

Research Article

Effectiveness of a Pilot Health Education Program on Knowledge and Attitude Toward Dealing with Diabetics

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ABSTRACT

BACKGROUND: This study aimed to measure the effectiveness of a pilot health education programme on Princess Nourah Bint Abdulrahman University student's knowledge and attitudes towards dealing with diabetic patients.

METHODS: A quasi-experimental study was conducted among 60 students at Princess Nourah Bint Abdulrahman University through two groups, intervention and comparative, from January to April 2019.

RESULTS: There was a statistically significant difference between the pre- and post-test total knowledge of the intervention group. Moreover, there was no significant difference between the pre- and post-test total knowledge of the comparative group, and there was no significant difference between the pre- and post-test attitudes of the intervention and comparative groups.

CONCLUSION: The health education programme was effective in improving the knowledge of the participants. It is recommended that family members and caregivers be involved in diabetes education sessions.

1. INTRODUCTION

Diabetes is one of the most important global public health issues (Tabish *et al.*, 2007). The American Diabetes Association defines diabetes as "a group of metabolic diseases characterised by hyperglycemia resulting from defects in insulin secretion, insulin action, or both" (Diagnosis and classification of diabetes mellitus 2014) (2, p. 81). The worldwide prevalence of diabetes among adults doubled from 1980 to 2014 (World Health Organization 2018). Saudi Arabia is one of the top 10 countries in the world with the highest prevalence of diabetes (Naeem *et al.*, 2015). The prevalence of diabetes in Saudi Arabia is 14.4% (World Health Organization 2016).

Type II diabetes is linked with multiple risk factors, such as being overweight, family history, heredity, age above 40, unhealthy diet, physical inactivity, history of gestational diabetes, hypertension, stress and smoking (Centers for Disease Control and Prevention 2017). Diabetes has many consequences, including foot neuropathy and eye problems, such as blindness,

glaucoma and retinopathy (American Diabetes Association 2018). Researchers have found that the proper control of one's lifestyle can minimise the problems associated with diabetes (Shawon *et al.*, 2016). Diabetic patients can control their lifestyles in various ways, such as with their diet and drug management (Li *et al.*, 2017). Medication commitment and social support have provided positive outcomes for diabetic patients (Gu *et al.*, 2017). Moreover, diabetic patients can commit to treatment regimens by receiving support from coping strategies that can be delivered from the individual's social network in a regular manner (Song *et al.*, 2012).

A study conducted in Riyadh, Saudi Arabia found that the level of knowledge in the general public about diabetes was reported to be about 20%, while the level of attitudes towards supporting diabetic patients was reported to be 52% (Asdaq *et al.*, 2018).

1.1. Rationale and justification

Diabetes has reached serious levels in terms of severity in Saudi Arabia, as roughly 14% of the total health

expenditure in 2014 was spent solely on diabetes patients, and this problem is not expected to lessen in the near future (Robert *et al.*, 2017). The number of individuals affected will keep growing unless proper management, lifestyle changes, healthier diets and sufficient physical activities are added to the community's culture (Asif *et al.*, 2014). A study conducted in Saudi Arabia showed that about two-thirds of the participants had at least one diabetic family member (Al-Mutairi *et al.*, 2015). Including family members in educational programmes provides support to the patient and helps increase adherence to a treatment regimen, which, in turn, can achieve a better outcome with the disease (Hu *et al.*, 2014). This study was conducted to assess the effectiveness of a pilot health education programme on a caregiver's knowledge and attitudes. The success of this pilot would be used as a starting point to implement wider interventions that include family members and caregivers in diabetes education.

Objectives

- Prior to the start of the intervention, assess the level of knowledge and attitudes relevant to dealing with diabetic patients among Princess Nourah Bint Abdulrahman University students.
- Apply a pilot face-to-face educational intervention on dealing with diabetic patients among Princess Nourah Bint Abdulrahman University students.
- Reassess the level of knowledge and attitudes relevant to dealing with diabetic patients among Princess Nourah Bint Abdulrahman University students.

2. METHODS

Study design and setting: A quasi-experimental study was conducted at Princess Nourah Bint Abdulrahman University over a period of three months among 60 students from a non-health class section.

Inclusion criteria: Each participant had to have a diabetic patient in her family.

Sampling technique: The participants were recruited through convenience sampling.

Sample size calculation: A minimum sample of 60 participants was calculated as necessary using the Epi calculator (Dean *et al.*, 2006). This was based on a prevalence of unexposed individuals with an outcome of 20% and an odds ratio of five. The 60 participants were divided into two groups: 30 were exposed to the intervention, and 30 were in the comparative group.

