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Effect of Self-learning Package on Quality of Life of Diabetic Patients at Mohaiel Asser Region, KSA

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Abstract **Back Ground:** Diabetes Mellitus is one of highest challenges worldwide, represent major public health problem in Kingdom of Saudi Arabia for various reason with huge impact on quality of life. Individual's physical, emotional, and social well-being, are affected. It demand necessary steps to improve the quality of life of those patients, decrease cost management, avoid related complications and improve all level of health and maintain proper daily living activities. **Objective:** The main aim of this study was to assess the competency of illustrated self-learning package in improving quality of diabetic patients life. **Subject & Method:** A quasi experimental study with one group pretest posttest design was followed. The sample consisted of 50 diabetic patient selected based on inclusion criteria. A 36-items short form health survey questionnaire was used to assess participants quality of life in the pre-posttest. A self-instructional package in the form of illustrated booklet and CD, was distributed for all participants. **Result** were indicates to majority of participants were female and had a hereditary family diseases with compliance to daily treatment, majority of QOL dimensions posttest were improved compared with pretest. **Conclusion:** Diabetes care is a lifelong responsibility, an educational self-learning illustrated package can serve as a choice method for patients with diabetes to enhance their disease-related knowledge, skills and compliance to strategies that improve QOL. There is a needs to initial QOL assessment, enhance awareness for newly diagnosed Pt. and periodically. An educational self-learning illustrated package can serve as a choice method for patients with diabetes to enhance their disease-related knowledge, skills and compliance to strategies that improve QOL.

Keywords Diabetes Mellitus, Kingdome of Saudi Arabia, Quality of Life, Self learning package

1. Introduction

Diabetes mellitus (DM) is a major public health problem, its complications represent a significant medical, social and economic problem [1]. Many people's with diabetes have complications of DM and/or other long-term conditions. Nearly 1 in 5 people with DM have clinical depression and anxiety that increase health care related costs by around 50% [2].

Diabetes mellitus (DM) is a chronic, complex disease, require continuous medical care, with strategies of reducing the multi-factorial risks beyond the glycemic control [3].

DM considered a sixth cause of death worldwide; every 7 seconds, one person dies from DM [4]. The International Diabetes Federation (IDF) reported that, at present, there are 415 million people worldwide suffering from DM, aged between 20 and 79 years old, the global prevalence being of 8.8%, and it is estimated that in 2040 their number will grow up to 642 million, with a prevalence of 10.4% [5].

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There is a fact that most world countries reported a permanent increase of the DM prevalence and incidence, so prevention measures are required, including optimizing the lifestyle and simultaneous control of body weight. Irreversible chronic complications in patients with uncontrolled diabetes mellitus leading not only to a poor life quality but also to a 2-5 times increase of costs of management, and it is necessary to tight follow-up of these patients for the rest of their lives [6].

Saudi Arabia is one of the 19 countries and territories of the IDF MENA region. 415 million people have diabetes in the world with more than 35.4 million people in the MENA Region; will rise to 72.1 million in 2040. There were 3.4 million cases of diabetes in Saudi Arabia in 2015 [7]. DM in Saudi Arabia represent 23.9% of the population compared to 23.1% in Kuwait, and 19.8%, in Qatar. The global average figure is far lower, at 8.3% [8].

3 to 4 out of 18 million Saudi residents between the age of 20 to 79 years of which approximately 70% are Saudi nationals suffered from DM [9], about 3.6 million have diabetes, about 90% of them have T2D [10]. In Saudi Arabia, among Pt. with DM over the age of 30, an estimated 40.3% are unaware of their condition [8]. Furthermore, with 25.5% of Saudi population above the age of 30 displaying signs of

pre-diabetes and 28.7% of the Saudi population categorized as obese and hence at risk of T2D, the number of people with T2D is expected to rise significantly [11-14]. Indeed, by 2035, the number of Pt. with DM aged between 20 and 79 years old is estimated to reach 7.5 million in Saudi Arabia [15], with the increase in economic and societal burden, it is predicted that around 15% of complication related costs, estimated to be SAR3.9 billion per year are due to sub-optimal therapy compliance and persistence [7, 15, 16].

