:1731, doi:10.1016/S0924-9338(11)73435-6
26. Hair JF, Anderson RE, Black WC. *Multivariate Data Analysis*. 7th ed. Pearson, New York, 2014
27. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal* 1999, 6:1-55, doi:10.1080/10705519909540118
28. Cohen J. A power primer. *Psychol Bull* 1992, 112:155-159, doi: 10.1037//0033-2909.112.1.155

29. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J et al. Quality criteria were proposed for measurement properties of health status questionnaires. *J Clin Epidemiol* 2007, 60:34-42, doi: 10.1016/j.jclinepi.2006.03.012
30. Bagozzi RP, Yi Y. On the evaluation of structural equation models. *J Acad Mark Sci* 1988, 16:74-94, doi: 10.1007/bf02723327
31. Lynn MR. Determination and quantification of content validity. *Nurs Res* 1986, 35:382-385, PMID: 3640358
32. Davis LL. Instrument review: Getting the most from a panel of experts. *In Applied Nursing Research* 1992, 5:194-197, doi:10.1016/s0897-1897(05)80008-4
33. Shrout PE, Fleiss JL. Intraclass correlations: uses in assessing rater reliability. *Psychol Bull* 1979,86:420-428, doi: 10.1037//0033-2909.86.2.420
34. Washburn M, Brewer K, Gearing R, Leal R, Yu M, Torres L. Latinos' Conceptualization of Depression, Diabetes, and Mental Health-Related Stigma. *J Racial Ethn Health Disparities* 2021, 10:1-11, doi: 10.1007/s40615-021-01129-x
35. Tronieri JS, Wurst CM, Pearl RL, Allison KC. Sex Differences in Obesity and Mental Health. *Curr Psychiatry Rep* 2017, 19:29, doi: 10.1007/s11920-017-0784-8
36. Chen EY, Brown M. Obesity stigma in sexual relationships. *Obes Res* 2005, 13:1393-1397, doi: 10.1038/oby.2005.168
37. Hawro M, Maurer M, Weller K, Maleszka R, Zalewska-Janowska A, Kaszuba A et al. Lesions on the back of hands and female gender predispose to stigmatization in patients with psoriasis. *J Am Acad Dermatol* 2017, 76:648-654.e2, doi: 10.1016/j.jaad.2016.10.040
38. Rajput R, Gehlawat P, Gehlan D, Gupta R, Rajput M. Prevalence and predictors of depression and anxiety in patients of diabetes mellitus in a tertiary care center. *Indian J Endocrinol Metab* 2016, 20:746-751, doi: 10.4103/2230-8210.192924
39. Shaban MC, Fosbury J, Kerr D, Cavan DA. The prevalence of depression and anxiety in adults with Type 1 diabetes. *Diabet Med* 2006, 23:1381-1384, doi: 10.1111/j.1464-5491.2006.02012.x
40. Phelan SM, Griffin JM, Jackson GL, Zafar SY, Hellerstedt W, Stahre M et al. Stigma, perceived blame, self-blame, and depressive symptoms in men with colorectal cancer. *Psychooncology* 2013, 22:65-73, doi: 10.1002/pon.2048
41. Lewis C, Zammit S, Jones I, Bisson JI. Prevalence and correlates of self-stigma in Post-Traumatic Stress Disorder (PTSD). *Eur J Psychotraumatol* 2022, 13:2087967, doi: 10.1080/20008198.2022.2087967
42. Yokota R, Okuhara T, Okada H, Goto E, Sakakibara K, Kiuchi T. Association between Stigma and Anxiety, Depression, and Psychological Distress among Japanese Women Undergoing Infertility Treatment. *Healthcare (Basel)* 2022, 10:1300, doi: 10.3390/healthcare10071300
43. Liu NF, Brown AS, Folias AE, Younge MF, Guzman SJ, Close KL et al. Stigma in People With Type 1 or Type 2 Diabetes. *Clin Diabetes* 2017, 35:27-34, doi: 10.2337/cd16-0020

