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Research Paper

The Mediating Role of Self-Esteem in the Relationship between Diabetic Self-Management and Well-Being among Diabetic Patients

Pavana Sivakumar[1]*, Dr. Jessy Fenn[2]

ABSTRACT

Diabetes is a chronic illness which is among the 7th leading causes of death in the world. Accompanied by physical, emotional and social discomforts, the treatment in itself proves expensive for a developing economy-or a single family. But studies have shown that it can be treated and consequences be delayed with diet, physical activity and regular screening. So the objective of the study was to find an effective type of self-care; the difference in diabetic self-management style based on the type of self-care (only medication, only diet & exercise and both); the difference in self-esteem and well-being based on the diabetic self-management styles; and the mediating role of self-esteem in the relationship between diabetic self-management and well-being among diabetic patients. The study was conducted among 102 diabetic patients using Diabetic Self-management questionnaire, Rosenberg's Self-esteem scale and Well-being questionnaire-12. The result showed a positive correlation between diabetic self-management and self-esteem and all factors of well-being except for negative well-being which showed a negative relationship. There was a significant difference in diabetic self-management based on the type of self-care and there was significant difference in self-esteem and well-being based on the level of diabetic self-management. The result also indicated a positive mediating role of self-esteem in the relation between diabetic self-management and well-being among diabetic patients. The result of the study can be applied in a medical setting to plan new interventions without using chemical assistance for appropriate management of diabetes.

Keywords: *Diabetic self-management, Self-esteem, Well-being*

Diabetes is a chronic, metabolic disease where the pancreas either fails to produce enough insulin or the body cannot effectively use insulin, characterized by elevated levels of blood sugar. Around 422 million people globally are diabetic and about 1.6 million deaths are directly attributed to diabetes (*Diabetes*, n.d.), making it the 7th leading cause of death (Melmed, 2011). India has the second most number of diabetic patients in the world (77 million) which amounts to almost 8.9% of the population. Concerning India, there might be an increase in the number of diabetic patients at least by twofold in the upcoming years. Among the states, Kerala is known to be the diabetic capital of the country, a good

[1]Teaching Assistant, Kristu Jayanti College, K. Narayanapura, Kothanur, Bengaluru
[2]Professor, Rajagiri College of Social Sciences, Kerala, India
*Corresponding Author

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20% of the population being diabetic (*Diabetes in Kerala | Cadi*, n.d.). According to CADI Research Foundation, among these 20% patients, 17% receive no treatment, 15% are on diet alone and 68% take medication. Diabetes being a prevalent cause of ailment and death, the impact of well-being and the self-management of the disease is taken into consideration. Also, what prompts an individual to choose the specific way of keeping it under control (diet, medication, both, or none) and the self-esteem of the individual was studied along with its relationship with self-management of diabetes.

Chronic diseases tend to be inter-related to anxiety or depression (Sopjani et al., 2016) in majority cases. Similarly, depression has been found to have an association with diabetes (Park et al., 2013) and has a negative effect on health outcomes and self-care behaviors (Rivera-Hernandez, 2014). People with depression and diabetes show poor glycemic control, poor diet and exercise and irregular glucose checking pattern (Egede & Ellis, 2010). Low self-esteem also impacts depression and health care behavior (Weinger et al., 2005). Likewise, higher self-esteem increases the individuals' ability to deal with diseases and self-management. Self-esteem improves the worth of an individual which in turn enhances the confidence a person has on his or her actions. This aids them in decision making regarding the way of life to treat a disease. General well-being also plays a crucial role in striking a balance between perception of self and realistic actions.

The realm of diabetic self-management has been less explored. In the current scenario, while looking at the future of a developing country like India, we need to be aware about the rapid rise in the number of diabetic patients. As an upcoming economy, the rising cost of healthcare for diabetes alone can hinder the natural flow of living cost. The difference in education and health facilities across the country also makes it important that we pass on the awareness with equal emphasis. The need of an action plan at the hour is of utmost importance and the role of psychological factors, diet, exercise etc. should be taken into account to promote cost effectiveness and life enrichment.

METHODOLOGY

Objectives

To look at the difference in diabetic self-management style based on the type of self-care (only medication, only diet & exercise and both); the difference in self-esteem and well-being based on the diabetic self-management styles; and the mediating role of self-esteem in the relationship between diabetic self-management and well-being among diabetic patients.