The epidemiologic transition in the Kingdom of Saudi Arabia has been fast that leads to remarkable increase in living standards, characterized by unhealthy dietary patterns, and decreased physical activity [17] & increase in the prevalence of T2DM, in addition to genetic predisposition of Saudi people to diabetes, and a high prevalence of consanguineous marriages [18].

Table 1. Increased Risk of Complications and Healthcare Costs over the Lifetime of a Non-Compliant patients with DM

Percent increased risk versus compliant patients with DM	Complication
286%	More likely to have end stage renal disease
24%	More likely to have a heart attack
26%	More likely to have a stroke
40%	More likely to have an amputation
111%	More likely to go blind (severe vision loss)
>SAR103,500	Estimated extra cost to the healthcare system over their lifetime

Adopted from IMS Institute for Health care Informatics [20].

Quality of life (QOL) is defined as, an individual's perceptions of their own life in the context of their culture, value , goals, standards, and concerns [21]. Quality of life from healthcare professionals view is a reflection of an individual's whole health, including physical, psychological, and social wellbeing [22]. QOL consisted from: Physical health, psychological condition, independence, relationships with others, and the environment where one lives in [23, 24].

Through studies QOL for diabetic patients can be identify optimal treatment and care methods based on a given patient's life situation [25]. DM significantly affects the patient's lifestyle, psychological comfort, and wellbeing, contributing to increased sensitivity, a sense of losing control, increased stress, and undermine quality of life [26]. Quality of life assessment must be a routine part of diabetes care, the information gained through a full patient's assessment, challenge factors in treatment, enables the comprehensive understanding of the patient's situation, development of new methods of management and education, then evaluation the effectiveness of these methods [27].

DM is a disease that affects major aspect of patients' life and continuously increasing financial costs of management, to optimize clinical management and increase the effectiveness of health interventions there is a needs to conduct research on their quality of life [28]. DM is a main contributing factor in overall health status, morbidity, mortality and impaired QOL, uncontrolled diabetes increases health problems & reduced QOL [29].

Assessment of the diabetic psychosocial aspects are important to improve self-monitoring and treatment maintenance. The DQOL questionnaire was designed to measure diabetes-specific quality of life. It contains five separate categories: satisfaction with treatment; impact of treatment; worry about the future effects of diabetes; worry about social and vocational issues; and overall well-being [30]. Patients QOL & self-care activity is critical outcomes of disease treatment and control. Self-management & changing lifestyle has direct application for metabolic control & efficient prognosis as measured by DQoL [31]. Quality of life is a significant indicator of treatment effectiveness, used parallel with clinical and functional assessment [32].

DM has various complications on body systems, with significantly and negatively affect the health and QOL in patients with diabetes. Sense of responsibility, diet restrictions, daily use of medications & incompatibility of social roles, self-management and increased costs of drugs, have a significant impact on the general health, well-being, and the QOL of diabetic patients [33]. Diabetic patients suffer from lower QOL compared with the non-diabetic patients [34], and with those without chronic diseases [37, 38].

Reduced QOL was reduce life satisfaction & impact on the results of treatment and care through affecting one's commitment to the health-care directives [33]. There is relationship between the control of diabetes symptoms and improving the QOL by educating the patients. Training is the basis of disease treatment and achieve satisfactorily-controlled diabetes related complications, those patients need to actively participate in disease management such as daily monitoring of blood glucose, direct meetings with medical personnel, regular exercise program and changes in diet and lifestyle [37]. On the other hand, nurses can determine the negative impact of the disease on the patients' QOL and design special care programs to correct them through examining the patients' health status and QOL [38]. Improving QOL not only valuable for diabetic patients, but also reduces the associated health care costs, improving Pts. knowledge & performance, improve control of metabolic status and performing the suitable self-care behavior, so, diabetic patients should undergo training about their disease and improve their knowledge and skills [39].

