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## Original Article

# The effect of educational program based on the precede-proceed model on improving self-care behaviors in a semi-urban population with type 2 diabetes referred to health centers of Bavi, Iran

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## ABSTRACT

**Aims:** Self-care in patients with diabetes reduces the number of hospital admissions, costs and improves their quality of life so that just by training self-care to them can reduce 80 percent of diabetic complications. Therefore, this study aimed to investigate the effect of educational program based on precede-proceed model on improving self-care behaviors in patients with type 2 diabetes referred to health centers in city Bavi in 2016–2017.

**Materials and methods:** This quasi-experimental study, conducted on 110 patient women with type 2 diabetes referred to health centers in Bavi city in 2016–2017. The training program was designed based on Precede-Proceed Model. Data collection tools included the Precede researcher-made questionnaire and the Glasgow questionnaire. The duration of the training course was three months. After one month, the effect of this program, and the amount of improvement of the patients' self-care behavior were evaluated. Independent *t*-test, paired *t*-test, Chi-square and Fisher's exact tests were carried was used for data analysis.

**Results:** After the intervention, the average score of predisposing factors (knowledge, attitude and self-efficacy), reinforcing factors, enabling factors and self-care behaviors, in the intervention group compared to the control group, significantly increased ( $P < 0.05$ ). After the training, the fasting blood sugar (FBS) and body mass index (BMI) decreased in the experimental group, but this reduction was not statistically significant ( $P > 0.05$ ).

**Conclusion:** The findings of this research showed that Precede-Proceed Model would be an appropriate framework to educate patients with type 2 diabetes as well as promote self-care behaviors.

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## 1. Introduction

Diabetes mellitus caused by metabolic disorders that leads to incorrect metabolism of carbohydrates, fats, and proteins [1,2]. This disease is increasingly spreading around the world [3]. So that in 2010, an estimated 18.8 million persons in the United States had diagnosed diabetes mellitus and another 7.0 million had

undiagnosed diabetes [4]. Diabetes was the seventh leading cause of death in the United States in 2010 [5]. In 2012, an estimated 1.5 million deaths were directly caused by diabetes and another 2.2 million deaths were attributable to high blood glucose and The global prevalence of diabetes among adults over 18 years of age 8.5% in 2014 [6]. The prevalence of diabetes has been estimated 2–3 percent in the general population of Iran, and 7.3 percent among those aged above 30 [7].

The most important complications of this disease are blindness in adults, non-traumatic lower limb amputation, and chronic kidney failure. In addition, [8]. In 2013, the total Disability-Adjusted Life Year (DALY) in the world was 2.88 percent (2.4–3.42) and the total DALY in Iran was 2.27 percent (2.04–2.51). In Iran, DALY in women is more compared to men; DALY related to

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diabetes in Iranian women is 4.51 percent and 3.48 percent in men [9]. In addition, life expectancy has decreased by one-third among people with diabetes and the prevalence of disability in them is two to three times more than healthy people [10]. Generally, Diabetes imposes direct and indirect costs of health, Diabetes Cost in the United States an Estimated \$245 Billion in 2012, \$176 billion in direct medical costs (medical goods and services) and \$69 billion in indirect costs from lost workdays, restricted activity, disability, and early death [11]. In Iran, about 8.69 percent of total health expenses is used to management of type 2 diabetes. Indirect costs on average are about 864.7 dollars, which is equivalent to 19% of the Iranians' national per capita income [12]. Chronic diseases such as diabetes have a complicated origin, gradual onset and tensity, and unpredictable improvement, which require patients' participation in their care due to the long process of the treatment [13].

Self-care leads to a decrease in the number of hospital admissions and costs, and an increase in the quality of life; so that training diabetes self-care can decreases 80 percent of diabetic complications, and non-compliance the self-care program is the most important predisposing factor for mortality in these patients [14,15].

On self-care in patients with diabetes include changing the lifestyle, regular physical activity, taking diabetes medications, and regularly monitoring the blood glucose [16].

American Diabetes Association(ADA) recommends that people with diabetes should be educated about self-care and treating themselves to delay the complications of diabetes. In other words, raising the patients' awareness guarantees his/her long-term life and decreases the treatment costs. No doubt, reaching these goals requires the patients' participation in their self-care and sequential

and dynamic education [17]. The using of the most appropriate theory increases the effectiveness of health education and health promotion [18]. Precede-Proceed model is one of the models that is widely used for guidance, implementation, and evaluation of interventions offered in primary care settings. This model is a planning model for health promotion [19], consists of nine stages assigned into two parts: Precede and proceed. The stage of Precede includes social and epidemiological and behavioral and educational (in this phase enabling, predisposing and reinforcing factors are determined) and administrative and political assessment. Precede stage includes the implementation phase, process evaluation, impact assessment, and outcome evaluation [20]. It is one of the most popular models in health education so that by mid-2000, about one thousand cases of its applications were published in the field of health [21].

This model has been used for educating patients with type 2 diabetes and assessing its impact on the quality of their life, as well as changing the lifestyle of patients with hypertension [22,23]. Moreover, in a study conducted in Spain, precede model was recognized as a useful method in the overall treatment of patients with type 2 diabetes, which led to a decline in glycosylated hemoglobin and systolic blood pressure levels [22].

Bavi city with a population of 104,968, is located in a 5 kilometer distance from Ahvaz city (the capital of Khuzestan province, in southwest of Iran). This city was of fringe area of Ahvaz, which has been separated from this city since 2013–2014. Bavi has a rural socio-culture context. There is no reliable statistics available on the prevalence of diabetes in this city. However, given the high prevalence of diabetes in this province, especially in women [25] and due to the absence of a study to promote self-care

**Table 1**  
Distribution of absolute and relative frequency of demographic characteristics of the participants.

Demographic variables	Number/percent	Groups		The significance level	
		Intervention	Control		
Education	literacy	Number	25	27	P=0.25*
		percent	45.5%	49.1%	
	elementary	Number	19	22	
		percent	34.5%	40%	
	guidance	Number	3	4	
		percent	5.5%	7.3%	
High school and college	Number	8	2		
	percent	14.5%	3.6%		
Job	Employed	Number	1	0	P=0.5**
		percent	8.1%	0	
	Housewife	Number	55	54	
		percent	100%	98.2%	
The Type of Treatment	Food (metformin or glibenclamide)	Number	39	43	P=0.76*
		percent	70.9%	78.2%	
	Injection	Number	7	4	
		percent	12.7%	7.3%	
	Oral and injectable	Number	5	5	
		percent	9.1%	9.1%	
	None (having a diet)	Number	4	3	
		percent	7.3%	5.5%	
Nationality	Fars	Number	2	1	P=0.84*
		percent	6.3%	1.8%	
	Lor	Number	1	1	
		percent	1.8%	1.8%	
	Arab	Number	52	53	
		percent	94.5%	96.4%	
*** Average Age (year)		48.74 ± 8.81	49.89 ± 7.9	P=0.47***	
*** Average Duration of Disease (year)					

\*chi – square.

\*\* Fisher's Exact Test.

Independent Samples Test (*t*-test)\*\*\*.

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