



Diabetes Management Self-Efficacy: A Mediating Roles of Diabetes Health Literacy and Psychological Adjustment to Diabetes

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Abstract:

Background: Self-efficacy in diabetes management means a person's belief in his or her skills to properly care for diabetes and keep it under control. The study aimed to explore the interaction between self-efficacy and two critical mediators such as diabetic health literacy and psychological diabetes adjustment.

Methods: A descriptive correlational study conducted at Diabetes and Endocrinology Center in Diwaniyah city for the period of October 1st 2023 to March 1st 2024. The study sample consist of 390 patients is selected according to non-probability sampling approach. The questionnaire, consisting of 14 items for health literacy, 11 for diabetic self-efficacy, and 20 for psychological adjustment, was validated by experts and tested for reliability through a pilot study. Data collection involved interviews, and both descriptive and inferential statistical analyses were applied for data analysis.

Results: The study indicate that the half of individuals with diabetes (50.3%) have low health literacy. Nearly 60% of individuals with diabetes show suboptimal self-efficacy in managing their condition, (75.9%) of individuals with diabetes exhibit moderate psychological adjustment. Results indicate that 50.3% have low health literacy, nearly 60% exhibit suboptimal self-efficacy, and 75.9% show moderate psychological adjustment. Positive associations are found between self-efficacy and both health literacy ($p = .000$) and psychological adjustment ($p = .000$).

Conclusions: The study suggests a concerning pattern of low health literacy and suboptimal self-efficacy in managing diabetes. Creating a supportive community on social media for diabetes patients focusing on health literacy, self-efficacy, and psychological adaptation to diabetes mellitus. Additionally, manual booklet of diabetic education and its management it should be write in simple words and use attractive pictures given to the diabetic patients.

Key-words: Diabetes, Self-Efficacy, Health Literacy, Psychological Adjustment.

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Introduction:

Control and reducing the levels of diabetes, a chronic metabolic disorder with high levels of blood sugar is the main task of the patients by demonstrating DMSE (Diabetes Management Self-Efficacy) (Qasim et al., 2020) Self-efficacy means that an individual thinks that he/she is able to execute required actions and organize them in a manner that impacts the results (Krshna, 2019). In the context of diabetes, MSDE stands for the self-efficacy with regard to the performance of self-care actions such as taking medications, controlled diet, exercise routines, and monitoring of blood glucose (Hailu et al., 2019), (Radhi, 2020) The DMSE model has garnered more prominence in research and factors that link it with better control of diabetes have been unraveled. One figure in this relationship is the diabetes health literacy (DHL) which is having abilities to find access, understand, and utilize health information concerning diabetes based on the definition (Muchiri et al., 2021) The higher degree of DHL in people teaches them specific settings for their diabetes management, therefore elevating their capability of making right decisions about their DMSE. Researchers have highlighted the bidirectional connection between DMSE and DHL in which people who are more confident in their core functional competencies seek and understand the health information more effectively (Xu et al., 2018).

Moreover, psychosocial factors such as the psychological adaptation to DMSE are considered as the other pivotal mediators in the relationship between DMSE and the diabetes outcomes. Negative psychological effects of diabetes, emotional distress, and managing the condition successfully are important factors that may lead to a patient's inability to handle diabetes properly (Powers et al., 2018) Psychological adaptation combats coping mechanisms and brings stability to the emotional life and psyche. A number of studies showed that the patients with high DMSE (diabetes-related stress management efficiency) scores had better adaptability to diabetes complications in the psychological sphere, and

consequently -- better overall condition (Nooseisai et al., 2021) A number of scholarly studies have focused on the interplay of these three components—DSME, the DHL, and the mental adjustment to diabetes. For instance, another study concluded that people with high levels of DMSE, not just were in better glycemic control, but they were also equipped with the knowledge about the disease, and had improved psychology adjustment (Hurst et al., 2020) This encourages a possible third link of DHL and mental adjustment in the translation of diabetes exercise memory study to the positive outcomes of diabetes. Therefore, thus aimed to explores the interaction between self-efficacy and two critical mediators such as diabetic health literacy and psychological diabetes adjustment.