Hypotheses

H1. There is a difference in diabetic self-management style based on the type of self-care.
H2. There is a difference in self-esteem and well-being based on the diabetic self-management styles
H3. There is a mediating role of self-esteem in the relationship between diabetic self-management and well-being among diabetic patients.

Variables

- Well-being is the condition of an individual or group. A higher level of well-being means that in some sense the individual's or group's condition is more positive.
- Self-esteem is the evaluation which the individual makes and customarily maintains regarding himself; it expresses an attitude of approval or disapproval and indicates the

extent to which an individual believes himself to be capable, significant, successful, and worthy.

- Self-management refers to management of or by oneself; the taking of responsibility for one's own behaviour and well-being.

Sample

The sample consisted of 102 diabetic patients out of which 32 participants used medication alone to manage diabetes. 29 participants adopted lifestyle changes and 41 participants adopted both medication and lifestyle changes to manage diabetes. Employing a purposive sampling method, participants included in the sample were chosen by the researcher so as to meet the research objectives.

Table No.1 The distribution of diabetic patients based on gender, type of self-care, onset of diabetes and other major illness, and the level of diabetic self-management.

Group	Sub-group	N	Percentage (%)
Gender	Female	50	49
	Male	52	51
Type of self-care	Medication	32	31.4
	Diet and Exercise	29	28.4
	Both	41	40.2
Onset of diabetes	1 to 2 years	28	27.5
	2 to 5 years	28	27.5
	5 to 10 years	15	14.7
	More than 10 years	31	30.4
Other major illness	Yes	41	40.2
	No	61	59.8
Level of Diabetic self-management	Low diabetic self-management (0-25)	22	21.5
	Moderate diabetic self-management (26-36)	58	56.8
	High diabetic self-management (37-48)	22	21.8

Instruments

Three measures were used in this study,

1. **Rosenberg's Self-esteem Scale**: Rosenberg's Self-esteem Scale is a measure of self-esteem developed by Rosenberg in 1965. The scale consists of 10 items that measures global self-worth by measuring both positive and negative feelings about the self. Response options include Strongly Agree (4), Agree (3), Disagree (2), Strongly Disagree (1). Items 2,5,6,8 and 9 are reverse scored. Scores between 15 and 25 are considered average. The Rosenberg Self-Esteem scale has a Guttman scale coefficient of reproducibility of .92, indicating excellent internal consistency. Test- retest reliability over a period of 2 weeks revealed correlation of .85 and .88. This scale has demonstrated excellent concurrent, predictive and construct validity. The Rosenberg Self- Esteem scale correlates significantly with other measures of self-esteem, including the Coopersmith Self-Esteem Inventory. In addition, the Rosenberg Self-Esteem scale correlates in the predicted direction with measures of depression and anxiety.

2. **Well-being Questionnaire-12:** WBQ-12 is a measure of well-being developed by Bradley in 2006. It is a 12 item scale used to measure the well-being of the individual. The three subscales are positive well-being, negative well-being and energy. The WBQ-12 has good internal consistency (α 0.73–0.87) and good test–retest reliability (0.66–0.80). Factorial and convergent validity was also established.
3. **Diabetes Self-management Questionnaire:** DSMQ is a 16-item questionnaire to assess self-care activities associated with diabetes developed by Schmitt et.al, in 2013. Four subscales, Glucose Management (GM), Dietary Control (DC), Physical Activity (PA), and, Health-Care Use (HU), as well as a Sum Scale (SS) as a global measure of self-care were derived. The DSMQ's item and scale characteristics as well as factorial and convergent validity were analyzed. Cronbach's α coefficients were 0.77 for Glucose management, 0.77 for Dietary control, 0.76 for physical activity, 0.60 for health care-use and 0.84 for the sum scale.

Data Collection

The data was collected from individuals (both male and female), who were diagnosed with diabetes for at least a year falling in the age range of 30 to 80. The participants were then divided on the basis of the type of self-care they used; individuals who used medication only (Group 1); who controlled diet and did exercise (Group 2) and who took medication; controlled diet and exercised (Group 3). The participants were also divided on the basis of the level of diabetic self-management. The score ranges between 0-48, where the scores 26- 36 falls within normal range, below 26 indicates low diabetic self-management and above 36 indicates high diabetic self-management. The participants were then provided with the Google form.