All patient who suffer from chronic disease such as DM must be live a good quality of life, there is a need to be educated about management of their illness. A structured education is essential to provide diabetic patients with the necessary self-management knowledge and skills to achieve accepted blood sugar control. The results of systematic review showed that structured diabetes education has a positive impact on biomedical and quality of life on diabetic

patients especially with some degree of reinforcement at additional points of contacts. Further research is needed to evaluate the effect of education on longer duration [40].

Health education programs (HEP) considered as a significant part in therapeutic strategies, aims to help patients gained accurate healthy knowledge, develop skills that better health-concern and quality of life. HEPs are available in various formats and types and have widely proven to be useful in improving biological, psychosocial and behavioral parameters [41].

Many studies conducted to evaluate QOL of diabetic patients reported significant improvement in the intervention group compared to the control group at the end of intervention, some reported significant improvement either in bodily pain and vitality scales of quality of life at the end of 3 years follow up, or improvement in all domains of quality of life in intervention group compared to control group at the end of the study at the end of 6 months follow up [42-44]. The diabetic educational program should have four criteria to be effective: structured written curriculum conducted by trained educators and be reviewed and quality assured [45]. Study showed that self-management education has little effects on the quality of life in a relatively short term follow up, the improvement of quality of life occurs in long term interventions ,more than 2 years [46].

A structured diabetes education has a short and long term positive effect especially on HbA1c and quality of life. It is recommended that all people with diabetes should be engaged in a structured diabetes education program long term research to evaluate the effectiveness of structured diabetes education on the diabetes complications and mortality rate is recommended because of the natural progressing history of diabetes and the educational message may decline over time and may need reinforcement [47].

A displaying training video leads to a positive impact on all dimensions of QOL of patients with diabetes, the mean overall QOL of these patients was significantly increased. In this regard, it is stated that treatment acceptance and adherence to the self-care principles by the diabetic patients is very valuable in disease management and brings about disease control and the necessary lifestyle changes. The field's literature emphasizes that QOL is an important and valuable consequence in patients with diabetes which has to be routinely evaluated along with training assessments. Teaching approach based on interactive multimedia tools is a good choice for diabetics Pts. for enhancing their knowledge about self-care and increasing their QOL. Results can be used as guidance for nurse managers and practitioners in nursing training programs to consider the importance of video training in patients with diabetes [48].

DM is negatively impacts many aspects of a person's life, including the psychological impact of being chronically ill, dietary restrictions, changes in social life and eventually lifelong disabilities [49]. Implementation of a health education program about life style modification and glycemic control for diabetic patients, and measures to improve quality of life are highly needed [50].

Self-care training affects the mean score of QOL of patients with diabetes, the pre mean score of QOL increased from 46 to 75.52 after the training (P = 0.04) [51]. The effective self-care behaviors in diabetic patient lead to glycol-sylated hemoglobin levels closer to normal and an improved QOL [52]. The overall diabetic management goal is to prevent acute and chronic complications with preserving a good quality of life. QOL is an important health outcome in its right, representing the ultimate goal of all health interventions [53]. Several studies have demonstrated that diabetes has a strong negative impact on QOL especially in the presence of complications [54].

2. Subject & Methods

2.1. Aim of the Study

This study aimed to assess the effectiveness of self-learning package on Quality of Life of patients with diabetes mellitus.

2.2. Hypothesis

There is a significant difference between quality of Life of patients with diabetes mellitus, pre-post administering the self-learning package.

2.3. Design

A quasi-experimental, of one-group pretest-posttest designs was followed to conduct this study.