Methods:

A descriptive correlational study design was adopted by standard questioning individuals of the study population with the sole purpose of describing the examined phenomena in terms of its nature and degree of presence was conducted during the period from October 1st, 2023 to February 26th, 2024.

The study was conducted at Diabetes and Endocrinology Center in Diwaniyah city. By a purposive (non-probability) sample of (390) Patients was chosen based on a set of criteria include: 1) patients who are diagnosed with diabetes mellitus, 2) who are different level of education, 3) who are different age groups and 4) volunteer to participate in the study after his consent.

This questionnaire consists of two parts include the socio-demographic characteristics include patients age, gender, marital status, residents, education level, occupation, and monthly income. Diabetes Health Literacy: This segment focuses on diabetes health literacy, utilizing a scale developed by Jordan et al. (Jordan et al., 2010) It comprises 14 items measured on a 4-level Likert Scale, yielding a potential score range of 14-56. A higher average indicates a heightened level of diabetes health literacy. The Cronbach-alpha value in

current was 0.82 which indicate the higher reliability. Diabetes Management Self-Efficacy: This section addresses diabetes management self-efficacy, employing a scale developed by Noroozi et al. (Noroozi & Tahmasebi, 2014) Comprising 11 items measured on a 4-level Likert Scale, scores can range from 11-44. A higher average signifies robust diabetes management self-efficacy. The Cronbach-alpha value in current was 0.87 which indicate the higher reliability. Psychological Adjustment to Diabetes: This segment focuses on the psychological adjustment to diabetes, utilizing a scale validated by Schmitt et al. (Schmitt et al., 2018) It comprises 20 items measured on a 4-level Likert Scale, with potential scores ranging from 0-60. A higher average reflects a heightened level of psychological adjustment. The Cronbach-alpha value in current was 0.83 which indicate the higher reliability

The questionnaire was validated by experts and then its reliability was verified through a pilot study The Cronbach-alpha value in current was 0.81 which indicate the higher reliability.

The researcher interviewee the patients with diabetes mellitus, explained the instructions, answered their questions regarding the form, urged them to participate and thanked them for the cooperation. The interview techniques were used on individual bases, and each interview (15-20) minutes after taking the important steps that must be included in the study design.

All statistical analyses were performed using the IBM SPSS 20.0 software. Numbers and percentages were employed to rank the variables, while mean and standard deviation were utilized to statistically describe the continuous variables. A Kolmogorov-Smirnov (K-S test) and Shapiro-Wilk tests were used to test normality. Additionally, Pearson's correlation coefficient tests were run to evaluate any statistical differences and relationship between the groups. A 0.05 threshold for statistical significance was used.

Ethical consideration:

Ensuring adherence to ethical obligations is paramount for researchers conducting a study. Prior to collecting data from the identified community, it is imperative for the researcher to clearly articulate the study's main purpose and objectives to potential participants. Maintaining strict confidentiality of the data obtained from the study sample is essential, with a commitment to utilizing the information solely for scientific purposes related to the study. Before initiating the data collection process, the researcher provides a comprehensive overview of the research's scientific background and its objectives to the participants. Explicitly outlining the study aims, participants are informed verbally and invited to join the study on a voluntary basis. Upon obtaining their consent, participants receive an anonymous questionnaire to safeguard their privacy throughout the research, which was obtained on 2023/9/25.