Data Analysis

The data was analysed using Pearson's product-moment correlation. To find the relation between the variables and demographic variables, one way ANOVA was used and WARP was used to find the mediation.

Ethical Statement

The participation in the research was voluntary and anonymous. The participant had the right to withdraw from the study without any reason during any point of the study.

RESULTS

Table No.2 The mean, standard deviation and normality of diabetic self-management, self-esteem, and well-being.

Variables	N	Mean	Standard Deviation	*K*	*Sig.*
Diabetic Self-management	102	27.51	6.95	.070	.200
Self-esteem		31.61	5.52	.089	.047
Well-being		18.83	5.03	.076	.155

The mean, standard deviation, and the Kolmogorov-Smirnov test of normality of variables among 102 diabetic patients. The mean score of diabetic self-management is 27.51 which indicates average score. The mean score of self-esteem is 31.61 which is high and the mean score of well-being is 18.83 which indicates average score. KS test shows that the variables diabetic self-management, self-esteem and well-being are normally distributed in the sample ($p>0.05$).

Table No. 3 Pearson product-moment correlation of well-being with self-esteem and diabetic self-management among diabetic patients.

	Glucose Management	Dietary Control	Physical Activity	Health Care-use	Diabetic Sum Scale	Self-esteem
Self-esteem	.396**	.543**	.367**	.289**	.569**	1.00
Negative well-being	.396**	.543**	.367**	.289**	.569**	1.00
Energy	.198*	.524**	.350**	.196*	.440**	.670**
Positive well-being	.185	.494**	.330**	.204*	.396**	.632**
General well-being	.207*	.585**	.403**	.232*	.447**	.728**

***=p<0.01, *=p<0.05*

The Pearson product-moment correlation to determine the relationship between well-being with self-esteem and diabetic self-management among diabetic patients. There was a strong, positive correlation between diabetic self-management and its dimensions with self-esteem, energy, positive well-being, and general well-being. There was a strong negative correlation between diabetic self-management and its dimensions dietary control, physical health, and health-care use with negative well-being, which was statistically significant. There was a strong, positive correlation between self-esteem and glucose management, dietary control, physical activity, health care-use, diabetic sum scale, energy, positive well-being, and general well-being. There was a strong negative correlation between self-esteem and negative well-being (r = -.509), which was statistically significant.

Table No. 4 One-way ANOVA to compare the type of self-care in diabetic self-management.

		SS	Df	MS	F	Sig.
Diabetic self-management	Between group	775.02	2	387.51	7.26	.001
	Within group	5309.14	99	53.62		
Glucose management	Between group	80.77	2	40.39	3.86	.024
	Within group	1033.89	99	10.44		
Dietary Control	Between group	145.51	2	72.75	12.50	.000
	Within group	575.85	99	5.81		
Physical Activity	Between group	109.23	2	54.62	13.49	.000
	Within group	400.72	99	4.04		
Health care use	Between group	26.26	2	13.13	4.98	.009
	Within group	261.10	99	2.63		

There is a significant difference in diabetic self-management based on the type of self-care of diabetic patients. (p=<.005)

Table No.5 Tukey post hoc comparing the type of self-care in diabetic self-management.

