Research Article

Self-efficacy development model for strengthening quality of life diabetes mellitus patients at Darussalam Puskesmas Medan, Indonesia

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ABSTRACT

Background: Diabetes mellitus (DM) affects the quality of life (QoL) of patients in all dimensions. QoL of DM patient tends to experience of unfavorable condition. **Objectives:** The present study aimed to analyze the effectiveness of self-efficacy development model with health belief model approach through diabetes self-management education (DSME) in two group of DM patient with the goal to increase QoL. **Materials and Methods:** The type of research was a quasi-experimental study. 30 DM patients with ≤18 years old were included in the study. The patient was assigned to two groups. The first group of patients received self-efficacy development model with health belief model approach through DSME with six sessions and the second group of patients did not received this model. The QoL with SF-36 was the indicator. **Results:** There were statistically significant differences in the QoL using SF-36 between two groups with *t*-test, it was found that $P = 0.000$. The analysis revealed that there was a significant difference in the mean score between the group which obtained the treatment of self-efficacy development model with health belief model approach through DSME and the group which did not obtain it. **Conclusion:** The intervention using self-efficacy development model with health belief model approach through DSME showed a statistically significant improvement in the DM QoL.

KEY WORDS: Self-efficacy Development Model; Health Belief Model; Diabetes Self-management Education; Quality of Life

INTRODUCTION

Diabetes is a well-recognized cause of premature death and disability, increasing the risk of cardiovascular disease, kidney failure, blindness, and lower-limb amputation. Diabetes was directly responsible for 1.5 million deaths in 2012 and 89 million disability-adjusted life-years. The prevalence of diabetes was the highest in the WHO Region of the Eastern Mediterranean Region (14% for both sexes) and the lowest in the European and Western Pacific Regions (8% and 9% for both sexes, respectively).[1] In the United States, it is the major cause of seven deaths in the United States, as the cause of some forms of heart disease.[2]

Diabetes mellitus (DM) affects the quality of life (QoL) of patients in all dimensions, physical, mental, and social.[3] Self-efficacy might be an important target of intervention for improving QoL of a chronically ill adolescent. General self-efficacy and changes therein positively affected the QoL of adolescents with diabetes.[4] DM affects the QoL of both and adults and elders to a varying degrees.[5-10] Better efficacy in managing DM is related to good behavior of self-management have been shown to improve quality of life.[11-12]

The result of the study conducted by Sari[13] found that QoL of DM patients was in bad category in one of the hospitals in Medan. Based on the preliminary survey conducted by the

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studies at Darussalam Puskesmas, Medan, it was found that the average visits of DM patients each year increased. The patients visited Darussalam Puskesmas had various types of complication; some of them were cardiovascular disorder, diabetic ulcers, nervous system disorder, and kidney. To increase QoL, it is necessary to develop models for increasing self-efficacy of DM patients. According to Bandura,[14] a person's self-efficacy is developed through four main sources: Mastery of experience, vicarious experience, social persuasion, and physiological, and emotional states. The most effective self-efficacy is through mastery experience by skill achievement. Success will be achieved by learning from errors. Motivation is stimulated through training about how to cope with errors by giving information.[15]

One of self-efficacy development models by emphasizing the experience of success is Health Belief Model as a model of expectation for a certain value[16] in which self-management education becomes an attempt to achieve it. The Health Belief Model provides a useful framework of psychological variables that have been shown to be successfull predictors of patient compliance, and which may, therefore, serve as a logical basis for educational interventions.[17] Health Belief Models tell us that patients' self-management behaviors (their coping strategies) are critically related to their illness perception.[18] With enhancing self-efficacy due to initial performance attainments, the person is more ready to take on tasks of greater complexity. Patient-provider contracting may reflect a highly effective approach for enhancing self-efficacy. This technique is effective when properly used because the patient and provider are in a true therapeutic alliance, with both involved in choosing goals that the patient feels personally capable of achieving within the time limit. When the patient does accomplish the goal, the sense of self-efficacy in enhanced and the patient is ready to contract for a new, more-difficult goal.[19] To promote self-efficacy of diabetics, the educator utilized specific training approaches such as verbal persuasion, modeling, and performance. According to interactive approach, there is a discussion during the educational sessions with the active participation of the patients and that all the informations are derived and analyzed on the basis of patient's knowledge and experience.[20]