Results:

Table (1): Socio-Demographic Characteristics

Socio-demographic data	Classification	No.	%
Age/years	30 to less than 40	11	2.8
	40 to less than 50	121	31.0
	50 to less than 60	134	34.4
	60 to less than 70	86	22.1
	70 and older	38	9.7
	Min–Max	37–74	
	Mean ± SD	56.81 ± 9.04	
Gender	Male	230	59.0
	Female	160	41.0

Socio-economic Status	Upper lower class	203	52.1
	Lower middle class	130	33.3
	Upper middle class	57	14.6
BMI	Under weight below (18.5)	0	0.0
	Normal (18.5-24.9)	259	66.4
	Overweight (25.0-29.9)	94	24.1
	Obesity (30.0 and above)	37	9.5
Duration of DM	1 to less than 5	128	32.8
	5 to less than 10	91	23.4
	10 to less than 15	39	10.0
	15 to less than 20	38	9.7
	More than 20	94	24.1
	Min–Max	1–28	
	Mean $\pm$ SD	11.68 $\pm$ 10.49	

No. Number; %= Percentage

In a study, which was a demographic characteristic of whopping 390 participants, it has been observed that the age sample varied from 37 to 74 years, with an average age of 56.81 ± 9.04 years. Among the noteworthy findings was the proportion of genders which was dominated by males (59.0%) while the dwellers of the second group were women (41.0%).

Economical background pointed out emerge of 52.1 % from the upper class to the lower-class. Among all the sub popular (66.4%) of the participants had normal BMI. The percentage of participants (32.8%) with the disease for less than 5 years appeared to be high.

Table (3): Overall study variables

Scale	M	SD	Score	No.	%
Health-literacy (14 Q)	27.86	10.95	Low	196	50.3
			Moderate	162	41.5
			High	32	8.2
			Total	390	100.0
Self-efficacy of DM (11 Q)	21.79	8.94	Poor	227	58.2
			Moderate	102	26.2
			Good	61	15.6
			Total	390	100.0
Health-literacy (14 Q)	27.86	10.95	Low	196	50.3
			Moderate	162	41.5
			High	32	8.2
			Total	390	100.0
Psychological adjustment (20 Q)	30.18	8.39	Low	46	11.8
			Moderate	296	75.9
			High	48	12.3
			Total	390	100.0

Level of Assessment [Low=14-28; Moderate= 28.1-42; High= 42.1-56]

The study reveals that diabetes patients with low health literacy constitute a higher percentage (50.3%) than the average mean value ($27.86 \pm$

10.95) on health literacy assessments. Additionally, a substantial portion (58.2%) of diagnosed individuals exhibited suboptimal self-

efficacy in managing diabetes, as indicated by their lower average scores (21.79 ± 8.94) on self-efficacy assessments. Moreover, a significant number (75.9%) of individuals with diabetes

showed moderate psychological adjustment to the condition, reflected in their moderate average scores (30.18 ± 8.39) on the psychological adjustment to diabetes acceptance scale.

Table (3): Diabetes Management Self-Efficacy in the light of Diabetes Health Literacy and Psychological Adjustment

Correlation Statistics	Self-efficacy	Health Literacy	Psychological Adjustment
Self-efficacy	1		
Health Literacy	.168**	1	
Psychological Adjustment	.503**	.121*	1

***.* Correlation is significant at the 0.01 level (2-tailed).

The findings of the study indicate a positive correlation between the self-efficacy of diabetes management in diabetic patients and two key

factors: diabetes health literacy ($r= 0.168$; $p= .000$) and diabetes psychological adjustment ($r= 0.503$; $p= .000$).

