



# Effect of Training Sessions on Awareness, Disease Management, and Quality of Life in Patients with Type 2 Diabetes

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## ABSTRACT

**Aims** Quality of life is especially important in patients with diabetes. This study aimed to investigate the quality of life model in patients with type 2 diabetes based on awareness and mediated disease management behaviors.

**Materials & Methods** In this study, 300 patients with type 2 diabetes in Indonesia, Iraq, Iran, and India were studied. Research instruments include a diabetes patient awareness questionnaire, disease management behaviors questionnaire, and quality of life questionnaire in diabetic patients. The covariance multivariable test and structural equation modeling were used in SPSS 23 software.

**Findings** The results of the analysis of the measurement model show that the factor structure of the research scales is approved, and the test results of the field model show that the fit indices are in a good condition. The results showed that disease management behaviors have a significant direct effect on the quality of life of patients with type 2 diabetes and awareness has direct and indirect effects on quality of life (mediated by disease management behaviors).

**Conclusion** Findings indicate the importance of the role of awareness and disease management behaviors in the quality of life of patients with type 2 diabetes. Also, the results showed that the studied variables were upgraded for the post-test mode.

**Keywords** Quality of Life; Awareness; Disease Management; Type 2 Diabetes

## CITATION LINKS

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## Introduction

Diabetes is the most common metabolic disease in the world [1]. Globally, type 2 diabetes is currently one of the most common types of diabetes that are on the rise over time [2]. The main purpose of disease control is to prevent cardiovascular complications, maintain normal blood sugar, reducing mortality and the cost of treatment [3]. Complications of diabetes include retinopathy, hypertension, chronic renal failure, diabetic foot ulcers, and a significant reduction in life expectancy. People with diabetes have a significantly reduced quality of life due to the high cost of treatment and its complications, and the inability to perform physical function due to the complications of the disease causes perceived stress among patients. To better control diabetes, self-care behaviors should be performed daily [4, 5]. For this reason, self-care is a way to promote health and well-being in patients. Self-care behaviors include several elements, including treatment, management of emotions such as neutralizing and balancing perceived stress due to the nature of chronic diabetes, and finally behavioral management, including diet, blood sugar measurement, regular physical activity, and using health care facilities [6, 7]. With the epidemic spread of this disease, the cost of this disease also increases so that the medical cost of diabetics is on average twice as high as non-diabetics [8]. Due to the significant economic effects of diabetes on patients, families, and the health system, the management, and care of this disease require a high cost. About 12% of the world's total health budget is spent on diabetes [9]. This type of disease is associated with severe complications that negatively affect the health, productivity, and quality of life of patients. Low quality of life leads to reduced self-care, inadequate blood sugar control, and increased risk of complications [10]. Therefore, identifying the quality of life is one of the methods of lifestyle analysis that is considered the most important aspect in the primary and secondary prevention of many chronic diseases such as diabetes. Also, it is necessary to measure a wide range of the patient's life, such as physical well-being, functional ability, and emotional and social well-being [11, 12]. Diabetics experience many changes in many aspects of their quality of life. Diabetes can have significant effects on patients' quality of life such as work restrictions, social life, family relationships, marital relationships, and leisure activities [13, 14].

One of the factors that play an important role in disease control is education [15]. The purpose of self-care education is to increase knowledge and awareness, change the view of the disease and emphasize its main role in disease management and treatment. Self-care education is also about maintaining one's self-esteem in life, controlling negative emotions, promoting health and quality of

life, reducing costs, reducing the number of hospitalizations, preventing complications, or delaying the physical and psychological effects of illness [16, 17]. Educating patients by treatment staff can help patients with diabetes to control the disease and reduce stress levels. This group has a special role in creating positive behavioral changes and transfer of services in health and health as a bridge between the theory and the client's clinic [18]. Coherent education can improve the quality of life of diabetic patients and their metabolic control and reduce the physical and psychological complications of the disease [19]. However, the impact of diabetes education programs on patients' quality of life is rarely evaluated and more attention is paid to its therapeutic goals [20]. Educating patients to increase the awareness and quality of life of diabetic patients is of particular importance. Therefore, this study was conducted with the aim of the effect of education on the quality of life of diabetic patients [21, 22].