2.1. Data collection

The data were collected by a self-administered Arabic questionnaire that was designed by the

The data were collected by a self-administered Arabic questionnaire that was designed by the researchers, guided by previous studies (Fatema *et al.*, 2017; Anderson *et al.*, 1989). A 27-item questionnaire was

used to assess the respondent's characteristics, knowledge and attitudes towards dealing with diabetic patients. The first part of the questionnaire covered the respondent's characteristics: age, marital status, level of education, speciality, if they had a diabetic patient in their family, and the relationship of the diabetic patient with the participant.

Knowledge was measured using 11 questions, targeting the definition of diabetes, types, risk factors, complications and treatment. They were multiple-choice questions, and the participants had to select the correct answer. Correct answers were coded as one point, and incorrect answers were coded as zero points. The total possible score was 11 points. A cut-off score was created at the median of the sample; if an individual's score \leq median, this was considered poor knowledge, and an individual's score $>$ median was considered good knowledge.

The attitude section was composed of 10 questions, and the responses were recorded on a three-point Likert scale (disagree, neutral and agree) scored 1, 2 and 3, respectively, with a highest possible score of 30. The questions numbered 2, 3, 6 and 9 were reversed-scored questions. A cut off point was established at the median, if an individual's total attitude score \leq median, this was considered a negative attitude and an individual's total attitude score $>$ median was considered a positive attitude.

Pilot test: Before conducting the study, pilot testing was conducted among 20 students to test the clarity of the questionnaire. The Cronbach's alpha coefficient was .798.

Study procedure: The study was conducted in three phases. In the first phase, before the intervention, the questionnaires were distributed to the participants in both the intervention and comparative groups.

In the second phase, a pilot health education intervention was implemented at Princess Nourah Bint Abdulrahman University among the 30 students in the intervention group. The intervention was a one-day educational session that consisted of two lectures about diabetes and caring for diabetic patients. Each lecture lasted for an hour and used a PowerPoint presentation and photos. A take-home video of the family's role in caring for a diabetic patient was distributed in addition to two sets of educational flyers.

In the third phase, two weeks after the intervention, the same questionnaires were distributed to the students in both the intervention and comparative groups to reassess their knowledge and attitudes.

2.2. Data analysis

The collected data were coded, entered and analysed using the statistical package for the social sciences (SPSS Inc 2011, Version 25). Data were presented in descriptive tables, and the tests of significance applied were Pearson chi-square, McNemar and Wilcoxon signed-rank tests. The Pearson chi-square test was used

for comparisons between the intervention and comparative groups; the McNemar test was used for comparisons between paired nominal data and the Wilcoxon signed-rank test was used for comparisons between ranked observations. All statistical tests were considered significant at values of $p \leq .05$.

3. RESULTS

Table 1 presents the characteristics of the participants. Approximately 70% of the participants' ages were in the range of 21–23. In addition, 83.3% of them were single, and 90% of the participants had a speciality in early childhood. Moreover, 94.9% of the participants were in levels 5–8. The intervention and comparative groups were equal in number of participants.

Table 1: Characteristics of the participants (n = 60).

Question	No.	%
Age		
17–20	6	10.0%
21–23	42	70.0%
>23	12	20.0%
Marital status		
Single	50	83.3%
Married	10	16.7%
Specialties		
Early childhood	54	90.0%
Special education	6	10.0%
Level		
1–4	3	5.1%
5–8	57	94.9%
Relationship of participant to diabetic patient		
1st degree	38	63.3%
2nd degree	13	21.7%
Other	9	15.0%
Group		
Intervention group	30	50.0%
Comparative group	30	50.0%

Table 2 shows the comparison between the pre-test and post-test knowledge among the intervention group. There was a statistically significant difference in the questions types of diabetes ($p = .004$), risk factors of diabetes ($p < .001$), complications of diabetes ($p < .001$),

awareness about types of medication ($p < .001$) and procedure for foot care ($p = .016$). There was a highly statistically significant difference between the pre-test and post-test in total score ($p < .01$).

Table 2: Comparison between pre-test and post-test knowledge of intervention group.