Table 1. Demographic characteristics of the participants

| Characteristics | Total sample (n=105) Mean \pm SD / N (%) | Re-test sample (n=15) Mean \pm SD / N (%) |
|------------------------------|---|--|
| Age (years) | 34.3 \pm 11.1 | 33.3 \pm 9.5 |
| Diabetes duration (years) | 19.4 \pm 10.5 | 17 \pm 9.8 |
| Gender | | |
| Male | 31 (29.5) | 3 (20) |
| Female | 74 (70.5) | 12 (80) |
| Educational Level | | |
| Primary and secondary | 26 (24.8) | 7 (46.7) |
| University | 79 (75.2) | 8 (53.3) |
| Family status | | |
| Unmarried | 50 (47.6) | 10 (66.7) |
| Married | 33 (31.4) | 4 (26.7) |
| Divorced | 5 (4.8) | 0 (0) |
| Other | 17 (16.2) | 1 (6.7) |
| Treatment: insulin pump | 44 (41.9) | 9 (60) |
| Employment | | |
| Paid work (employed) | 74 (70.5) | 10 (66.5) |
| Unemployed | 17 (16.20) | 4 (26.7) |
| Retired | 3 (2.9) | 0 (0) |
| Other | 11 (10.5) | 1 (6.7) |
| Income status | | |
| Low | 16 (15.2) | 0 (0) |
| Average | 71 (67.6) | 13 (86.7) |
| High | 18 (17.1) | 2 (13.3) |
| Psychosocial characteristics | | |
| T1-DDS (Total score) | 76.5 \pm 29.3 | N/A |
| RSES | 29.4 \pm 4.3 | N/A |
| DASS-21 | | |
| Depression | 4.4 \pm 4.6 | N/A |
| Anxiety | 4.3 \pm 4.2 | N/A |
| Stress | 6.7 \pm 4.6 | N/A |

Note: T1-DDS: Diabetes Distress Scale for Type 1 Diabetes (23-138); RSES: Rosenberg Self-Esteem Scale (10-40); DASS-21(0-21): Depression Anxiety and Stress Scale; N/A: Not Applicable

Table 2. Factor analysis and internal consistency reliability of the 18-item DSAS-1-Gr

| Item wording (item No.) | Three-factor solution ^a | | | | | | Diabetes stigma (unidimensional) ^b | |
|---|------------------------------------|------|---------------------|------|--------------------|------|---|------|
| | Identity concerns | | Treated differently | | Blame and judgment | | EFA | CFA |
| | EFA | CFA | EFA | CFA | EFA | CFA | | |
| I feel embarrassed when I have to manage my type 1 diabetes in public (e.g., check blood glucose, inject/bolus insulin, refuse food, eat extra food) (10) | 0.85 | 0.9 | | | | | 0.69 | 0.77 |
| I worry what people will think if they see me injecting/bolusing insulin or checking my blood glucose in public (13) | 0.85 | 0.86 | | | | | 0.61 | 0.44 |
| I feel self-conscious about all the tools I need to manage my type 1 diabetes (e.g., insulin pen, pump, blood glucose meter) (7) | 0.82 | 0.8 | | | | | 0.6 | 0.75 |
| I feel worried about telling people I have type 1 diabetes in case they react negatively (18) | 0.80 | 0.74 | | | | | 0.63 | 0.78 |
| To avoid negative reactions, I don't tell people I have type 1 diabetes (2) | 0.79 | 0.70 | | | | | 0.55 | 0.68 |
| I feel embarrassed about what people might think if I need help with a hypo (5) | 0.65 | 0.67 | | | | | 0.57 | 0.63 |
| Some people think I'm unreliable because I have type 1 diabetes (15) | | | 0.72 | 0.67 | | | 0.61 | 0.49 |
| Some people see me as a lesser person because I have type 1 diabetes (3) | | | 0.72 | 0.81 | | | 0.69 | 0.68 |
| I have been discriminated against in the workplace because I have type 1 diabetes (6) | | | 0.71 | 0.67 | | | 0.51 | 0.63 |
| I have been rejected by others (e.g., friends, colleagues, romantic partners) because of my type 1 diabetes (12) | | | 0.70 | 0.57 | | | 0.59 | 0.23 |
| Some people expect less of me because I have type 1 diabetes (19) | | | 0.69 | 0.65 | | | 0.62 | 0.52 |
| Because I have type 1 diabetes, I have been excluded by others from certain social events (8) | | | 0.62 | 0.5 | | | 0.49 | 0.38 |
| Some people think I'm irresponsible when my diabetes management isn't 'perfect' (4) † | | | 0.61 | 0.68 | 0.47 | N/A | 0.4 | 0.42 |
| Some people assume that it is my fault I have type 1 diabetes (e.g., I ate too much sugar, I could have prevented it) (9) | | | | | 0.88 | 0.85 | 0.6 | 0.48 |
| Some people think I need insulin because I haven't looked after myself (11) | | | | | 0.78 | 0.73 | 0.59 | 0.39 |
| Some people think that I brought type 1 diabetes on myself (17) | | | | | 0.77 | 0.89 | 0.63 | 0.78 |
| Because I have type 1 diabetes, some people judge me if I eat sugary food or drinks (e.g., cakes, lollies, soft drink) (14) | | | | | 0.54 | 0.49 | 0.57 | 0.49 |