Due to the impact of diabetes on the health and well-being of clients, as well as complications that may even overshadow their independence and dependence, increasing the need for these patients to be hospitalized and receive health care services and consequently impose a heavy economic burden on the system; this study aimed to investigate the effect of education and its effect on the quality of life of people with type 2 diabetes.

## Materials and Methods

The target group in this study was patients with type 2 diabetes in Indonesia (100 cases), Iran (50 cases), India (50 cases) and Iraq (100 cases). The sample size was 300 people who were divided into two groups A and B. The sample selection method was simple sampling. After selecting the samples, individuals were randomly divided into two groups A and B (150 people in each group and a total of 300 people). Exclusion criteria include:

- People who do not take medicine
- People who abuse alcohol and drugs
- Patients with depression and psychotic patients.

After the necessary coordination for conducting the research and selecting the sample and explaining the purpose of the research, to comply with ethical considerations, all participants had full authority to participate in the research and were sure that the collected information was analyzed as a group. After completing the informed consent form, participants were asked to answer the questionnaire individually. At the beginning of the study, to control the confounding variables, the two groups were compared in terms of age and duration of the disease. Control of other variables (occupation, level of education, family history) in the analysis stage was performed using statistical tests.

The method of data collection was a researcher-made questionnaire that has four sections including:

- demographic variables 9 items (gender, age, level of education, occupation, marital status, year of disease history, monthly income, source of information on diabetes, and BMI).
- 30 awareness questions including options (yes, no, I don't know; scoring: correct answer equal to 2, I do not know equal to 1 and the wrong answer is zero). Dimensions of awareness include vulnerability (10 items), benefits (10 items), and obstacles (10 items).
- 30 questions related to disease management (includes options of 1 day to 7 days, scoring also varies from 1 to 7), dimensions of disease management including adhering to diet (10 items), taking medication (10 items), and doing exercise (10 items).
- 30 questions related to the quality of life (Likert five-choice range, scoring based on answers ranging from 1 to 5), dimensions of quality of life including physical function (10 items), energy-fatigue (10 items), and mental health (10 items).

To determine the validity of the questionnaire, the opinions of experts including health education, nutrition sciences, and specialist physicians were used. The reliability of the questionnaire was determined through Cronbach's alpha (0.74).

To increase the self-efficacy and self-management of diabetic patients, several training sessions in different fields have been used. This training includes the symptoms of the disease, the nature of the disease, the complications of diabetes, effective self-care in promoting patients' health, the role of physical activity and nutrition in promoting patients' health, ways to prevent organ infections, blood sugar control, how to take medications and how to inject insulin correctly. The training sessions after the initial examination of the individuals and determining the educational needs, it was adjusted in the pre-test stage. The training sessions were group discussion, question and answer. The preparation of educational content was based on the instructions of the WHO, articles, authoritative books, and educational booklets of diabetes associations. The purpose of training classes was to motivate people to perform self-care practices to ultimately improve their lifestyle and follow the behavior correctly in our sample. In order to perform a pre-test and assess the knowledge, self-care behavior, and quality of life indicators of diabetic patients, before the start of the training, individuals in both groups were asked to complete a

questionnaire about diabetes. At the end of the training sessions and after 4 months, the two groups again answered the questionnaire questions in the post-test stage.

The descriptive and analytic statistical tests in SPSS 23 software were used to analyze data. The covariance multivariable test and structural equation modeling were used.

## Findings

The mean age of individuals in the A group was  $51.68 \pm 3.62$  and in the B group was  $53.74 \pm 2.88$  years. Also, the history of the disease in the A group was  $7.19 \pm 0.96$  and in the B group was  $7.83 \pm 1.02$  (Table 1).

