

## Determination of empowerment score in type 2 diabetes patients and its related factors

Azar Tol,<sup>1</sup> Davood Shojaeezadeh,<sup>2</sup> Golamreza Sharifirad,<sup>3</sup> Fatemeh Alhani,<sup>4</sup> Mohamadreza Mohajeri Tehrani<sup>5</sup>

Department of Health Education and Promotion, School of Public Health, Isfahan University of Medical Sciences, Isfahan,<sup>1,3</sup>

Department of Health Education and Promotion, School of Public Health, TUMS; School of Public Health, Poursina Ave, Tehran<sup>2</sup> School of Medicine, Tarbiat Modarres University, Tehran,<sup>4</sup> Endocrine and Metabolism Research Centre, TUMS; Dr. Shariati Hospital, North Karegar Ave, Tehran,<sup>5</sup> Iran.

### Abstract

**Objectives:** To assess empowerment score in type 2 diabetic patients.

**Methods:** A descriptive - correlation study was performed for a period of four months in 2011. Study population was type 2 diabetic patients referred to Omolbanin, Diabetic Center in Isfahan, cultural capital of Iran. Hundred and sixty diabetic patients met the inclusion criteria and were all included in the study. Patient's empowerment was measured by DES (Diabetes Empowerment Scale) self-report scale with subscales reflecting three areas including Managing the psychosocial aspect of diabetes (9 items), Assessing dissatisfaction and readiness to change (9 items) and Setting and achieving diabetes goal (10 items). Collected data was analyzed by using SPSS software version 11.5.

**Results:** Participants were between the ages of 38 and 78 with a mean of  $48.67 \pm 7.99$  years. There were 49.4% males, 87.5% were married, and 44.9% had education of diploma and higher. Mean duration of diabetes was  $5.62 \pm 3.81$  years. In all 46.9% participants had borderline metabolic control according to World Health Organization criteria. Using Diabetes Empowerment Scale, three conceptual domains of 'Managing the psychosocial aspect of diabetes', 'Assessing dissatisfaction and readiness to change' and 'Setting and achieving diabetes goal' were measured and scored for each patient. The average score of each domain was  $27.15 \pm 8.20$ ,  $(29.03 \pm 10.40)$ ,  $(31.95 \pm 11.70)$  respectively. 'Setting and achieving diabetes goal' was considered as the most important domain in measuring diabetes self-management.

Diabetes empowerment level showed a significant relationship between variables such as educational level ( $p < 0.001$ ), gender (0.007), age ( $p < 0.001$ ), and duration of diabetes ( $p < 0.001$ ). Pearson correlation coefficient also revealed that empowerment of type 2 diabetic patients has a reverse relationship with HbA1c ( $r = -0.75$ ,  $p < 0.001$ ). Furthermore, ordinal regression test revealed that having diploma and higher education ( $p = 0.005$ ), and optimal and borderline HbA1c ( $p < 0.001$ ) were effective factors in empowering diabetic patients.

**Conclusion:** Empowerment is psychosocial self-efficacy. Healthcare professionals and researchers have introduced 'self-empowerment' as a key element in managing chronic diseases. When it comes to diabetes, empowerment implies an approach that attempts to enhance the ability of patients to actively understand and influence their own lives and health status. It seems that patients with diabetes can be empowered to manage their chronic disease if they are actively informed and educated.

**Keywords:** Empowerment, Diabetes type 2, Self-management, Self-care, HbA1c (JPMA 62: 16; 2012).

### Introduction

Type 2 diabetes is a metabolic disorder and an increasingly prevalent condition worldwide.<sup>1</sup> As a determinant of epidemiologic transition, diabetes is recognized as a major health concern in both developed and developing countries.<sup>2</sup> World Health Organization (WHO) estimates that it is becoming the epidemic of the 21st century, and that 70% of known cases of diabetes are detected in developing countries.<sup>3</sup>

The prevalence of diabetes is accompanied by rapid cultural changes, aging population, increase in civilization,

changes in nutritional behavioural patterns, unhealthy and inappropriate lifestyle.<sup>4</sup> The prevalence of disease varies from region to region. For example, it is reported that in Iran, the prevalence in adults is between 2 to 10%.<sup>5</sup> Similarly, the Iranian Ministry of Health and Medical Education (MOHME) has reported a prevalence of 2.3%<sup>6</sup> in Tehran. Diabetes poses a big burden on individuals, families and societies.<sup>7</sup>