Knowledge questions	Pre		Post		P-value*
	No.	%	No.	%	
Definition of diabetes	24	80.0%	27	90.0%	.508
Types of diabetes	22	73.3%	30	100%	.004***
Risk factors of diabetes	4	13.3%	23	76.7%	<.001***
Complications of diabetes	3	10.0%	23	76.7%	<.001***
Awareness about types of medication	20	66.7%	30	100%	<.001***
Different types of medication	26	86.7%	30	100%	.1
Special diet	30	100%	30	100%	>.9
Special care for feet	26	86.7%	30	100%	.1
Procedure for foot care	22	73.3%	29	96.7%	.016***
Dealing with hyperglycemia	27	90.0%	29	96.7%	.625
Dealing with hypoglycemia	23	76.7%	27	90.0%	.219
Total knowledge (good)**	10	33.3%	27	90.0%	<.01***

* McNemar test of significance

** Pearson's chi square test of significance

***Statistically significant

Table 3 shows that there were no significant differences between the pre-test and post-test in all questions of knowledge and in the total knowledge score for the comparative group.

Table 3: Comparison between pre-test and post-test knowledge of comparative group.

Knowledge questions	Pre		Post		P-value*
	No.	%	No.	%	
Definition of diabetes	21	70.0%	24	80.0%	.453
Types of diabetes	24	80.0%	26	86.7%	.687
Risk factors of diabetes	3	10.0%	3	10.0%	>.9
Complications of diabetes	3	10.0%	8	26.7%	.125
Awareness about types of medication	18	60.0%	22	73.3%	.289
Different types of medication	26	86.7%	27	90.0%	>.9
Special diet	28	93.3%	28	93.0%	>.9
Special care for feet	25	83.3%	27	90.0%	.5
Procedure for foot care	17	56.7%	16	53.3%	>.9
Dealing with hyperglycemia	27	90.0%	26	86.7%	>.9
Dealing with hypoglycemia	26	86.7%	24	80.0%	.652
Total knowledge (good)**	6	20.0%	11	36.6%	.125

* McNemar is the test of significance.

**Pears

Table 4 presents the comparisons between the pre-test and post-test attitudes towards dealing with diabetic patients in the intervention group.

There were no statistically significant differences between the pre-test and post-test for all questions of attitude and the total score.

Table 4: Comparison between pre-test and post-test attitudes of intervention group.

Attitude questions	Pre			Post			P-value*
	Agree	Neutral	Disagree	Agree	Neutral	Disagree	
	No.	No.	No.	No.	No.	No.	
	(%)	(%)	(%)	(%)	(%)	(%)	
Seriousness of diabetes	16	7	7	16	7	7	.9
	(53.4)	(23.3)	(23.3)	(53.4)	(23.3)	(23.3)	
Never get break with diabetes	13	4	13	8	9	13	.4
	(43.3)	(13.4)	(43.3)	(26.7)	(30)	(43.3)	
Diet affects social live	5	5	20	7	9	14	.1
	(16.7)	(16.7)	(66.6)	(23.3)	(30)	(46.7)	
Importance of family support	29	1	0	30	0	0	.3
	(96.7)	(3.3)	(0)	(100)	(0)	(0)	
Proper training of family members	30	0	0	30	0	0	>.9
	(100)	(0)	(0)	(100)	(0)	(0)	
Diet treatment without medication	11	9	10	13	9	8	.4
	(36.7)	(30)	(33.3)	(43.3)	(30)	(26.7)	
Effect of family member education	29	1	0	29	1	0	>.9
	(96.7)	(3.3)	(0)	(96.7)	(3.3)	(0)	
Preparing a suitable diet	29	1	0	28	1	1	.2

	(96.7)	(3.3)	(0)	(93.4)	(3.3)	(3.3)	
Importance of medication	7	7	16	4	7	19	.3
	(23.3)	(23.3)	(53.4)	(13.3)	(23.3)	(63.4)	
Importance of foot care	28	2	0	30	0	0	.2
	(93.3)	(6.7)	(0)	(100)	(0)	(0)	
	No.		(%)	No.		(%)	>.9
Total attitude (good)							
	17		(56.7)	17		(56.7)	

*Wilcoxon signed rank is the test of significant.

** Pearson’s chi-square is the test of significance.

Table 5 shows the comparisons between the pre-test and post-test attitudes towards dealing with diabetic patients for the comparative group. There were no statistically

significant differences between the pre-test and post-test for all questions of attitude and the total score.

Table 5: Comparison between pre-test and post-test attitudes of comparative group.

