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## Original Article

# Development and psychometric evaluation of a new instrument to assess nutritional perceptions and behaviors of diabetic men

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## ABSTRACT

**Background:** It is obvious that unhealthy nutritional behaviors have caused the increasing incidence of diabetes. This study aimed to design the Measure of Nutritional Perceptions and Behaviors in diabetic men and to evaluate its psychometric properties.

**Methods:** A questionnaire was developed within 7 factors. Three methods of face validity, content validity, and construct validity were employed to ensure the validity of the scale. 206 men with diabetes completed the questionnaires. Internal was used to evaluate the reliability of the scale.

**Results:** The mean age of men was 58.26 (9.74) years. Results showed that each item in the final questionnaire was highly correlated with the total score of each dimension  $P < 0.05$ . Moreover, factor analysis led to the extraction of 36 items with acceptable factor loadings in the range of 0.41 to 0.84, which could account for 51% of the total variance. The Cronbach's alpha coefficient equal to 0.83 was obtained for the whole scale.

**Conclusion:** The reliability and validity of diabetic men's beliefs about healthy nutritional behaviors were desired and the overall structure of the questions was confirmed. This questionnaire can be used to identify individuals at risk for unhealthy nutritional behaviors and also to conduct and evaluate the impact of educational interventions.

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## 1. Background

Diabetes is one of the most prevalent metabolic diseases, falls within the biggest health problems, and can lead to debilitating complications if not controlled [1–4]. In addition to the negative health effects, it imposes huge costs on the health system [5–7]. According to the report released by the World Health Organization, the prevalence of diabetes in 2016 amounted to 10.30% in the adult population of Iran; this value was announced equal to 9.6% for men and 11.1% for women [8].

As per the research findings, nutritional behaviors and the observance of proper eating diets play a crucial role in the control of blood sugar in diabetic patients [9]. They should show proper nutritional behaviors to control blood sugar, which entails

increased knowledge about nutritional behaviors in these patients [9]. Studies have shown that a large number of diabetic patients refrain from adopting healthy eating behaviors despite the presence of extensive training in this regard; in other words, self-care is influenced by several factors, such as nutritional knowledge [10,11]. In contrast, some studies have shown that there is no significant association between increased knowledge and the adoption of healthy behaviors [12]. In this regard, some researchers have referred to the role of psychosocial factors in self-care behaviors [13]. One of the most important factors in this context is self-efficacy, or one's confidence in his/her ability to perform this behavior. In many studies, self-efficacy is a direct predictor for making a decision on the behavior and the conduct of this behavior [14–17]. Other studies have shown that family support leads to the creation of motivation and the improvement of self-care behaviors in various related fields, including nutrition [18,19]. Thus, enhancing one's perceptions of social support may improve the self-care process in one's nutrition [18,19]. Since there are a large number of the determinants of self-care behaviors, it is

Abbreviations: CVR, content validity ratio; CVI, content validity index; EFA, explanatory factor analysis.

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therefore necessary to design and validate an instrument for the measurement of these constructs together. In this way, it will be possible to measure the association between the above factors and behaviors and to assess the results of related interventions.

To date, several instruments have been developed to assess the factors associated with the nutrition of diabetic patients, but none of them have addressed the above-mentioned factors. In 2009, Jitender Nagpal designed and developed an instrument in India to evaluate the quality of life of diabetic patients on middle- and high-income populations where this scale did not take into account the psychosocial variables that determined behavior [20]. Similarly, SGK in 2015 designed and developed an instrument in Asia on the quality of life of different ethnic and multi-lingual groups of South East Asia [21]. It is noteworthy that these two instruments have not been designed to measure the behaviors and their related perceptual factors, such as social support, self-efficacy, knowledge, and control beliefs that are the important determinants of self-care behaviors. In 2016, Ashok Chandra Rao developed a tool to assess the knowledge of diabetic patients [22]. However, the above-mentioned instruments lacked the ability to assess the other

variables mentioned above. Ghazanfari et al. developed a questionnaire to measure the perceptual factors associated with physical activity in Iranian women and assessed its psychometric features [23]. However, the above instrument has solely addressed the perceptual factors in the context of theory of planned behavior. In addition, it does not consider other factors, such as social support, self-efficacy, and knowledge in the dimension of men's nutritional behaviors. As it was mentioned above, several instruments have been designed to evaluate nutritional factors and quality of life in diabetic patients based on culture, language, and ethnic groups in various populations [20,21]. However, no studies have been done so far to assess nutritional behaviors and beliefs of diabetic men in Iran. With respect to the increasing rates of diabetes development [24,25], and the importance of identifying nutritional behaviors and beliefs as well as their determinants, an increasing need is felt for the design and evaluation of technical and appropriate health training interventions as well as the design of a valid and reliable instrument. Therefore, the present study was aimed to evaluate the psychometric features of the Measure of Nutritional Beliefs and Behaviors in diabetic men in Isfahan.