| | | | | | | |
|--|------------|------------|------------|-------------|------|------|
| Some people make unfair assumptions about what I can and cannot do because of my type 1 diabetes (1) | | | 0.46 | 0.42 | 0.45 | 0.37 |
| Score range | 6–30 | 7–35 | 5–25 | 18–90 | | |
| Mean ± sd | 12.7 ± 5.9 | 16.2 ± 5.8 | 15.9 ± 4.5 | 44.9 ± 12.5 | | |
| Eigenvalue | 6.35 | 2.8 | 1.6 | N/A | | |
| % variance explained | 35.3 | 15.5 | 9.2 | | | |
| Composite reliability (CFA) | 0.9 | 0.84 | 0.82 | 0.87 | | |
| AVE (CFA) | 0.61 | 0.43 | 0.50 | 0.3 | | |
| Cronbach's alpha | 0.89 | 0.84 | 0.80 | 0.88 | | |

Note: ^a Forced three factor solution with principal components analysis and varimax rotation, loadings less or equal to 0.40 are not shown, variables are sorted by highest loading; ^b Forced one-factor solution with principal components analysis; †not included in the scoring of “Blame and judgment” subscale; N/A: Not Applicable; AVE: Average Variance Extracted.

Table 3. Correlations of the DSAS-1-Gr and its subscales with validity measures

| | Identity concerns | Treated differently | Blame and judgment | DSAS-1-Gr unidimensional |
|---------------------------|-------------------|---------------------|--------------------|--------------------------|
| DASS-21 | | | | |
| Depression | 0.31** | 0.30* | 0.39** | 0.41** |
| Anxiety | 0.39** | 0.33** | 0.40** | 0.46** |
| Stress | 0.37** | 0.37** | 0.48** | 0.51** |
| Total distress (T1-DDS) | 0.35** | 0.29** | 0.28** | 0.42** |
| RSES | -0.38** | -0.38** | -0.30** | -0.43** |
| Diabetes duration (years) | -0.21* | -0.10 | -0.34** | -0.29** |

Note: DASS: Depression Anxiety and Stress Scale; T1-DDS: Diabetes Distress Scale for Type 1 Diabetes; RSES: Rosenberg Self-Esteem Scale. *p<0.05, **p<0.01

ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Διαστάσεις και ψυχομετρικές ιδιότητες της ελληνικής έκδοσης της Κλίμακας Αξιολόγησης Στίγματος στον Διαβήτη τύπου 1 (DSAS-1-Gr)