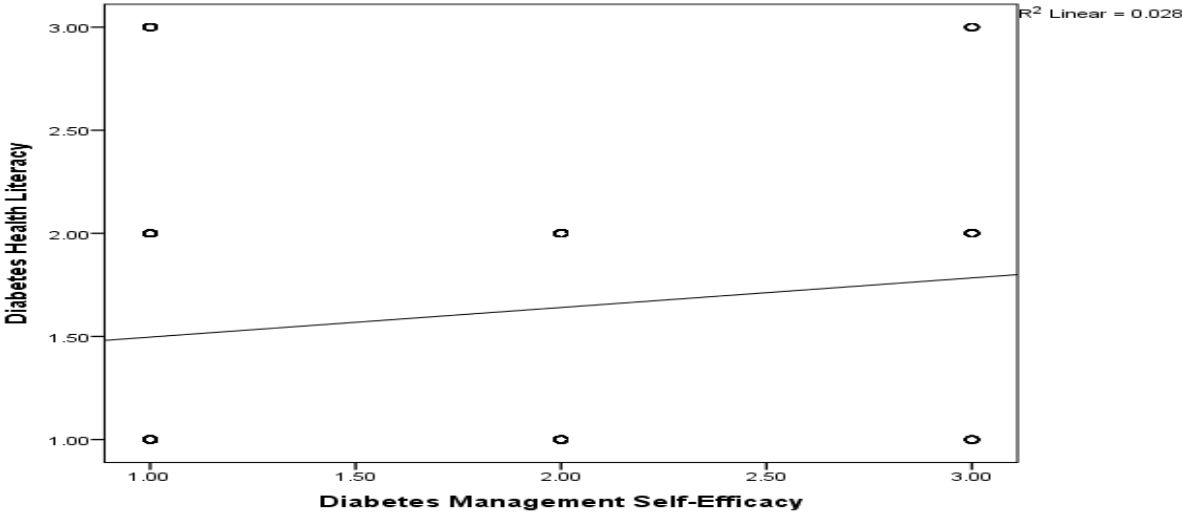


Fig. 1. Diabetes Management Self-Efficacy and Diabetes Health Literacy

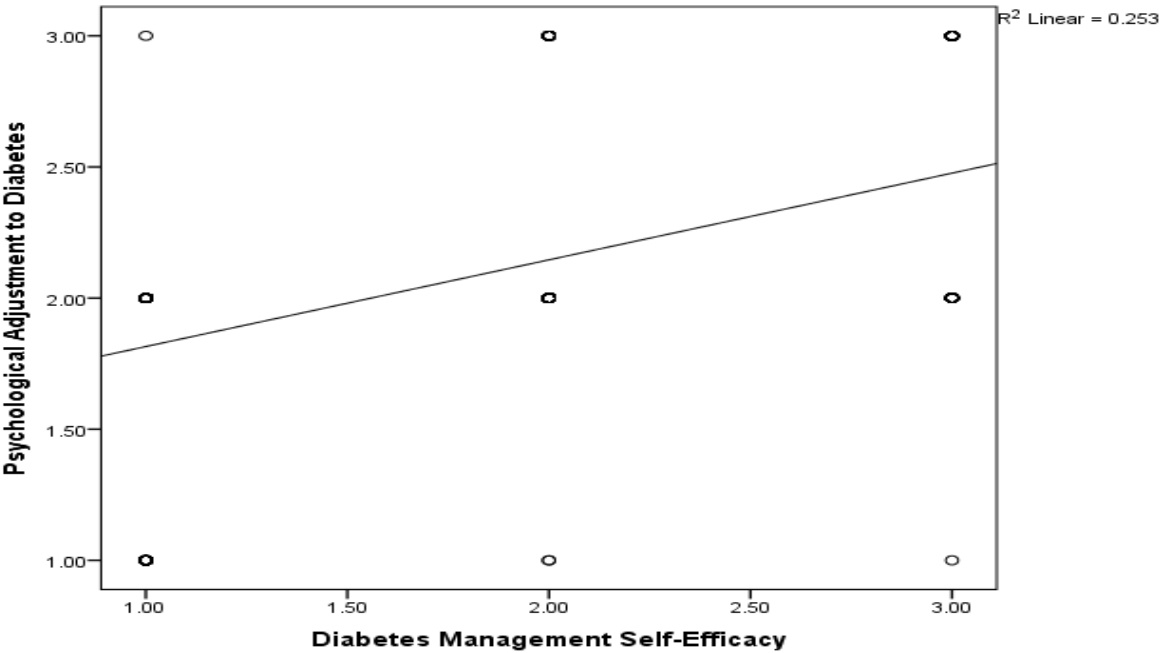


Fig. 2. Diabetes Management Self-Efficacy and Diabetes Health Literacy

Discussion:

The demographic characteristics of the 390 diabetic patients examined in this study offer valuable insights into the population under consideration, encompassing the following aspects. The age range among the 390 diabetic patients in this research is wide as it is from 37 to 74 years. The fact that it manifests itself throughout different stages of adulthood indicates the broad implications of diabetes in the general society. The implication is that individuals in different phases of adulthood are at risk of developing the chronic condition. The mean age of 56.81 ± 9.04 years as well presents us that the majority of the sample belongs to the older age group. This corroborates previous evidence that shows diabetes having a greater risk with older age (Jassim & Khalifa, 2018), (Khalifa, 2022) Diabetes, being a chronic condition, usually appears in middle-aged or older people (Fauze, 2023), (Qassim et al., 2018) The remarkable fact in the research results on gender distribution adds a new perspective to the story, as almost 6 out of 10 participants claimed to be male (59.0%). Such gender disparity makes this aspect of the cohort require more rigorous analysis to reveal the possible gender-specific factors that influence the presence or treatment of diabetes in this cohort. Current studies have proved gender-dependent diabetes risk factors and outcomes, therefore, adapting intervention programs to specific groups is essential (Mousa & Mansour, 2020), (Hussein & Ahmed, 2020) Research showing the distribution of the socioeconomic status indicates a notable presence of the upper lower class, which is more than half of the participants. This socio-economic situation may also be related to access to healthcare resources, adherence to drugs and other lifestyle factors. There is a vast amount of evidence indicating inequality in diabetes prevalence and management among socio-economic classes, which stresses the urgent need for separate intervention programs to redress these inequalities (Abbood & Naji, 2023), (Indelicato et al., 2017) Among all the participants, the BMI distribution, and it seems that 66.4% is within the

normal range which illustrate the association between diabetes and obesity is not always correct. This stresses the degree of the association, implying that other elements may also have an impact on diabetes development of these populations (Radhi et al., 2023) The importance of balance between BMI and diabetes is of key significance while defining preventive strategies and developing intervention programs (Sabah Khudhair & Abbas Ahmed, 2022) With 32.8% of participants having been diagnoses of diabetes mellitus for less than 5 years, duration of the disease becomes a major issue. They may be representing those in the very early stages of diabetes, a group which may be given a chance for early interventions that help patients to prevent as well as improve the long-term outcomes of the complications related to diabetes. Due to the fact that early diagnosis and management are critical parts of diabetes care, and interventions at the beginning have been demonstrated to be more efficient (Radhi et al., 2023) This clearly shows why the regular surveillance and preventive health measures for the newly diagnosed diabetes in the studied population are of much relevance.

The studies' results indicating that over half (50.3%) of diabetic individuals possessing low health literacy is a critical factor in understanding the issues they are confronted with. Health literacy, which is regarded as the ability of individuals to obtain, process, and understand basic health information, is found to be crucially important in patients managing chronic conditions such as diabetes (van der Gaag et al., 2022) The phenomenon of cognitive bias was quantified through the use of health literacy assessments and the mean scores (27.86 ± 10.95) provide insights on the magnitude of the issue. The influence of low health literacy in diabetes patients on self-management of their condition by the patients themselves can be quite devastating. The health literacy of some individuals is low, and they may find it hard to understand medical instructions, follow treatment plans, and engage in preventive health behavior (Dineen-Griffin et al., 2019) This may result in poorer health outcomes, increased

healthcare cost, and increased risks of medical complications with diabetes.

