

## **Evaluation of psychometric properties of the third version of the Iranian Diabetes Attitude Scale (IR-DAS-3)**

Mohammad Yoosef Mahjouri<sup>1</sup>, Seyed Masoud Arzaghi<sup>1\*</sup>, Mostafa Qorbani<sup>1</sup>, Ensieh Nasli Esfahani<sup>1</sup>,  
Bagher Larijani<sup>1</sup>

*1- Endocrinology and Metabolism Research Center, Tehran University of Medical Sciences, Tehran, Iran*

### **Abstract**

**Background:** The aim of this pilot study was to evaluate the psychometric properties of the third version of the Iranian Diabetes Attitude Scale (DAS-3).

**Methods:** A sample of 100 patients with type2 diabetes, selected via a systematic random sampling method, completed the IR-DAS-3. The validity of the questionnaire was evaluated through concurrent and criterion validity, whereas its reliability was assessed by test re-test internal consistency and splitting method.

**Results:** The internal consistency and test-retest reliability of IR-DAS-3 was acceptable ( $\alpha = 0.78$ ,  $\alpha = 0.68$ ). The IR-DAS-3 total score and its five subscales score were correlated with HbA<sub>1c</sub> levels ( $P < 0.01$ ); this supported the concurrent validity of the questionnaire.

**Conclusion:** The psychometric properties of the IR-DAS-3 are acceptable and the scale is a good instrument for assessing the attitudes of the Iranian diabetic patients.

**Keywords:** Diabetes, Diabetes Attitude Scale (DAS), Validity, Reliability

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\*Corresponding Author: Endocrinology and Metabolism Research Center, Tehran University of Medical Science, Shariati Hospital, North Kargar Street, 14114 Tehran, Iran. Tel: +98 (21) 88220037-38, Fax: +98 (21) 88220052, email: dr.arzaghi@gmail.com

## Introduction

Diabetes is a chronic and progressive disease. In its poorly controlled forms, it is associated with various long term complications and has considerable effects on a patient's well-being and social life. The World Health Organization estimates that diabetes will affect more than 350 million persons worldwide by 2030, with the number of sufferers being more than doubled from the year 2000 (1).

Self-management of the daily activities is expected to not only prevent from the complications of diabetes but also minimize the problems of living with the disease (2). There are four factors which determine an individual's adherence to treatment, the psychological consequences of the disease and self-management: self-esteem, self-efficacy, depression and bingeing behavior (3); from among which self-esteem and self-efficacy are the most important factors (4).

Self-management is the core of diabetes care and improving self-efficacy is believed to be an effective way for improving self-management skills (2); as a result, improving diabetic's self-efficacy is the main purpose of educational, psychological and behavioral interventions in diabetes (5).

Self-efficacy is a psychological concept which was introduced by Albert Bandura (1982) for the first time (6). According to Bandura, self-efficacy defined as people's judgments about their ability to organize and execute courses of action to attain desired outcomes (7), thus self-efficacy may be a key element in successful self management behavior (7, 8). In some studies regression analysis indicate self-efficacy as a mediator between mastery experience and adherence to treatment (2) and some studies identified, 30.8% of the variance in HbA1c assays explained by patients' diabetes specific self-efficacy (9), and also self-efficacy explained 4% to 10% of the variance in diabetes self-care behaviors beyond that accounted for by patient characteristics and health beliefs about barriers (10).

There is a significant difference between the treatment methods in diabetes and other acute diseases; in diabetes treatment we need to know about attitudes of patients towards disease and variety of education and clinical caring relate to (11-13). Also, to know about patients behavior with diabetes requires some knowledge of their

attitudes towards diabetes and its treatment (14). Studies showed patient's beliefs about the seriousness of diabetes and responding to cues to action were associated with adherence to treatment (15) and perceived severity was associated with metabolic control and perceived barriers was associated with adherence to treatment in older Type 2 diabetes (16). Also the health care provider beliefs and attitudes about disease can influence the adherence to standards of diabetes care (17). Therefore, investigating the patients' and clinicians' attitudes about diabetes and their beliefs about treatment is cost-effective way which improves clinician-patients relation and increase positive consequences.

Diabetes Attitude Scale (DAS) is one of the applicable tools in assessing attitudes in diabetes and since is general instrument, can be used in different situations, for assessing patients attitudes about diabetes and treatments that received (18), assessing clinicians ideas toward treatment (19-21), study of difference between patients and clinicians attitudes (22), study the difference between attitudes of patients belong to various classifications of gender, age and types of diabetes (23) and investigating educational programs prepared for diabetic people (24).

We need an Iranian version of DAS for assessing attitudes of health care provider and patients about diabetes. Therefore, the aim of this study is to evaluate properties of third version of the Iranian Diabetes Attitude Scale (IR-DAS-3).