**Table 1**) Characteristics of demographic variables

| Variable                     | Group A |      | Group B |      |
|------------------------------|---------|------|---------|------|
|                              | N       | %    | N       | %    |
| <b>Gender</b>                |         |      |         |      |
| Female                       | 87      | 58   | 94      | 63   |
| Male                         | 63      | 42   | 56      | 37   |
| <b>Age</b>                   |         |      |         |      |
| < 30                         | 11      | 7.4  | 8       | 5.3  |
| 30-60                        | 122     | 81.3 | 118     | 78.7 |
| > 60                         | 17      | 11.3 | 24      | 16   |
| <b>Disease background</b>    |         |      |         |      |
| < 5                          | 43      | 28.7 | 38      | 25.3 |
| 5-10                         | 94      | 62.6 | 96      | 64   |
| > 10                         | 13      | 8.7  | 16      | 10.7 |
| <b>Job</b>                   |         |      |         |      |
| Freelance                    | 27      | 18   | 23      | 15.3 |
| Employee                     | 64      | 42.7 | 66      | 44   |
| Unemployed                   | 59      | 39.3 | 62      | 40.7 |
| <b>Monthly income</b>        |         |      |         |      |
| Low                          | 47      | 31.3 | 49      | 32.6 |
| Medium                       | 89      | 59.3 | 91      | 60.7 |
| High                         | 14      | 9.4  | 10      | 6.7  |
| <b>Education rate</b>        |         |      |         |      |
| < Diploma                    | 57      | 38   | 49      | 32.6 |
| Diploma                      | 35      | 23.3 | 37      | 24.7 |
| Bachelor                     | 42      | 28   | 46      | 30.7 |
| > Bachelor                   | 16      | 10.7 | 18      | 12   |
| <b>Marital status</b>        |         |      |         |      |
| Single                       | 31      | 20.7 | 28      | 18.7 |
| Married                      | 119     | 79.3 | 122     | 81.3 |
| <b>Source of information</b> |         |      |         |      |
| Treatment staff              | 79      | 52.7 | 81      | 54   |
| Family                       | 17      | 11.3 | 19      | 12.7 |
| Friends                      | 10      | 6.7  | 13      | 8.7  |
| Media                        | 23      | 15.3 | 21      | 14   |
| Book and magazine            | 14      | 9.3  | 11      | 7.3  |
| Others                       | 7       | 4.7  | 5       | 3.3  |
| <b>BMI</b>                   |         |      |         |      |
| < 18.5                       | 19      | 12.7 | 13      | 8.7  |
| 18.5-25                      | 47      | 31.3 | 46      | 30.7 |
| > 25                         | 84      | 56   | 91      | 60.7 |

There were significant differences between the post-test of the two groups according to the covariance analysis in awareness, disease management, and quality of life and their dimensions (Table 2). According to Table 3, all the studied paths were meaningful ( $p < 0.05$ ).

**Effect of Training Sessions on Awareness, Disease Management ...**
**Table 2)** Comparing the mean of awareness, disease management, and quality of life and their dimensions between two groups by covariance analysis

| Parameters                | Test stage | Group A    | Group B     | p-value |
|---------------------------|------------|------------|-------------|---------|
| <b>Awareness</b>          | Pre-test   | 36.62±4.47 | 35.74±4.01  | <0.001  |
|                           | Post-test  | 36.78±0.49 | 36.13±2.86  |         |
| <b>Vulnerability</b>      | Pre-test   | 16.84±2.16 | 16.09±2.07  | <0.01   |
|                           | Post-test  | 18.23±2.37 | 17.81±2.49  |         |
| <b>Benefits</b>           | Pre-test   | 9.81±1.06  | 8.72±0.83   | <0.05   |
|                           | Post-test  | 11.26±1.65 | 11.03±1.49  |         |
| <b>Obstacles</b>          | Pre-test   | 27.14±3.73 | 25.81±2.91  | <0.05   |
|                           | Post-test  | 24.85±4.19 | 24.39±3.76  |         |
| <b>Disease management</b> | Pre-test   | 27.14±7.92 | 35.17±10.14 | <0.001  |
|                           | Post-test  | 27.38±8.06 | 33.89±9.08  |         |
| <b>Adhere to diet</b>     | Pre-test   | 26.38±3.06 | 21.17±2.76  | <0.01   |
|                           | Post-test  | 24.13±3.32 | 23.52±3.07  |         |
| <b>Taking medication</b>  | Pre-test   | 15.36±2.74 | 18.30±1.54  | <0.001  |
|                           | Post-test  | 17.06±2.35 | 19.17±2.19  |         |
| <b>Doing exercise</b>     | Pre-test   | 34.14±4.51 | 35.91±4.64  | <0.05   |
|                           | Post-test  | 36.13±4.89 | 36.67±4.93  |         |
| <b>Quality of Life</b>    | Pre-test   | 51.46±7.26 | 48.12±7.94  | <0.001  |
|                           | Post-test  | 57.31±4.19 | 53.67±5.26  |         |
| <b>Physical function</b>  | Pre-test   | 9.48±6.37  | 8.17±4.39   | <0.001  |
|                           | Post-test  | 15.73±2.91 | 12.72±2.46  |         |
| <b>Energy and fatigue</b> | Pre-test   | 27.74±2.18 | 25.63±3.65  | <0.001  |
|                           | Post-test  | 27.93±2.76 | 26.43±4.13  |         |
| <b>Mental health</b>      | Pre-test   | 14.67±1.86 | 12.61±2.74  | <0.05   |
|                           | Post-test  | 16.03±2.14 | 12.49±2.98  |         |