The report points out at a disturbing tendency of the self-efficacy among patients suffering from diabetes. This research has revealed that almost two-thirds of the participants which is 58.2% have low self-efficacy in managing their health condition. This suggests that the task of these people to effectively deal with activities related to diabetes is a difficult one. The score results on self-efficacy assessments concerning diabetes management also prove this, with participants scoring 21.79 ± 8.94 on average. This thus infers that there is a huge difference between the assessed capability and the actual capacity in handling the complexities that characterize diabetes. The observed suboptimal self-efficacy is further fortified by the quantitative assessment of the participants, which indicates their relatively lower average scores in the questionnaires that regard self-efficacy of diabetes management. The mean score of 21.79 ± 8.94 that was recorded implies a decreased degree of confidence in coping with diabetes self-care. These findings overlap with existing literature that the relationship between self-efficacy and adherence to diabetes management practices is complex (Lin et al., 2017), (Yao et al., 2019).

The research findings have, however, highlighted the psychological equilibrium of patients with diabetes mellitus; indicating that a large proportion of them i.e. 75.9% were in average psychological functioning. It is imperative to have such an understanding about the mental health of the diabetic individuals because it brings to fore the significance of considering the psychological component in dealing with a chronic condition. The research used the Psychological Adjustment to Diabetes Acceptance Scale to rate the level of psychological adjustment. Thus, a valid and reliable measure to evaluate the extent of psychological adjustment to the new situation (diabetes) was provided. While putting this finding into the context, it is essential to examine the bigger picture of diabetes mellitus and mental health. Over the years, the bidirectional

relationship between diabetes and psychological well-being has been investigated extensively, highlighting the significant role of psychosocial factors in the management of the disease and vice versa (Hackett & Steptoe, 2017) This study likewise relates with this literature by giving particular information on the psychological adjustment of individuals with diabetes, hence our understanding of the complex connection between mental health and chronic illnesses is enhanced (Yasui-Furukori et al., 2019) .

The study's findings reveal a noteworthy positive correlation between self-efficacy in diabetes management among diabetic patients and two crucial factors: health literacy of diabetes and psychological adjustment of diabetes as well. In the first place, the correlation coefficient (r) of 0.168 between self-efficacy and diabetes health literacy becomes statistically significant with higher levels of health literacy ($p < 0.05$). This stresses the fact that people with better diabetes health literacy demonstrate more self-confidence in their capability to manage their diabetes. This is in sync with the existing literature that highlights the role of health literacy in managing chronic diseases, as individuals with greater health-literacy skills are more likely to understand and interpret health information which in turn affect their self-efficacy. In addition, the study creates a stronger relationship between diabetes self-efficacy ($r=0.503$) and psychological adjustment to diabetes. This p -value of less than .000 means a highly significant relation which makes psychological well-being the most important factor in diabetes self-efficacy. One of the main features of psychological adjustment to diabetes diagnosis is that the better adjustment is, the higher the self-efficacy and the better the disease management. This finding confirms the previous research asserting that psychological factors such as coping techniques and emotional adjustment are factors influencing an individual's ability to follow the diabetes management tasks (Indelicato et al., 2017), (Abbood & Naji, 2023) In addition, the identified positive association of self-efficacy in the diabetes management and diabetes health

literacy complements the on-health literacy as the critical determinant of health outcomes (Radhi et al., 2023) Capacity of people to discern relevant health information and to use it properly significantly determines their ability to take conscious decisions regarding their health, thus, clearly proving that enlightened patient is a strong patient.

Conclusions:

The study suggests a concerning pattern of low health literacy and suboptimal self-efficacy in managing diabetes. Creating a supportive community on social media for diabetes patients focusing on health literacy, self-efficacy, and psychological adaptation to diabetes mellitus. Additionally, manual booklet of diabetic education and its management it should be write in simple words and use attractive pictures given to the diabetic patients

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