Dependent Variable	(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	Mean	Standard Deviation	95% confidence interval	
								Lower bound	Upper bound
Glucose management	1	2	1.52	0.82	.164	9.96	3.63	-0.45	3.49
		3	-0.64	0.76	.679			-2.45	1.17
	2	1	-1.52	0.82	.164	8.44	3.23	-3.49	0.45
		3	-2.16*	0.78	.019			-4.02	-0.29
	3	1	0.64	0.76	.679	10.6	2.87	-1.17	2.45
		2	2.16*	0.78	.019			0.29	4.02
Dietary control	1	2	-2.61*	0.62	.000	5.31	2.29	-4.09	-1.14
		3	-2.54*	0.57	.000			-3.90	-1.19
	2	1	2.61*	0.61	.000	7.93	2.10	1.14	4.08
		3	0.07	0.59	.990			-1.31	1.46
	3	1	2.54*	0.57	.000	7.85	2.68	1.18	3.89
		2	-0.07	0.59	.990			-1.46	1.31
Physical Activity	1	2	-2.53*	0.51	.000	4.5	2.1	-3.76	-1.30
		3	-1.90*	0.47	.000			-3.01	-0.76
	2	1	2.53*	0.51	.000	7.03	1.82	1.30	3.76
		3	0.64	0.49	.388			-0.52	1.80
	3	1	1.90*	0.48	.000	6.39	2.06	0.76	3.01
		2	-0.64	0.49	.388			-1.80	0.51
Health care-use	1	2	-0.14	0.41	.932	5.43	1.81	-1.13	0.84
		3	-1.09*	0.38	.014			-2.01	-0.18
	2	1	0.14	0.41	.932	5.58	1.61	-0.84	1.13
		3	-0.95*	0.39	.046			-1.88	-0.012
	3	1	1.09*	0.38	.014	6.53	1.46	0.18	2.01
		2	0.95*	0.39	.046			0.012	1.88
Diabetic self-management	1	2	-4.51*	1.87	.047	26.93	7.66	-8.97	-0.043
		3	-6.50*	1.72	.001			-10.61	-2.39
	2	1	4.51*	1.87	.047	31.44	6.35	0.043	8.97
		3	-1.99	1.77	.504			-6.21	2.23
	3	1	6.50*	1.72	.001	33.43	7.67	2.39	10.61
		2	1.99	1.77	.504			-2.23	6.21

*. The mean difference is significant at the 0.05 level.

In glucose management, the group that took medication and followed diet (Group 3) performed better than the other two groups. In dietary control, the group which followed diet and exercised (Group 2) performed better than the other two groups. In physical activity, the group which followed diet and exercised (Group 2) performed better than the other two groups. In health care-use, the group that took both medication and followed diet and exercise (Group 3) performed better than the other two groups. Overall, the diabetic self-management is better in the group which followed both the exercise and diet as well as took medication (Group 3).

Table No.6 One-way ANOVA to compare the level of diabetic self-management in self-esteem

		SS	Df	MS	F	Sig.
Self-esteem	Between group	882.53	2	441.26	19.89	.000
	Within group	2195.55	99	22.17		
	Total	3078.08	101			

There is a significant difference in self-esteem based on the level of diabetic self-management. (p=<.005)

Table No.7 Summary of Tukey post hoc comparing the level of diabetic self-management in self-esteem.

Dependent Variable	(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	Mean	Standard Deviation	95% confidence interval	
								Lower bound	Upper bound
Self-esteem	1	2	-5.81*	1.23	.000	26.15	4.85	-8.75	-2.86
		3	-9.20*	1.47	.000			-12.71	-5.69
	2	1	5.81*	1.23	.000	31.96	4.82	2.86	8.75
		3	-3.40*	1.17	.013			-6.18	-0.60
	3	1	9.20*	1.47	.000	35.36	4.22	5.69	12.71
		2	3.40*	1.17	.013			0.60	6.18

*. The mean difference is significant at the 0.05 level.

Self-esteem is highest in the group which has high diabetic self-management (3). The self-esteem is lowest in the group with low diabetic self-management (1) and falls in the normal range with moderate diabetic self-management (2).

Table No.8 One-way ANOVA to compare the level of diabetic self-management in well-being

		SS	Df	MS	F	Sig.
Well-being	Between group	1222.42	2	611.21	12.98	.000
	Within group	4661.79	99	47.08		
	Total	5884.20	101			

There is a significant difference in self-esteem based on the level of diabetic self-management. (p=<.005)

Table No.9 Summary of Tukey post hoc comparing the level of diabetic self-management in well-being.

Dependent Variable	(I)	(J)	Mean Difference (I-J)	Std. Error	Sig.	Mean	Standard Deviation	95% confidence interval	
								Lower bound	Upper bound
Self-esteem	1	2	-6.47*	1.80	.001	17.68	5.28	-10.76	-2.18
		3	-10.9*	2.14	.000			-16.02	-5.79
	2	1	6.47*	1.80	.001	24.16	7.26	2.18	10.76
		3	-4.42*	1.70	.029			-8.48	-0.36
	3	1	10.9*	2.14	.000	28.59	6.86	5.79	16.02
		2	4.42*	1.70	.029			0.36	8.48

*. The mean difference is significant at the 0.05 level.

Well-being is highest in the group which has high diabetic self-management (3), it is lowest in the group with low diabetic self-management (1) and it falls within the normal range in moderate diabetic self-management (2).