**Table 3)** The path analysis of awareness, disease management, and quality of life (p=0.001)

| Independent variable      | Dependent variable | Standard coefficient | Upper bound | Lower bound |
|---------------------------|--------------------|----------------------|-------------|-------------|
| <b>Awareness</b>          |                    |                      |             |             |
| -                         | Disease management | 0.4                  | 0.129       | 0.074       |
| -                         | Quality of Life    | 0.2                  | 0.467       | 0.384       |
| Disease management        |                    |                      | 0.329       | 0.204       |
| <b>Disease management</b> | Quality of Life    | 0.7                  | 0.253       | 0.176       |

## Discussion

Controlling diabetes requires self-management of patients, which is a lifelong effort to maintain quality of life. Treatment programs primarily improve quality of life, or strategies that increase patients' quality of life may be accepted by patients and improve their metabolic status. This study aimed to investigate the effect of health education programs on awareness, disease management, and quality of life of diabetic patients. The results showed a positive effect of education on awareness, disease management, and quality of life. Therefore, education can play an important role in the prevention and control of diabetes. The quality of life of diabetic patients is very important because low quality of life reduces self-care, lacks timely control of blood sugar, and increases the complications of the disease. Improving quality of life is not only valuable for diabetics but also reduces their associated health costs.

Self-care activities focus on doing these activities several times a week, and patients who engage in regular self-care activities have a better quality of life and lower blood glucose. Self-care requires a lot

of effort on the part of patients, and the self-management activities of patients with diabetes do not have the same difficulty levels. Some disease management activities, such as diet and exercise, are really difficult activities and more difficult than other self-care activities such as medication, so these activities seem to be heavier for patients. The results showed that most patients have a history of 5 to 10 years and the main source of information to deal with the disease is the treatment staff.

In group A for awareness in the pre-test stage, there was a significant relationship with the source of information, and also in the post-test stage, there was a significant relationship with gender, age, disease history, and source of information. For disease management in the pre-test stage, there was no relationship with any parameters, and also in the post-test stage, there was a significant relationship between gender, age, disease history, and source of information. For the quality of life in the pre-test stage, there was a significant relationship with age, marital status, and source of information, and also in the post-test stage, there was a significant relationship with gender, age, disease history, job, marital status and source of information.

In group B for awareness, there was a significant relationship with all parameters, except for gender and age in the pre-test stage. For disease management in the pre-test stage, there was a significant relationship with disease background, monthly income, education rate, and source of information, and also in the post-test stage, there was a significant relationship with all parameters, except for job and BMI. For the quality of life in the pre-test stage, there was a significant relationship with disease background, monthly income, education rate, and source of information, and also in the post-test stage, there was a significant relationship with all parameters, except for marital status and BMI.

The results also showed that the awareness variable has a direct effect on the quality of life variable and a significant indirect effect due to disease management behaviors. The results of this study are consistent with the results of Sarkar *et al.* [23], who concluded in their study that there is a relationship between awareness and control of blood glucose is one of the components of health outcomes and quality of life in patients with diabetes. Also, Safford *et al.* [24] in a study concluded that improving disease management has been associated with increased quality of life and these two variables are related. In a study, Herts *et al.* [25] concluded that there is a significant relationship between disease awareness and management and the speed of disease recovery, and patients with higher self-efficacy had a faster recovery process.

Data collection through self-report questionnaires and selection of available people is one of the limitations of this study. It is suggested that similar

studies be performed in other groups of chronic patients and that the role of gender modulation be considered so that the results of the two groups can be compared.

## Conclusion

Providing appropriate training in the prevention, improvement, and treatment of diabetes can improve general health, and physical function and increase the overall quality of life in diabetic patients by raising awareness. Considering the importance of awareness and disease management in the health consequences of patients with type 2 diabetes, it is better to use these variables in promoting the health and quality of life of patients.

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