A new approach of thinking is required to recognize that patients are in control of and responsible for the daily self-management of diabetes.<sup>8</sup> Such a new approach should

be based on the issues of 'empowerment ' to be more applicable about day to day activities in diabetic patients.<sup>9</sup>

Broadly, 'empowerment is a process through which people gain greater control over decisions and action affecting their health' (WHO, 1998). On the one hand empowerment, as a positive concept, considers recourses beside defects and on the other hand it recognizes the problems and solves them. Also empowerment, as a process, enables people to overcome their problems in the field of healthcare.<sup>8</sup> Since empowerment enhances diabetic patients' ability and capacity to cope with the disease, it is a vital concept in life with diabetes.<sup>10</sup>

Patients with diabetes demand long-term and continuous self-care, self- management and preventive care behaviours.<sup>8</sup> In this context, the roles of patients are fundamental in the process of treatment.<sup>11,12</sup> Diabetic patients must take responsibility for their care and make appropriate decisions on day to day activities.<sup>13</sup> It has the potential to help them to dominate barriers<sup>14</sup> and cope with challenges encountered; Cooper et al noted that empowerment of diabetic patients undoubtedly would help them adopt healthy and appropriate behaviours and improve self-care and self-management.<sup>15</sup>

This study aims to assess the empowerment score among diabetes patients with diabetes. The study has the potential to improve our understanding of the level of empowerment, and can help decision-makers tailor appropriate and timely interventions.

## Patients and Methods

A descriptive correlation study was conducted during 4 months in 2011with continuous sampling. Patients were eligible to participate if they were at least 35 years old, had type 2 diabetes diagnosed for a minimal of 1 year and had attended relevant training programmes on diabetes. Finally 160 patients were included on the basis of p ratio between diabetic patients in confidence level 95% and power test 80%.

Data collection was performed by a self - reporting questionnaire. HbA1c index was obtained from available medical records of patients. This biochemistry measurement revealed diabetes control within prior 3 months.<sup>16</sup> The questionnaire consisted of two parts. First section was related to demographic information including 6 items and next section was Diabetes Empowerment Scale (DES-28) developed by the University of Michigan Diabetes Research center and Training Center.<sup>17,18</sup> The DES is a 28-item self-report scale with subscales reflecting 3 areas of DES: 1) Managing the psychosocial aspect of diabetes (9 items), 2) Assessing dissatisfaction and readiness to change (9 items) and 3) Setting and achieving diabetes goal (10 items). The responses to each item were rated between 1 and 5 (1=strongly

disagree, 2=somewhat disagree, 3=Neutral, 4= somewhat agree, 5= strongly agree).Therefore, the minimum and the maximum of the scale were 28 and 140 respectively. Points are added to gain total score, higher scores represented higher DES. This range of score was divided in three subgroups as followed: Low (28-65 score), Middle (66-103 score) and High (104-140 score).This scale was employed after determining validity and reliability. In order to validate the scale, content validity method was used; hence translated items were given to ten members of scientific board of Tehran University of Medical Sciences. In order to determine internal reliability of DES, test - retest was used, twenty diabetic patients completed the revised scale twice in 2 weeks interval. Chronbach's alpha was 0.93. The internal reliabilities of three subscales were 0.95, 0.92, and 0.90 Cronbach's alpha, respectively. The results of pilot study were not included in the main study. Analysis was performed by using SPSS software. Univariate analysis was performed by Kendall's tau for categorical variables and Spearman correlation for quantitative variables to assess their relation to empowerment variable (ordinal). Multivariable analysis was done with ordinal regression. Results were considered significant at conventional p 0.05 level. All patients were informed about the aim of the study. From ethics point of view no patient was forced or obliged to participate in the study.