## Methods

### Procedure

The procedure consisted of two stages: 1- Preparing Persian version of DAS-3: after translating English version of DAS-3 by 3 bilingual translators and back translation, it offered to two groups of professionals in this field, clinicians and patients, then their opinions about probable changes summarized and used for the last version. 2- Psychometric evaluations: The last Persian version of DAS-3 distributed in two stage (at the onset of study and two months later) among participants after obtaining their informed consent. The patients completed the questionnaires in a comfortable and quiet room. The DAS-3 questions for

illiterate participants were read by a physician and their answers were recorded.

### Subjects

The present cross-sectional study was conducted in diabetes clinic of Endocrine and Metabolism Research Institute, Tehran University of Medical Sciences (TUMS). One hundred patients were selected via random sampling method among 4500 patients who had medical record in that clinic. Inclusion criteria were: patients with type2 diabetes, over 18 years old, without any serious complications, such as unstable coronary artery disease, severe heart failure, stroke with sequelae, end-stage renal disease, severe peripheral vascular disease and any severe psychiatric disorder affecting cognitive ability such as dementia and schizophrenia.

### Measurements

We used the US version of DAS-3. The content validity of the US version of DAS-3 was generated by a panel of 22 diabetes experts through Delphi technique. The Delphi process resulted in a DAS-3 with five subscales: need for special training, seriousness of type 2 diabetes, value of tight control, psychosocial impact of diabetes, and patient' autonomy. The scale consists of 33 five-point Likert scale items and score from strongly agree to strongly disagree (20). Also, In addition to DAS-3, Diabetes Empowerment Scale (DES) was used. Twenty eighth items of this scale are categorized in three subscales, including: managing the psychosocial aspects of diabetes, assessing dissatisfaction and

readiness to change, and setting and achieving diabetes goals (25). Scoring is based on completed items from strongly agree (5 points) to strongly disagree (1 point) where higher scores indicates better adjustment to the illness. To assess demographic characteristics (Gender, Age, Diabetes treatment, Education, Duration of diabetes) we used a self-report questionnaire. Current HbA<sub>1c</sub> value was collected from the patients' medical records.

### Statistics

In the present study, all analyses were performed with Statistical Package for the Social Sciences (SPSS-16). The reliability was evaluated through internal consistency (total Cronbach's alpha and alpha for each subscales), test-retest and splitting methods (spearman-brown coefficient correlation) and DAS validity evaluated through criterion validity (correlation between the scores obtained in DAS and HbA<sub>1c</sub> for all participants that calculated by Pearson correlation coefficient) and concurrent validity (correlation between the scores obtained from DAS and the scores obtained from DES).

### Results

#### Demographic and clinical data

IR-DAS-3 completed by 100 patients (male= 54, female = 46) with type2 diabetes. The mean age of participants was 52.6 (SD=7.1) years with average duration of diabetes 8.6 (SD=5.8) years, other demographic and clinical data summarized in Table 1.

**Table 1. Demographic and clinical data (n= 100)**

Characteristics	%
<b>Sex</b>	
Men	54
Women	46
<b>Age *</b>	52.65 (7.1)
<b>Duration of diabetes (years)*</b>	8.64 (5.80)
<b>HbA<sub>1c</sub> *</b>	6.86 (0.37)
<b>Education</b>	
Illiterate	21
Elementary school	14
High school	47
University	18
<b>Diabetes treatment</b>	
Insulin	11
Oral agents	59
Insulin and oral agents	30

\*Data for the age, duration of diabetes and HbA<sub>1c</sub> are Mean (SD).

### Reliability

Internal consistency calculated by Cronbach's alpha ( $\alpha$ ). The  $\alpha$ -coefficient for IR-DAS-3 total score was 0.78, Cronbach's  $\alpha$  for each of five subscales summarized in Table 2. Also test-retest reliability evaluated through Pearson coefficient correlation and the results suggested 0.68 as total reliability ( $p < 0.01$ ).

Moreover, splitting method (Spearman-Brown coefficient correlation for two parts of the scale) determined that correlation between forms, the first part alpha, the second part alpha, and the reliability coefficient respectively was 0.61, 0.58, 0.71 and 0.76. These results showed that the reliability of IR-DAS-3 is acceptable.