Figure No.1 The relation between diabetic self-management and well-being

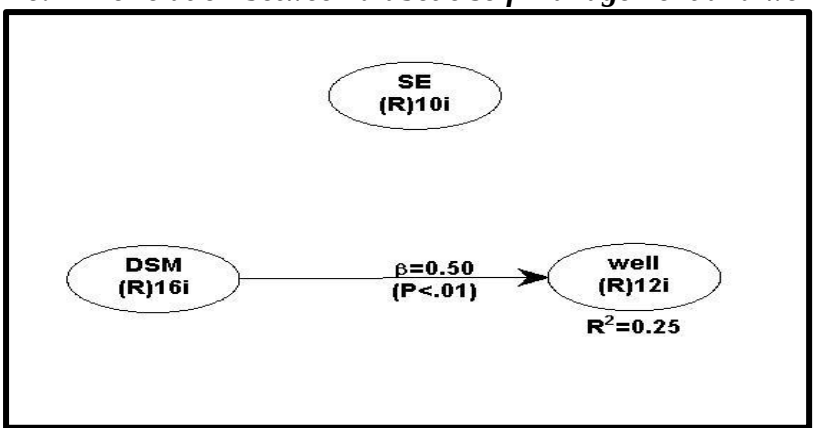
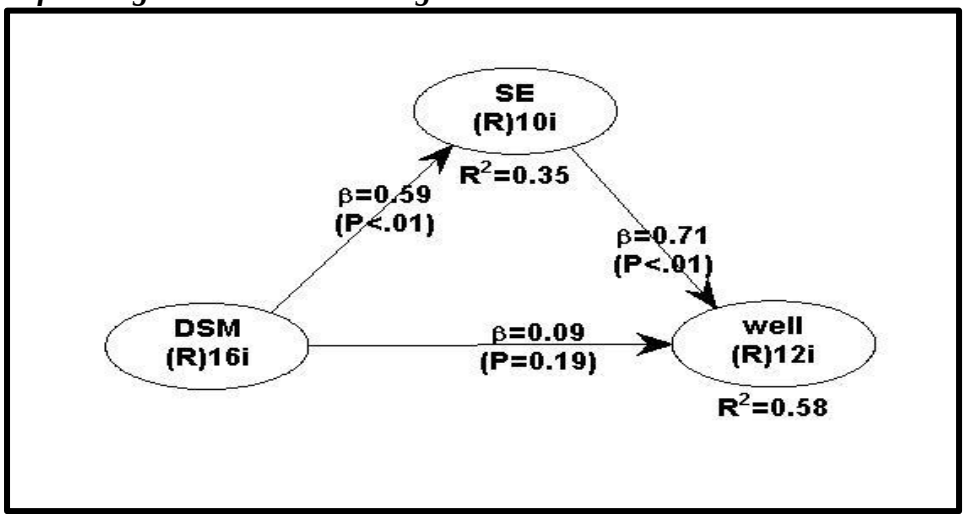


Figure No.2 The role of mediating variable self-esteem in the relationship between diabetic self-management and well-being.



The figure shows that the mediating variable self-esteem has a role in the relation between diabetic self-management and well-being explained by the decrease in β value before the presence of mediating variable (β=0.50) and after the presence of mediating variable (β=0.09).

DISCUSSION

Diabetes, characterized by high blood sugar, results due to the lack of insulin or when the body is incapable of processing the insulin that is produced. In India, the second next to China with the largest diabetic population, Kerala is considered to be the diabetic capital with 20% of its population being diabetic. Environmental, and lifestyle changes due to industrialization and migration as well as genetic reasons have been reported as possible reasons for the high incidence in South India. (Mohan et al, 2003; Ramachandran, 2009).

With the projected growth to 134 million diabetics in India by 2045 (IDF, 2017), this poses a staggering burden for our developing economy and individual families. Interventions such as diet, exercise, and regular evaluation, which do not require additional expense assists to control and manage the disease. In spite of this awareness, there is a variation in the way diabetes is managed. The study aimed to explore personal variables that influence diabetic self-management and how it affects the well-being of the individual.