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ΠΕΡΙΛΗΨΗ

Ο Σακχαρώδης Διαβήτης τύπου 1 (ΣΔ1) είναι μία από τις πιο συχνές χρόνιες παθήσεις που επηρεάζουν τα παιδιά και τους έφηβους. Η καθημερινή διαχείριση του ΣΔ1 απαιτεί συνεχή ινσουλινοθεραπεία, καθώς και την αναπόφευκτη προσαρμογή των καθημερινών δραστηριοτήτων των πασχόντων σύμφωνα με τον γλυκαιμικό έλεγχο, τα οποία πιθανόν επιδρούν στο στίγμα που σχετίζεται με τον ΣΔ1. Ένα μεγάλο ποσοστό ατόμων με ΣΔ1 έχει αποδειχθεί ότι βιώνουν αίσθημα κοινωνικής διάκρισης και στίγματος, τα οποία μπορεί να οδηγήσουν σε συναισθηματική δυσφορία και να λειτουργήσουν ως εμπόδιο στην αναζήτηση βοήθειας. Σε αυτή την εργασία παρουσιάζονται οι βασικές ψυχομετρικές ιδιότητες της ελληνικής μετάφρασης του ερωτηματολογίου Diabetes Stigma Assessment Scale-1 (DSAS-1), το οποίο αξιολογεί το αυτοαντιλαμβανόμενο στίγμα σε άτομα που πάσχουν από ΣΔ1. Ένα δείγμα 105 ενηλίκων με διαβήτη τύπου 1, ηλικίας 34.3 έτη ($\pm 11,1$), κυρίως γυναίκες (70,5%), με μέση διάρκεια νόσου τα 19.4 έτη ($\pm 10,5$), συμπλήρωσαν το μεταφρασμένο στα ελληνικά DSAS-1 (DSAS-1-Gr). Για τη διερεύνηση της εγκυρότητας εννοιολογικής κατασκευής της κλίμακας, χρησιμοποιήθηκαν η διερευνητική παραγοντική ανάλυση και η επιβεβαιωτική παραγοντική ανάλυση. Η επιβεβαιωτική παραγοντική ανάλυση υποστήριξε το μοντέλο των τριών παραγόντων, αντίστοιχα με την πρωτότυπη έκδοση στα αγγλικά: 'ανησυχίες ταυτότητας', 'διαφορετική αντιμετώπιση', 'μομφή και κριτική'. Οι δείκτες εσωτερικής συνοχής (Cronbach alpha) ήταν πάνω από $\alpha = 0.80$ και για τις τρεις υποκλίμακες, ενώ η μονοδιάστατη δομή της κλίμακας είχε δείκτη εσωτερικής συνοχής $\alpha = 0.88$. Η κλίμακα DSAS-1-Gr παρουσίασε συγκλίνουσα εγκυρότητα με το Diabetes Distress scale for type 1 Diabetes (T1-DDS), το ερωτηματολόγιο Rosenberg Self-Esteem scale, καθώς και με τις υποκλίμακες κατάθλιψη, άγχος και στρες του ερωτηματολογίου DASS-21. Η αποκλίνουσα εγκυρότητα αξιολογήθηκε και επιβεβαιώθηκε με τα χρόνια νόσησης από το ΣΔ1. Τέλος, οι γυναίκες παρουσίασαν υψηλότερη συνολική βαθμολογία στην DSAS-1-Gr σε σχέση με τους άνδρες. Το ερωτηματολόγιο DSAS-1-Gr είναι ένα έγκυρο και αξιόπιστο εργαλείο που μπορεί να χρησιμοποιηθεί στην κλινική πρακτική για την αξιολόγηση του στίγματος σε άτομα με ΣΔ1 στην ελληνική γλώσσα.

ΛΞΞΙΣ ΕΥΡΕΤΗΡΙΟΥ: Σακχαρώδης διαβήτης τύπου 1, σίγμα, εγκυρότητα, αξιοπιστία, παραγοντική ανάλυση.

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