The objective of self-management education in diabetes (DSME) is to improve metabolic control and QoL, to mitigate complication, and to minimize the cost of health services. DSME can be done at home, clinics, schools, or in the working places.[21-24]

MATERIALS AND METHODS

Subject

The research was conducted in the working area of Darussalam Puskesmas, Medan, Indonesia, from August 8 to October 1, 2016. The population of the study was all DM outpatients at Darussalam Puskesmas, Medan. The samples were taken using consecutive sampling technique. All subjects who visited the Puskesmas, fulfilling the selected criteria, were included in the study until the number of samples was sufficient. The samples consisted of 30 respondents, either for the treatment group or for the control group. Inclusive criteria of the samples were ≤18 years old, with or without complication, being able to read and write, willing to become respondents, and following the research procedure until the last stage.

All respondents were given pre-test to assess QoL of DM patients with short-form-36.[25-27] Moreover, to measure blood content using easy touch GCHb device. The group that obtained self-efficacy development model with Health Belief Model approach through DSME which was divided into three small groups of 10 respondents each group. Group 1 was located on Jalan Jangka, Group 2 was located on Jalan Kertas, and Group 3 was located on Jalan Tinta. The time for the implementation of DSME had been agreed by the respondents. The period of one education session was from about 1.5 h to 2 h. We evaluated respondents' behavior through the formats of respondent activity notes each week and motivated them to improve their healthy life behavior after the evaluation. This activity was done before DSME was started.

Study Design

This study design was a quasi-experimental study.

Study Protocol

This study had been approved by the Research Ethics Committee of the Faculty of Nursing, University of Sumatera Utara, Indonesia. Diabetes self-management module, referred to Health Belief Model approach, was done using reference from various sources and was organized to become six sessions: The first session had the theme of description of DM; the second session had the theme of DM diet; the third session had the theme of physical activities; the fourth session had the theme of diabetes leg gymnastics and diabetes leg nursing care; the fifth session had the theme of the route and the days of illness; and the sixth session had the theme of stress management. While gathering the data, we divided the respondents into two groups. The first group was the group that obtained self-efficacy development model through DSME while the second group was the group that did not obtain it. We explained the benefit and the procedures of the study to the aspirant respondents that they would participate in the study, either the respondents in the group that obtained self-efficacy development model or the respondents in the group that did not obtain it. The respondents who were willing to participate were asked to sign informed consent. The respondents who were willing to participate in the study and fulfilled the study criteria were asked to fill out their bio-data which had been prepared by us; they included

sex, age, marital status, income, occupation, and duration of DM. All respondents were given pre-test to assess QoL and to measure blood glucose (BG). The group that obtained self-efficacy development model with Health Belief Model approach through DSME which was divided into three small groups. Each participant got DSME module used as the education material. DSME was conducted in 6 sessions within 6 weeks. It was carried out interactively with verbal persuasion method, group discussions, demonstrations, and redemonstrations according to the themes of each session, beginning from the introduction, stating the objective of the education in each session, and starting with giving education which was emphasized on health values and health behavior. After DSME in 6 sessions each week within 6 weeks was carried out, respondents were given post-test to assess QoL, and all of them were also given post-test in measuring BG using Easy Touch GCHb device.

The aspects of measurements were as follows. The variables in the study were QoL of DM patients, a prosperity of an individual and came from satisfaction or dissatisfaction in undergoing the illness, DM medication and nursing care, and being measured using short form health survey (SF-36) questionnaires with the range of scores of each item was 0-100 and with numerical data type of ratio scale, while the variable of BG with numerical data type of interval scale.

Statistical Analysis

The statistical analysis in this study divided into univariate analysis and bivariate analysis. Univariate analysis in this study was minimum value, maximum value, mean, and standard deviation, while bivariate analysis was used to find out the difference in the mean scores of QoL between the group of DM patients that obtained self-efficacy development model and the group of DM patients that did not obtain it using dependent *t*-test (paired *t*-test) and independent *t*-test (unpaired) in which it would have significance value when $P < 0.05$.