The present study aimed to find 1. the difference in diabetic self-management style based on the type of self-care (only medication, only diet & exercise and both); 2. the difference in self-esteem and well-being based on the diabetic self-management styles and 3. the mediating role of self-esteem in the relationship between diabetic self-management and well-being among diabetic patients. The focus was to identify which type of self-care intervention can be effective in individuals with diabetes. The study was conducted among 102 diabetic patients.

The diabetic self-management was observed to be different according to the type of self-care used. In the case of Glucose Management, group 3 which took medication as well as controlled diet and exercised was better than the other two groups. This group performed regular blood routine checks and maintained the sugar levels in a limit, better than the other two groups. For Dietary Control, Group 2 which controlled diet and did exercise but took no medication was better than the other two groups as expected as their focus lies in managing diabetes without medication or any other chemical assistance. This group also performed better in the Physical Activity dimension of diabetic management, compared to the other two groups. The dimension Health Care-use was found best in group 3 that took medication and was committed to diet control and exercise. The other two groups showed lesser participation with health care professionals than group 3. The overall diabetic self-management was seen to be highest in group 3 that did both and was found to be the lowest in group 1 who took medication alone.

The results showed that dimensions of diabetic self-management had a high positive relationship with well-being. An increase in self-management and self-care behavior increases well-being and reduces the chance of negative well-being. Glucose control, dietary control, physical activity, and health care-use aids in managing the diabetes and hence enhances the well-being of the individual involved.

Positive correlation was also observed between self-esteem and diabetic self-management.

All the dimensions of self-management, i.e., glucose management, dietary control, physical activity, and health care use, indicated a strong positive correlation with self-esteem. As self-esteem enhances a person's diabetic self-management also strengthens and vice versa. This leads to an increase in their ability to manage glucose, control diet and exercise and manage their health (Johnston-Brooks, Lewis, & Garg, 2002). Studies show that self-esteem is a key factor influencing health care behaviour (Jessor, Turbin, & Costa, 2010). Higher self-esteem promotes better confidence in one's own abilities and thus leads to better self-management. The result also showed a positive correlation between self-esteem and factors of well-being, substituted with; energy, positive well-being, and general well-being. Having high self-esteem is always key to an individual's well-being (Vanbuskirk, 2021). The sense of self-worth and the confidence that follows enhance the energy and positive well-being and reduce the negative well-being.

Regression analyses indicated that self-esteem mediates the relationship between self-management and well-being among diabetic patients as seen in Figure 1. The beta value between diabetic self- management and wellbeing reduced from a significant value of 0.5 to 0.09 which was not significant and the variance of wellbeing explained increased from 0.25 to 0.58. This shows the highly mediating influence of self -esteem in both diabetic care and wellbeing. Self- esteem was found to be highest among individuals present in the group with high diabetic self-management. When people learn to manage diabetes based on their diet, exercise and medication, they can often have better diabetic management and this can lead to higher self-esteem. Self -esteem thereby, could work both as a trigger factor for health based action as well as an outcome of better health management.

CONCLUSION

There was a significant difference in diabetic self-management based on the type of self-care. Group 3 which took medication, followed exercise and controlled diet had highest diabetic self-management when compared to the other groups. A positive correlation was found between diabetic self-management and self-esteem and all factors of well-being. There was a significant difference in self-esteem and well-being based on the level of diabetic self-management. People with high diabetic self-management tend to have higher self-esteem and well-being compared to others. The result also showed a positive mediating role of self-esteem in the relation between diabetic self-management and well-being among diabetic patients.

Implications of the study

The study provides evidence for medical practitioners and health care workers on how to plan intervention techniques for their clientele. Using available resources, planning on diet and staying fit have shown better results in diabetic self-management than medication alone. This option is economically feasible and has no side effects. In a developing economy like India, promoting lifestyle change is a far more viable option to control and regulate diabetes than solely relying on medical assistance. The study also shows the importance of self-esteem in choosing a desired form of self-care behaviour, also to enhance self-management and well-being. People should be given an opportunity to understand their capability and worth in performing or choosing something for themselves. Health psychologists can help their diabetic clients by improving their confidence to practice diet and rely on available resources. They can also work on the self-esteem of their client to ensure mental and physical well-being. The study can also be used as reference for future research.

Limitations of the study

- Financial aspect of the diabetic patients and their preferred kind of self-care could not be taken into consideration.
- The diabetic patient's glucose management could not be evaluated.

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