Table 2. Internal consistency for each subscales and total score

Subscales	Items	N. of items	Cronbach's $\alpha$
<b>Need for special training</b>	<b>In general, I believe that:</b> health care professionals who treat people with diabetes should be trained to communicate well with their patients. health care professionals should be taught how daily diabetes care affects patients' lives. it is important for the nurses and dietitians who teach people with diabetes to learn counseling skills. health care professionals should learn how to set goals with patients, not just tell them what to do. to do a good job, diabetes educators should learn a lot about being teachers. people who do not need to take insulin to treat their diabetes have a pretty mild disease. older people with Type 2 diabetes do not usually get complications. people whose diabetes is treated by just a diet do not have to worry about getting many long-term complications. blood sugar testing is not needed for people with Type 2 diabetes. Type 2 diabetes is a very serious disease. Type 2 is as serious as Type 1 diabetes. people who take diabetes pills should be as concerned about their blood sugar as people who take insulin. there is not much use in trying to have good blood sugar control because the complications of diabetes will happen anyway. keeping the blood sugar close to normal can help to prevent the complications of diabetes. almost everyone with diabetes should do whatever it takes to keep their blood sugar close to normal. low blood sugar reactions make tight control too risky for most people. people who have Type 2 diabetes will probably not get much payoff from tight control of their blood sugars. tight control is too much work. tight control of blood sugar makes sense only for people with Type 1 diabetes. diabetes affects almost every part of a diabetic person's life. the emotional effects of diabetes are pretty small. diabetes is hard because you never get a break from it. having diabetes changes a person's outlook on life. it is frustrating for people with diabetes to take care of their disease. support from family and friends is important in dealing with diabetes. the important decisions regarding daily diabetes care should be made by the person with diabetes. health care professionals should help patients make informed choices about their care plans. people with diabetes should have the final say in setting their blood glucose goals. the person with diabetes is the most important member of the diabetes care team. people with diabetes should learn a lot about the disease so that they can be in charge of their own diabetes care. what the patient does has more effect on the outcome of diabetes care than anything a health professional does. people with diabetes have a right to decide how hard they will work to control their blood sugar. people with diabetes have the right not to take good care of their diabetes.	5	0.78
<b>Seriousness of type2 diabetes</b>		7	0.71
<b>Value of tight control</b>		7	0.57
<b>Psychosocial impact of diabetes</b>		6	0.58
<b>Patient autonomy</b>		8	0.59
<b>DAS total score</b>		33	0.78

### Validity

We calculated criterion validity via assessing the existence of relation between HbA<sub>1c</sub> levels as metabolic control indicator and duration of diabetes with DAS total score and its subscales scores. The results indicated that the correlation between HbA<sub>1c</sub> with DAS total score and its subscales scores is negative and significant, also

duration of diabetes correlated with DAS total and one of the subscales (table 3). Moreover the concurrent validity between DES-28 and IR-DAS-3 questionnaires calculated by Pearson correlation and the results indicated this correlation was positively direct and mixed ( $r = 0.42$  and  $p < 0.01$ ).

Table 3. Correlations between IR-DAS-3 and diabetes-related data

Subscales	Duration of diabetes	HbA1C
Need for special training	0.31*	-0.78*
Seriousness of type 2 diabetes	0.11	-0.30*
Value of tight control	0.11	-0.49*
Psychosocial impact of diabetes	0.12	-0.67*
Patient autonomy	0.05	-0.60*
DAS Total score	0.21*	-0.86*

Correlations were performed with Pearson's product moment correlation or Spearman method as appropriate

\*  $P < 0.01$

## Conclusion

The purpose of this pilot study was to evaluate the validity and reliability of third version of Diabetes Attitude Scale (DAS-3), which is one of the scales that used for assessment self-efficacy in diabetes. In the present study we evaluated the reliability and results indicated that internal consistency of the scale is acceptable ( $\alpha = 0.78$ ), also results of test-retest reliability and splitting method showed that IR-DAS-3 is reliable. We also found support for criterion validity, because there was a relatively powerful negative correlation between overall DAS and its subscales scores with HbA<sub>1c</sub> levels as metabolic control indicator. This result indicated that positive attitude towards diabetes can improve metabolic control. On the other hand, we found that a fair correlation between DAS total score and the first subscale means "Need for special training" with duration of diabetes was exist. It seems this relation shows that by increasing duration of disease patients will understand that special education is needed for diabetes management. Also, it seems in general, by increasing duration of disease, attitudes of patients about diabetes will improve.

Moreover, in this study we found support for concurrent validity when comparing IR-DAS-

3 with DES-28, because there was a positively direct correlation between overall DAS and DES scores. Thus, this issue indicated that better attitude towards the diabetes, leads to increasing the ability of diabetes control and vice versa.

As the results showed this scale is reliable and valid tool for investigating the self-efficacy and attitude among people with diabetes and this findings are consistent with the results of previous study in this field (20). However the finding introduce this scale as an appropriate instrument for Iranian population, as the number of participant was not sufficient; re-conducting this study with greater and variable sample is recommended. As it was mentioned, DAS has been used for many groups of health care professionals and validated for them (19, 20, 22, 23), so the scale presented in this study can be used as guidance for this aim in Iranian health care professionals.

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