## Results

The response rate was 100%. Participants were between the ages of 38 and 78 with a mean of 48.67±7.99 years. There were 49.4% males, 87.5% were married, and 44.9% had education diploma and higher. Mean duration of diabetes was 5.62 ± 3.81 years and 46.9% participants had borderline metabolic control according to World Health Organization criteria (Table-1). Empowerment consisted of three domains that mean scores of each domain were determined as following: Managing the psychosocial aspect of diabetes (27.15 ± 8.20), Assessing dissatisfaction and

**Table-1: Demographic and clinical data.**

	Number (%)
<b>Gender</b>	
Female	79 (49.4)
Male	81 (50.6)
<b>Educational level</b>	
Lower than diploma	89 (55.6)
Diploma and higher	71 (44.4)
<b>Marital status</b>	
Unmarried	20 (12.5)
Married	140 (87.5)
<b>Metabolic control (HgbA1C)</b>	
Optimal control(<%7)	61 (38.1)
Borderline control(%7-8.5)	75 (46.9)
Poor control(>%8.5)	24 (15)

**Table-2: Distributing Empowerment score based on demographic variables.**

Empowerment variables	High		Middle		Low		Sum		p-value
	%	N	%	N	%	N	%	N	
Male	15.6	25	31.9	51	1.9	3	49.4	79	0.007
Female	25	40	24.4	39	1.3	2	50.6	81	
Married	36.9	59	48.1	77	2.5	4	87.5	140	0.2
Unmarried	3.8	6	8.1	13	0.6	1	12.5	20	
Less than diploma	12.5	20	40.6	65	2.5	4	55.6	89	<0.001
Diploma and higher	28.1	45	15.6	25	0.6	1	44.4	71	
Metabolic control optimal control(<%7)	33.8	54	6.3	10	0	0	40	64	<0.001
borderline control (%7- % 8.5)	6.9	11	37.5	60	0.6	1	45	72	
poor control(>%8.5)	0	0	12.5	20	2.5	4	15	24	

**Table-3: Regression model to determine relationship between empowerment score and demographic variables.**

Variables	Regression confident	p-value
<b>Gender</b>		
Female	-	-
Male	-0.21	0.61
Age	0.03	0.51
Years of suffering from diabetes	-0.16	0.14
<b>Level of Education</b>		
Diploma and higher	-	-
Less than diploma	-1.23	0.005
<b>Metabolic control</b>		
Optimal control (<%7)	-	-
Borderline control (%7- % 8.5)	-3.19	<0.001
Poor control (>%8.5)	-6.51	<0.001

readiness to change (29.03 ± 10.40) and setting and achieving diabetes goal (31.95 ± 11.70). Findings represented that setting and achieving diabetes goal domain was the most important one.

Furthermore, Spearman Correlation coefficient represented statistically significant relationship between age (r=-0.33, p<0.001) and duration of diabetes (r=-0.42, p<0.001) variables and empowerment group. It means that with increasing age and duration of diabetes, empowerment score decreases.

Kendal Correlation coefficient showed statistically significant relationship between sex (Kendal tau= 0.20, p= 0.007) and level of education (Kendal tau= 0.44, p<0.001) with empowerment (Table-2). These findings showed that women had more empowerment than men and diabetic patients who had a diploma and higher had a better empowerment score.

Also, ordinal regression test revealed that education of lower than diploma (β= - 1.23, p=0.005), borderline (β= - 3.19, p<0.001) and poor control HbA1c (β= - 6.51, p<0/001) were effective factors in diabetic patients empowerment level. These findings mean that diabetic patients with education of diploma and higher and optimal control of diabetes according to WHO criteria, have a better empowerment score (Table-3).

Furthermore, Pearson correlation coefficient represented that empowerment has reverse and linear relation with HbA1c in type 2 diabetic patients, so by increasing empowerment score, HbA1c can be decreased (r = - 0.75, p 0.001)

## Discussion

The main purpose regarding managing chronic diseases such as diabetes, is to encourage patient's active self - management.<sup>16</sup> Healthcare professionals and researches describe a key element in managing chronic disease which is perceived as self-empowerment. When it comes to diabetes, empowerment implies an approach that attempts to enhance the ability of patients to actively understand and influence their own lives and health status. Helping patients make informed choices about the care of their diabetes, and understand that managing type 2 diabetes in their responsibility would in turn set them on a course of empowerment so that they cope with the disease.<sup>15,19</sup>

Effective patient empowerment is not achieved unless patients can receive the necessary information and are educated about their health conditions.<sup>9</sup>

The study findings showed that the domain of Setting and achieving diabetes goal has obtained the highest mean score. It seems that years of suffering from diabetes can affect patients to adopt healthy behaviours through empowerment. It can affect patients' experience. This finding matches perfectly with the findings of liu's study (2010) which showed that with increasing duration of diabetes, the patients' empowerment score becomes better.<sup>20</sup> This, proves that patients with diabetes can be empowered to manage their chronic disease if they are adequately informed and educated. It is also known that self efficacy and self-esteem have a strong relationship with empowerment. Alhani in her study proved that self-esteem gives better self-control and leads to increase in self-efficacy and in empowerment.<sup>21</sup>