2.4. Subjects & Settings

This study conducted at Mohaiel Asser hospital, community health care center at Mohaiel Asser region. A non-probability convenient sampling of 50 patients with diabetes mellitus who attend to receive treatment or follow up in the above mentioned setting with normal level of consciousness & willing to participate and didn't participated in similar study before.

2.5. Instrument Tool

Data were collected by using a questionnaire sheet that divided to two parts, *first*: covered demographic variables & the *second* was the SF-36 health survey to assess QOL [55]. This instrument provides state of health profiles and is one of the most widely used generic scales in the assessment of clinical results. It is applicable to both the general population and to patients with a minimum age of 14 and can be used in descriptive as well as evaluation studies. It included 8 dimensions of physical functioning, physical role restrictions, bodily pain, general health perception, energy and power, social functioning, emotional role restrictions, and mental health.

Score is based on the short-form 36 (SF-36) standard measure. The 3-item question with scores of (0, 50, and 100), the 5-item question with scores of (0, 25, 50, 75, and 100), and the 6-item question with scores of (0, 20, 40, 60, 80, and

100) were considered, where higher scores indicate better QOL performance.

2.6. Preparatory & Implementing Phase

Quality of life questionnaire was translated in Arabic version & revised by an expert. Review of the current and past literature related to various aspects of the problem was done using textbooks, scientific journals, and internet. A pretest was conducted, then based on the finding, an illustrated booklet was prepared & revised by specialist for clarity & reliability, it covered the required knowledge regarding definition, types, signs & symptoms, complication, management of DM. as well as meaning of QOL, its component, why DM impact on QOL and possible strategies that can be followed to improved, then distributed to all subject both hard & soft copy, an e-mail and telephone number were given to all participants for any additional explanation. After 3 months from package distribution the post test was conducted by the same pretest questionnaire sheet that takes 30 minutes to fill it.

2.7. Ethical Considerations

The study was approved by ethical committee in college of applied medical sciences, Mohail and taken letters to mentioned setting directors to accomplish research. Patients were informed about the purpose of the study and about their right to withdraw at any time. The confidentiality of the information was secured and ensured.

Statistical analysis

Data coding, entry and statistical analysis were done using SPSS version 16.0. Descriptive and inferential statistics were used in the analysis of the study. Paired sample test is used for the testing of hypothesis.

3. Results

The findings based on the descriptive and inferential statistics analysis are presented under the following headings

1- Distribution of demographic variables.
2- Distribution of statistical value of pretest and posttest regarding Quality of life.
3- Distribution of percentage of samples in pretest and posttest under five domains.

The participants were divided into four categories based on age, 1. 20-29- (4%); 2. 30-39(56%); 3. 40- 49 (32%) & 4. 50- 59 (8%). Among them 92 % were females and 8 % were males. Out of them 12 % were unmarried and 88% were married. According to the number of dependents 4 % had no dependents, 52% had one dependent, 32% had 2 dependents, 8 % had 3 dependents, 4% had 4 dependents. Nearly 2 third of subject (64%) were not working, 20% had occupation, and 92% were having hereditary disease & taking regular treatment. Regarding their level of education, 20% of participants were illiterate, 12 % were able to read and write only, 6% have preparatory school, 36% had secondary school & 24 % were university graduates. Regarding the place of healthcare audited it was found that 72% of participants were from government sector, 20% were from partial health insurance and 8 % were from complete health insurance sector. 20 % of participants were earning a monthly income less than 5000SR, 72 % were earning between 5000- 10000 SR, and 8 % had more than 10000SR income (Table 2).