RESULTS

In this study, 30 respondents obtained self-efficacy development model (treatment), and 30 respondents did not (control). The results revealed that in the distribution of respondents' characteristics (treatment), 27 respondents (90%) were females, 14 respondents (46.7%) were 45-59 years old, 19 respondents (63.3%) were married, 29 respondents (96.7%) had the income of <2,271,500, 19 respondents (63.3%) were housewives, and 11 respondents (36.7%) had the duration of DM of ≥5 years ≤10 years. The distribution of respondents' characteristics (control), 21 respondents (70%) were females, 15 respondents (50%) were 45-59 years old, 20 respondents (66.7%) were married, and 22 respondents (73.3%) had the income of <2,271,500, 15 respondents (50%) were housewives, and 11 respondents (36.7%) the duration of DM of ≥5 years ≤10 years.

Description of respondents' QoL, pre- and post-BG with and without treatment (control) could be seen in Tables 1 and 2.

After the pre-test on QoL of DM respondents was conducted, the respondents were divided into two groups: The group that was given the treatment of self-efficacy development model with health belief model approach through DSME (30 respondents) and the group that was not given the treatment (30 respondents). The group that was given the treatment was divided into three small groups: Group 1 was located on Jalan Tinta (10 respondents), Group 2 was located on Jalan Kertas (10 respondents), and Group 3 was located on Jalan Jangka (10 respondents). DSME was conducted within 6 weeks in 6 sessions. The first session was about the description of DM, the second session was about DM diet, the third session was about physical activities, the fourth session was about diabetes leg gymnastics and diabetes leg care, the fifth session was about the route and days of diabetes illness, and the sixth session was about stress management. Paired *t*-test had to be conducted by distributing the data normally to find out the influence of self-efficacy development model in pre and post with and without treatment on QoL of DM patients. Shapiro-Wilk test was also needed to be used because the samples were less than 50 (<50) with a normal distribution of data ($P > 0.05$) at the significance level of 95%; therefore, paired *t*-test had to be conducted. The result of paired *t*-test could be seen in Table 3.

To find out the influence of self-efficacy development model in pre and post without treatment on BG of DM respondents, it was necessary to perform paired *t*-test; the requirement of performing it was by distributing the data normally ($P > 0.05$) using Shapiro-Wilk and because the samples were

Table 1: Description of respondents' QoL in pre and post, with and without treatment (control)

Parameters	*n*	Minimum	Maximum	Mean±SD
QoL pre-treatment	30	26.25	92.91	60.3650±19.08039
QoL post-treatment	30	49.86	99.30	81.4260±12.74791
QoL pre-control	30	9.58	97.22	56.4867±25.86154
QoL post-control	30	9.47	97.22	55.3330±28.08623

QoL: Quality of life, SD: Standard deviation

Table 2: Description of respondents' BG (pre and post with and without treatment (control)

Parameters	*n*	Minimum	Maximum	Mean±SD
BG pre-treatment	30	111	542	268.2000±103.22035
BG post-treatment	30	48	518	255.7667±145.12650
BG pre-control	30	96	594	268.9000±151.02212
BG post-control	30	54	589	262.3333±150.96525

BG: Blood glucose, SD: Standard deviation

<50, it was found that there was the difference in normal distribution ($P > 0.05$) at the significance level of 95% so that it was possible to take paired *t*-test, and in pre and post without being given abnormally distributed treatment ($P > 0.05$), paired *t*-test could not be done except non-parametric Wilcoxon Signed Rank test. The result of paired *t*-test and Wilcoxon Signed Rank test could be seen in Table 4.

To find out the difference in the mean score of respondents between pre- and post-treatment and pre and post without treatment, it was necessary to take independent *t*-test, and the requirement to this test was that the data had to be distributed normally ($P < 0.05$) using Shapiro-Wilk test because the samples were <50 (>50) at the significance level of 95%; therefore, it was possible to take independent *t*-test. The result of independent *t*-test could be seen in Table 5.