By empowering patients with diabetes, they can control and manage their day-to-day activities.<sup>22</sup> This has

been proved by Anderson's study which showed improvement in HbA1c levels due to empowerment self-management behaviors.<sup>23</sup>

Diabetic patients must be aware of various issues such as duration disease, ongoing care plan and adherence, emphasis on control of disease, dependence on others and coping with complication of diabetes.<sup>24</sup> Empowerment can be facilitated by interaction between patient and health provider and leads to interpersonal and intrapersonal communication.<sup>25</sup> This strategy can be helpful for patient empowerment.<sup>19</sup>

According to Health for All, a major strategy of WHO, empowerment is one of the important goals for a human being. This attempts to improve health through active participation and rational decision making.<sup>26</sup> Empowerment is considered as a practical strategy in health promotion.<sup>27</sup>

According to the findings of Table-3, most of the variables such as sex, age, level of education and duration of diabetes have significant association with HbA1C. These findings which are similar to Cooper's findings,<sup>19</sup> implies that empowerment practice can be an effective way to control and manage chronic diseases including diabetes.<sup>18,23,28</sup>

This study also revealed that there was a reverse and linear relationship between HbA1C and total empowerment score ( $r = -0.75$ ,  $p < 0.001$ ). This is similar to the Shiu's work (2003) which showed that by increasing total empowerment scores, patients' HbA1c decreased. Clearly, this finding represents that any enhancement in empowering diabetic patients can promote better diabetes control.<sup>28,29</sup>

Focusing on appropriate Knowledge and skills, active involvement and participation of patients in decision about their care process and adoption of healthy practices is the main pathway to diabetic empowerment.<sup>28,30,31</sup>

It is necessary to consider challenges related to empowerment from patients' point of view and healthcare professionals' perspectives. Attention to these challenges may facilitate problem solving in empowerment approach.<sup>32</sup> The main challenge of patients is that they should be able to involve in self-care process and play new and different roles, a challenge which is not easy for older patients. The solution would be to create a suitable relationship with health care providers and families. Often health care professionals decide instead of patients, this is in conflict with the nature of empowerment approach. They have to guide patients to set appropriate goals and participate in self-management behaviours.<sup>32</sup>

This study had three limitations: 1) the findings may not be generalized to the whole country because it was conducted in a single diabetes clinic in Isfahan 2) no similar

study was found to compare its results with findings of the study and 3) the study population had low health literacy which caused difficult data gathering process, but we could collect study data according to the study design.