Table 2. Percentage distribution of subjects demographic variables (N=50)

	Demographic Variables		Frequency	(%)
1	**age**	20-29 years	2	4.0
		30-39 years	24	48.0
		40-49 years	16	32.0
		50-59	4	8.0
		>59	4	8.0
2	**Gender**	male	4	8.0
		female	46	92.0
3	**Marital status**	Unmarried	6	12.0
		Married	44	88.0
4	**Number of dependents**	0	2	4.0
		1	26	52.0
		2	16	32.0
		3	4	8.0
		4	2	4.0
5	**Occupation**	does not work	32	64.0
		retired	10	20.0
		working	8	16.0
6	**Educational level**	illiterate	10	20
		read and write only	6	12.0
		preparatory	4	8.0
		Secondary	18	36.0
		university	12	24.0
7				
	Place health care audited	government sector	36	72.0
		partial health insurance	10	20.0
		complete health insurance	4	8.0
8	**Monthly income**	less than 5 thousand riyals	10	20.0
		5 to 10 thousand riyals	36	72.0
		> 10 thousand riyals	4	8.0
9	**Is there a hereditary disease**	Yes	46	92.0
		No	4	8.0
10	**Are you influenced by it**	yes, very much influenced	36	72.0
		yes a little	14	28.0
11	**Do you comply to daily treatment**	Yes	46	92.0
		No	4	8.0

Table 3 support the acceptance of research hypothesis, where pretest total mean score was found to be 72.48 and posttest mean score was found to be 84.38. The calculated T value was 5.95 was significant (P value<0.05). It was highlighted that there was a significant difference between the pre-post-test quality of life total mean scores. Hence hypothesis was accepted in turn, the illustrated educational self-learning package was significant improved health related quality of life for Pt. who suffer from DM.

Table 3. Participants quality of life total mean scores pre- post test

Quality of Life	Mean	T value	P value
Pre test	72.48		
Post test	84.38	5.595	P= < 0.05

Figure 1, showed that percentage of participants in pre-posttest regarding physical function during pretest was 18% poor category, 64 % moderate category and remaining 18% were under good category of quality of life, whereas in posttest 2%, 80% and 18% were under poor, moderate and good category respectively.

Figure 2 demonstrate the percentage of participants in pre-posttest regarding participants role limitation, which in pretest was 12%, 40%, and 48% categorized as poor, moderate & good & in posttest test were 10%, 48% and 42% respectively.

When the quality of life was analyzed under domain pain in pretest it was found that 30% were under poor category, 34 % were under moderate category and remaining 36% were under good category of quality of life, whereas in posttest 24%, 40% and 36% were under poor, moderate and good category respectively (Figure 3). Regarding participants general health pretest was 4%, 86%, and 10% poor, moderate & good respectively, in posttest were 2%, 88% and 10%. respectively (Figure 4).

Figure 5 illustrated the energy in pretest, it was found that 20%, 74%, and 2% of participants were in poor, moderate and good quality of life whereas in posttest it was found as 8%, 86% & 6% respectively.

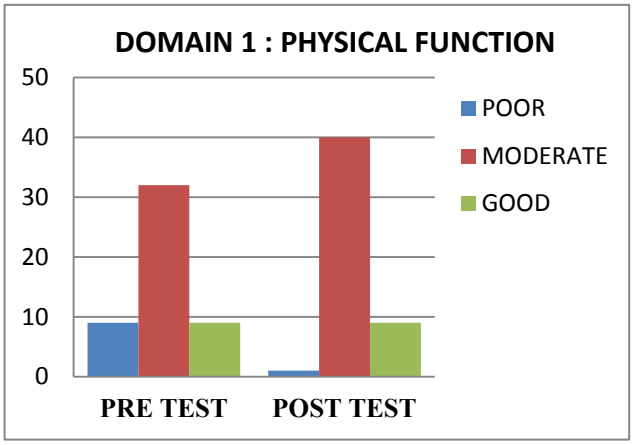

Figure 1. Percentage distribution of participants pre-posttest physical function domain