DISCUSSION

Quasi-experimental study had been conducted among 30 respondents, either for the treatment group or for the control group where is all DM outpatients at Darussalam Puskesmas, Medan, Indonesia. It was found, using a paired *t*-test, that the probability value of the difference in the mean score of QoL in pre- and post-treatment of self-efficacy development model was $P = 0.000$ ($P < 0.05$). It was also found, using paired *t*-test, that the probability value of the score of QoL in pre and post without treatment was $P = 0.292$ ($P > 0.05$) which indicated that there was the influence of self-efficacy development model with Health Belief Model through DSME on QoL of DM patients, and there was no influence of the group that did not obtain it. The result of paired *t*-test showed that the probability value of the difference in the mean value of BG was $P = 0.5891$ ($P > 0.05$) which indicated, based on the statistics, that there was no influence of self-efficacy development model on BG of DM respondents. The result of independent sample *t*-test, based on variance parity test through *P* Levene's test, showed that $P = 0.000$. Since $P < 0.05$, there was the difference in variance (the variance of the two groups was similar). Therefore, *P*-value in *t*-test was sought in the dissimilar variance at $P = 0.000$ ($P < 0.05$).

Table 3: The influence of self-efficacy development model on QoL of DM respondents

Paired	Mean	Correlation	*P*
Mean QoL pre-treatment - mean QoL post-treatment	−21.06100	0.714	0.000
Mean QoL pre without treatment-mean QoL post without treatment	1.15367	0.979	0.292

DM: Diabetes mellitus, QoL: Quality of life

Table 4: The influence of self-efficacy development model on BSC in DM respondents

Paired	Mean	Correlation	*P*
Mean BSC pre-treatment - mean BSC post treatment	12.43333	0.539	0.589
Mean BSC pre without treatment - mean BSC post without treatment	6.56667	0.804	0.517

DM: Diabetes mellitus

Table 5: The difference in the mean score of QoL in pre and post with and without treatment of self-efficacy development model

QoL	P Levene's test	*P*
Without treatment	0.000	0.000
With treatment		

QoL: Quality of life

Jalilan et al.[28] in a study on 120 Type 2 diabetic patients have found that educational program based on health belief model was improve self-management and seems implementing these programs can be effective in the prevention of diabetic complications. Another study by Vazini et al.[29] reported promotion in the self-care behaviors, preparing training packages tailored on the needs of diabetic patients with emphasis on increasing self-efficacy and removal barrier of normal self-care. Tang et al.[21], who pointed out that from some reviews and meta-analyses, it was found that DSME intervention had positive influence on health status concerning diabetes and psychosocial outcome, especially the increase in the knowledge of diabetes and improved glucose monitoring, dieting and physical exercise, leg care, using medicines, coping, and BG controlling.

Hamuleh et al.[30] had shown that using health belief model in diabetes education program is effective in diet obedience among Type 2 diabetic patients. Jahromi et al.[24] reported DSME improved the QoL outcomes of the diabetic elderly females.

In the present study was no influence of self-efficacy development model on BSC of DM respondents. It was not in accordance with what had been stated by American Diabetes Association[31] that various studies had found that DSME was correlated with the increase in clinical results such as BSC and the decrease in body weight and QoL. The absence of influence might probably be caused by other factors which controlled BSC. Glasgow and Osteen's model of diabetes education (1992) in Smith[32] pointed out that the schemes of the factors correlated with BSC were knowledge of diabetes, attitude, self-confidence, self-efficacy, optimism, motivation, health status (hospitalization, QoL, and blood pressure), dieting and self-care, characteristics of patients' illnesses, and social support. We had an opinion that another factor correlated with BSC was the time in taking BSC. However, from the data master, it was found that 19 respondents (63.33%) in the treatment group underwent the decrease in

BSC and 11 respondents (36.666%) in the without treatment group underwent the decrease in BSC.

The result of the study showed that there were some limitations in the analysis which were related to the respondents' variance which was not exactly the same between the group with treatment and the group without treatment. Besides that, limitations in the analysis were also related to data gathering method which occurred in a different time in which the treatment groups carried out their activity in the morning while another group carried out their activity in the afternoon.

Overall, findings of the current study supported that implementing self-efficacy development model with health belief model approach through DSME among DM patient would be effective to improve QoL.

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