Attitude questions	Pre			Post			P-value*
	Agree	Neutral	Disagree	Agree	Neutral	Disagree	
	No.	No.	No.	No.	No.	No.	
Do you believe in:							
	(%)	(%)	(%)	(%)	(%)	(%)	
Seriousness of diabetes	26	2	2	23	5	2	.08
	(86.6)	(6.7)	(6.7)	(76.7)	(16.6)	(6.7)	
Never get break with diabetes	16	9	5	16	11	3	.6
	(53.3)	(30)	(16.7)	(53.3)	(36.7)	(10)	
Diet affects social life	14	4	12	15	4	11	.8
	(46.7)	(13.3)	(40)	(50)	(13.3)	(36.7)	
Importance of family support	29	1	0	27	1	2	.2
	(96.7)	(3.3)	(0)	(90)	(3.3)	(6.7)	
Proper training of family members	30	0	0	30	0	0	>.9
	(100)	(0)	(0)	(100)	(0)	(0)	
Diet treatment without medications	13	9	8	12	9	9	.8
	(43.3)	(30)	(26.7)	(40)	(30)	(30)	
Effect of family member education	27	2	1	27	2	1	>.9
	(90)	(6.7)	(3.3)	(90)	(6.7)	(3.3)	
Preparing a suitable diet	30	0	0	28	1	1	.2
	(100)	(0)	(0)	(93.4)	(3.3)	(3.3)	
Importance of medication	9	10	11	9	7	14	.4
	(30)	(33.3)	(36.7)	(30)	(23.3)	(46.7)	
Importance of foot care	26	4	0	27	3	0	.4
	(86.7)	(13.3)	(0)	(90)	(10)	(0)	
	No.		(%)	No.		(%)	
Total attitude (good)**							
	10		(33.3)	12		(40)	.7

* Wilcoxon signed rank is the test of significant.

** Pearson’s chi-square is the test of significance

4. DISCUSSION

This study assessed the effectiveness of a pilot health education programme on Princess Nourah University students' knowledge and attitudes towards dealing with diabetic patients. The study revealed that there was a significant improvement in the knowledge in the intervention group after applying the health education campaign. However, there was no significant change in the attitudes of the intervention group.

4.1. Knowledge of intervention and comparative groups

From these results, it is clear that there was a highly significant difference between the pre- and post-test knowledge of the intervention group, which can be attributed to the effectiveness of the health education programme. This finding is directly in accordance with a previous study that stated the knowledge of the intervention group was improved after a health education program (Moreira *et al.*, 2018).

Regarding knowledge about the risk factors of diabetes, most of the participants recognised obesity as one of them, which can be considered common knowledge. This was consistent with a previous study conducted in Saudi Arabia that found obesity as a risk factor was common knowledge; however, knowledge regarding other risk factors after the application of the intervention was improved (Aljoudi *et al.*, 2009).

In contrast, there was no statistically significant difference for some questions, such as different types of medication, special diet and special care for the foot. However, all these questions in the post-tests were answered correctly. This can be interpreted as the baseline knowledge in these questions was already high, resulting in no significant differences; a similar finding was reached by Abbott (Abbott *et al.*, 2018). Moreover, the results revealed that there were no significant differences between the pre-test and post-test knowledge of the comparative group. This can be inferred, as there were no external factors impacting their knowledge. A previous research study has also demonstrated that (Akobeng *et al.*, 2005).

4.2. Attitude of the intervention and comparative groups

The study showed no statistically significant differences between the pre-test and post-test results of participants for all attitude questions. It is worth mentioning the attitudes were not poor initially among the participants thus a change is not necessary. In addition, attitudes are not easily changeable and change efforts requiring some time. This finding is consistent with what has been found in previous research about attitudes being difficult to change (Gardner *et al.*, 1996). In contrast, another study found improvements in attitudes after the intervention (Ramegowda *et al.*, 2016).

Due to time constraints, this study used a non-probability convenience sampling technique, which lacked representation and affects the ability to generalise the research findings. A more useful approach for this study would be to use a probability random sampling technique.

5. CONCLUSION AND RECOMMENDATIONS

This study concluded that the health education programme was effective in improving the knowledge of the intervention group, and there was no significant change in their attitudes. Health education interventions are needed to increase public awareness of the importance of dealing with diabetic patients. It is recommended that the role of the family be integrated in supporting patients for better outcomes regarding the curricula. Moreover, direct and indirect messages through mass and social media about the importance of family support in dealing with diabetic patients are needed. Furthermore, healthcare professionals in general and diabetes educators in particular need to realise their responsibilities regarding controlling diabetic patients, especially the importance of involving family members in health education sessions for their increasing improvement. The researchers recommend further studies to investigate the attitudes of other populations and to assess the actual practices of family members regarding their support of diabetic patients.

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DECLARATION OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ETHICAL APPROVAL

The Institutional Review Board (IRB) approval number 18.0373 from Princess Nourah Bint Abdulrahman University was received before starting our study. Each participant electronically signed informed consent before completing the survey.

AUTHORS' CONTRIBUTIONS

All authors contributed equally to the development of the research and the development of the manuscript, have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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