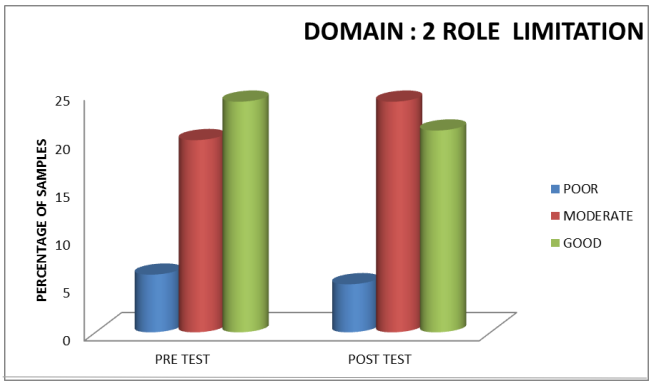

Figure 2. Percentage distribution of subjects pre-posttest role limitation domain

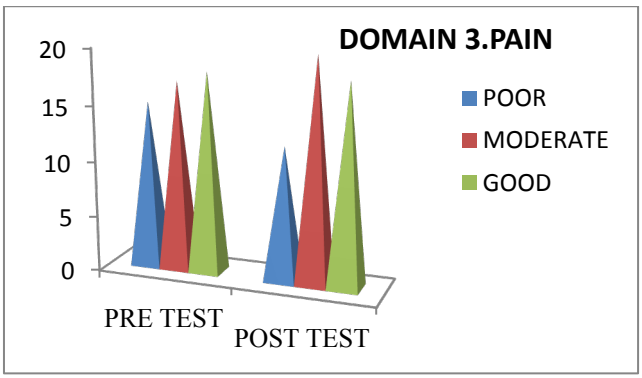

Figure 3. Percentage distribution of subjects pre-posttest pain domain

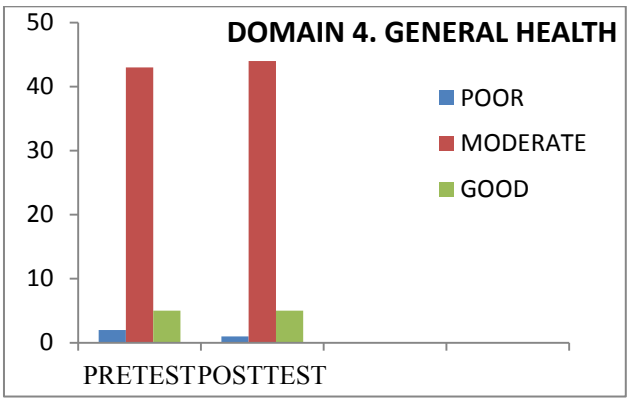

Figure 4. Percentage distribution of subjects pre-posttest general health domain

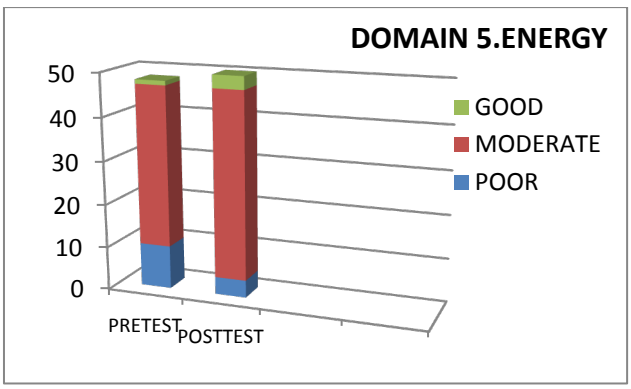

Figure 5. Percentage distribution of subjects pre-posttest energy domain

4. Discussion

Saudi Arabia ranks the second highest in the middle East & is a 7th highest rate in the world. Several challenges management needed, direct expense of diabetes is costing around 13.9% SR of total health expenditure that increased to 180 billion SR in year of 2014, implement strategies that improve QOL of diabetic Pts. is crucial to delay or prevent formidable issues [56].

A systematic review reported that diabetic patients had a lower related QOL than healthy people and those with better socio-economic status and better control of cardiovascular risk factors had better health related QOL [57].