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## References

1. Cooper H, Booth K, Gill G. Using combined research methods for exploring diabetes patient education. *Patient Educ Couns* 2003; 51: 45-52.
2. Spinaci S, Currat L, Shetty P, Crowell V, Kehler J. Tough Choices: Investing in health for development: Experiences from national follow-up to commission on macroeconomics and health. WHO Report 2006.
3. Wild S, Roglic G, Grenn A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes Care* 2004; 27: 1047-53.
4. Zimmet PZ. Diabetes epidemiology as a tool to trigger diabetes research and care. *Diabetologia* 1999; 42: 499-518.
5. Azizi F, Hatemi H, Janghorbani, eds. Epidemiology and Communicable disease control in Iran. Tehran: Eshtiagh publication 2000; pp 34-9.
6. Abolhasani F, Tehrani MRM, Tabatabaei O, Larjani B. Burden of diabetes and its complications in Iran in year 2000. *J Diabetes Metabolic Disorders* 2005; 5: 35-48.
7. Afkhami AM, Rashidi M. Type 2 diabetes risk factors. *J Rafsanjan Uni Med Sci Univ* 2005; 4: 348-65.
8. Anderson RM, Funnell MM. Using the empowerment approach to help patients change behavior. *Practical psychology for diabetes clinicians*, 2nd ed. Am Diabetes Assoc 2002; 1-10.
9. Sigurdardottir AK, Jonsdottir H. Empowerment in diabetes care: towards measuring empowerment. *Scand J Caring Sci* 2008; 22: 284-91.
10. Hage AM, Lorensen M. A philosophical analysis of the concept empowerment; the fundament of an educational- programme to the frail elderly. *Nurs Philos* 2005; 6: 235-46.
11. Delavari AR, Mahdavihazaveh M. Prevention and controlling diabetes. Health Deputy, Disease Management Center, Ministry of Health of Iran, 2005; 45.
12. Tang TS, Gillard ML, Funnell MM, Nwankwo R, Parker E, Spurlock D, et al. Developing a new generation of ongoing: Diabetes self-management support interventions: a preliminary report. *Diabetes Educ* 2005; 31: 91-7.
13. Humphry J, Jameson LM, Beckham S: Overcoming social and cultural barriers to care for patients when the diagnosis is diabetes. *West J Med* 1997; 167: 138-44.
14. Hunt LM, Pugh J, Valenzuela M. How patients adapt diabetes self-care recommendations in everyday life. *J Fam Pract* 1998; 3: 207-15.
15. Cooper H, Booth K, Gill G. A trial of empowerment - based education in type 2 diabetes- global rather than glycaemic benefits. *Diabetes Res Clin Pract* 2008; 8: 165-71.
16. American Diabetes Association. Standards of medical care diabetes 2009. *Diabetes Care* 2009; 32: S13-61.
17. Diabetes Empowerment Scale (DES-28). Michigan Diabetes Research and Training Center. (Online) (Cited .....). Available from URL: <http://www.med.umich.edu/mdrtc/survey/htm>.
18. Anderson RM, Funnell MM, Fitzgerald JT, Marrero DG. The Diabetes Empowerment Scale: a measure of psychosocial self-efficacy. *Diabetes Care* 2000; 23: 739-43.
19. Funnell MM, Anderson RM, Arnolds M, Donnelly M, Taylor-mood D. Empowerment: an Idea whose time has come in diabetes education. *The diabetes Educator* 1999; 1: 37-41.
20. Liu MY, Tai YK, Hung WW, Hsieh MC, Wang RH. [Relationships between emotional distress, empowerment perception and self-care behavior and quality

- of life in patients with type 2 diabetes]. *Hu Li Za Zhi* 2010; 57: 49-60.
21. Alhani F. Planning and evaluation of empowerment based family model in Iron deficiency Anemia, Doctorial dissertation Tarbiat Modares University, 2002.
  22. Anderson R, Funnell M. Patient empowerment: myths and misconceptions. *Patient Educ Counsel* 2010; 7: 277-82.
  23. Anderson RM, Funnell MM, Aikens JE, Krein SL, Fitzgerald JT, Nwankwo R, et al. Evaluating the Efficacy of an Empowerment-Based Self- Management Consultant Intervention: Results of a Two-Year Randomized Controlled Trial. *Ther Patient Educ* 2009; 1: 3-11.
  24. Guthrie DW, Guthrie RA. *Nursing Management of Diabetes Mellitus*. New York: Spring publishing, 2002.
  25. Gibson CH. The process of empowerment in mothers of chronically ill children. *J Adv Nurs* 1995; 21: 1201-10.
  26. Dashiff C, Bartolucci A. Autonomy development in adolescents with insulin dependent diabetes mellitus. *J Pediatr Nurs* 2002; 17: 96-106.
  27. Naidoo J, Wills J. *Health promotion foundations for practice*. 2nd ed. London, Toronto: Elsevier, 2000.
  28. Minet L, Mohler S, Vach W, Wagner L, Henriksen J. Mediating the effect of self-care management intervention in type 2 diabetes: a meta-analysis of 47 randomized controlled trials. *Patient Educ Couns* 2010; 80: 29-41.
  29. Shiu AT, Wong RY, Thompson DR. Development of a reliable and valid chinese version of the diabetes empowerment scale. *Diabetes Care* 2003; 26: 2817-21.
  30. Aujoulat E, Marcolongo R, Bonadiman L, Deccache A. Reconsidering patient empowerment in chronic illness: a critique of models of self-efficacy and bodily control. *Soc Sci Med* 2008; 66: 1228-39.
  31. Heinrich E, Schaper NC, Vries NK. Self-management interventions for type 2 diabetes: a systematic review. *Eur Diabetes Nurs* 2010; 7: 71-6.
  32. Anderson RM, Funnell MM, Arnold MS. Using the empowerment approach to help patients change behavior. In: Andersen BJ, Rabin RR (Eds). *Practical Psychology for Diabetes Clinicians*. 2nd ed. 2002; 3-12.
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