**Table 1**  
Corrected Item-Total Correlation.

Factor	Row	Item	Mean (Std. Deviation)	Corrected Item-Total Correlation	Skewness	Std. Error of Mean
Social support	1.	My family and the people around encourage me to have 3 major meals per day.	3.8 (1.27)	0.47	-0.76	0.08
	2.	My family and the people around encourage me to have major meals and snacks at certain hours.	3.8 (1.17)	0.48	-0.78	0.08
	3.	My family and the people around encourage me to have 3 snacks per day.	3.7(1.22)	0.47	-0.71	0.08
	4.	My family and the people around encourage me to all food groups per day and have a diverse diet.	3.6(1.2)	0.45	-0.57	0.08
	5.	My family and the people around support me in the consumption of liquid oil (olive or canola) in food preparation instead of solid oil.	3.7 (1.13)	0.47	-0.67	0.07
	6.	My family and the people around encourage me to use low salt foods.	3.8(1.08)	0.48	-0.78	0.07
	7.	My family and the people around encourage me to reduce the consumption of high-fat and fried foods.	3.7(1.1)	0.40	-0.67	0.07
	8.	My family and the people around encourage me to consume low-fat dairy.	3.8(0.9)	0.51	-0.62	0.06
	9.	My family and the people around support me in the use of the meat and poultry whose fat and skin have been isolated before cooking.	3.9(1.01)	0.40	-0.88	0.07
	10.	My family and the people around encourage me to use raw nuts.	3.8(0.9)	0.32	-0.67	0.06
	11.	My family and the people around support me in fish consumption.	3.9(0.9)	0.43	-0.8	0.06
	12.	My family and the people around support me in reducing or stopping drinking alcoholic beverages.	3.8(0.9)	0.36	-0.91	0.06
	13.	My family and the people around encourage me to consume fruits and vegetables and grains.	3.8(0.9)	0.41	-0.71	0.06
Self-efficacy	14.	I can restrict sugar intake.	3.7(0.9)	0.50	-0.074	0.06
	15.	I am able to use raw and unsalted nuts.	3.7(0.9)	0.35	-0.8	0.06
	16.	I am able to reduce the consumption of fried and high-fat foods.	3.8(1.05)	0.38	-0.7	0.07
	17.	I am able to use low-fat dairy.	3.8(0.9)	0.36	-0.9	0.06
	18.	I am able to use liquid oil (olive or canola) in the preparation of foods.	3.6(1.08)	0.38	-0.6	0.07
	19.	I am able to avoid drinking alcoholic beverages or to limit their consumption.	3.6(1.05)	0.31	-0.9	0.07
	20.	I am able to use packed juice and refrain from having industrial and sugary drinks.	3.8(0.9)	0.38	-0.6	0.06
	21.	I can use low-fat yogurt, lemon juice, and herbs instead of sauce.	3.7(1.04)	0.33	-0.7	0.07
	22.	I can use fish twice a week or more.	3.7(1.06)	0.27	-0.7	0.07
	23.	I can use fruits and vegetables per day.	3.7(1.01)	0.40	-0.5	0.07
	24.	I can separate the fat from meat and poultry before cooking.	3.7(0.9)	0.41	-0.7	0.06
behaviors	25.	Have you used chicken skin?	4.2(0.9)	0.42	-1.17	0.06
	26.	Have you used the fat of meat?	4.2(0.8)	0.34	-1.07	0.06
	27.	Have you consumed alcoholic drinks?	4.08(1.19)	0.34	-1.2	0.08
	28.	How often have you used solid oil?	4.1(0.9)	0.30	-0.9	0.06
Controlled beliefs	29.	Daily use of all food groups and varied diets is not possible.	2.4(1.05)	-0.05	0.83	0.07
	30.	Low salt food intake is not pleasant.	2.3(1.13)	-0.08	0.88	0.07
	31.	The consumption of major meals and snacks at certain hours is hard.	2.4(1.01)	-0.14	1.01	0.07
	32.	Daily consumption of three major meals is time-consuming.	2.8(1.2)	0.09	0.34	0.08
	33.	Daily consumption of three snacks is time-consuming.	3.01(1.25)	0.04	0.22	0.08
Knowledge	34.	Which type of oil is more suitable for diabetics?	0.4(0.5)	0.24	0.11	0.03
	35.	What is the best cooking method of food?	0.6(0.48)	0.26	-0.5	0.03
	36.	Is the regular and punctual consumption of meals and snacks necessary for diabetic patients?	0.4(0.4)	0.25	0.2	0.03

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