Fahad Al-Shehri study concluded that most diabetic patients (78.7%) had negative (i.e., unfavorable) audit of diabetes dependent quality of life scores. Diabetic patients' age, education and occupation were not significantly associated with their QOL. Female patients had significantly worse QOL than male patients ($p = 0.026$). Married patients had significantly worse QOL compared with non-married patients ($p = 0.012$). Patients with type 2 diabetes had significantly worse QOL than those with type 1 diabetes ($p = 0.029$). The degree of diabetes control was significantly and directly associated with QOL score ($p < 0.001$). The worst QOL was expressed among poorly controlled diabetes while the best was among patients with excellent control [58]. Diabetic patients face great challenges in all quality of life dimensions. Epidemiologists, public health researchers, and health policy makers should work together to develop comprehensive programs for health promotion and disease prevention through increasing public awareness [59].

The samples in current study were divided in to four categories or bio-functional age groups, Percentage of samples categorized in to the groups were 20-29- (4%); 30-39(56%); 40- 49 (32%); 50- 59 (8%). 92% were females and 8 % were males, 12 % were unmarried and 88% were married. According to the number of dependents 4 % had no dependents, 52% had 1 dependent, 32% had 2 dependents, 8% had 3 dependents, 4% had 4 dependents, which is not constant with study conducted by Levterova. et.al. found that less than half were females (52.9%), married (74.3%) and living in urban areas (61.4%) [60].

Type 2 DM has negatively affected all domains of quality of life of the study group [60]. Result of current study were agreement with this result where many of participants didn't work, majority were female, nearly to half were aged more than 40 years, and 92% of the sample were having hereditary disease & taking regular treatment, high percentage of heredity diseases demonstrated that consanguineous marriage still followed in south Saudi Arabia. Regarding their educational level, 20 % were illiterate, 12% able to read and write, 8% have preparatory school, 36% had attended secondary school & university graduates were 24%, this education level illustrate why nearly to two third weren't work & or may be due to participants age . In this study 20% of samples were earning a monthly income less than 5000SR, 72% were earning between 5000- 10000 SR, and 8% had more than 10000SR income, which indirectly showed that high prevalence of DM was noticed in low and moderate economic status.

In the current study the researchers noticed that there is a significant difference between the pre-posttest mean scores regarding quality of life. Therefore patients can have a change in the quality of life if their knowledge level is improved by self-learning educational package. This result was concurrent with systematic review study that showed a structured diabetes education has a positive impact on biomedical and quality of life on diabetic patients especially with some degree of reinforcement at additional points of contacts [47].

A significant increase in general health perception, physical functioning, social functioning, pain, and mental health; however, there was no statistically significant increase in energy and fatigue and role emotional [48]. The present study result were constant with this result where we found an improvement in participants QOL domains after administer an illustrated self-learning package.

5. Conclusions

The main result of current study were indicates to:

1. Majority of participants were female and had a hereditary family diseases with compliance to daily treatment (92%), aged more than 30 years & dependent on family members on response to daily living activities (96%).
2. Nearly 2 third didn't working (64%), only 24% were graduated from university and nearly three quarter were following government health care sectors with monthly family income ranged between 5-10SR (72%).
3. A posttest total QOL mean score was statistically difference improved after administering a self-illustrated learning package compared to a pretest mean score (P value < 0.05) that supported a research hypothesis.
4. Majority of QOL dimensions posttest were improved compared with pretest.

6. Recommendations

DM had worst impacting in QOL. Based on results of present study and research hypothesis, we concluded that

- There is a highlight needs for take steps in order to improving diabetic Pts. QOL.
- An educational self-learning illustrated package can serve as a choice method for patients with diabetes to enhance their disease-related knowledge, skills and compliance to strategies that improve QOL.
- There is a needs to initial QOL assessment, enhance awareness for newly diagnosed Pt. and periodically.

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