Knowledge and Attitude of Diabetic Patients Type One and Type Two Toward Hyperglycemia

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Abstract

Background: Diabetes Mellitus (DM) is a primary contributor to chronic hyperglycemia, defined as elevated blood glucose levels exceeding 140 mg/dL. This condition results from insufficient insulin production and significantly adds to the global burden of health complications. **Aim:** The purpose of this study was to assess knowledge and attitude of diabetic patients with type one 1 and type 2 toward hyperglycemia. **Research Design:** A descriptive and exploratory research approach was utilized to fulfill the study's objective. **Setting:** The research was carried out in the internal medicine department, including both male and female sections, at Beni-Suef University Hospital. **Subjects:** A convenience sample of 60 diabetic patients, who were present at the study location and agreed to participate during the data collection period, was selected. **Tools of Data Collecting:** Three instruments were used for data gathering: a questionnaire assessing patients' knowledge about hyperglycemia, a self-management assessment tool for diabetes and high blood sugar, and a survey measuring patients' attitudes toward hyperglycemia. **Results:** The findings indicated that 33.3% of the participants were aged between 20 and 40 years. Among them, 90% had an inadequate overall knowledge of diabetes and hyperglycemia. Additionally, 60% demonstrated a moderate level of self-management, while 86.7% exhibited negative attitudes toward hyperglycemia. **Conclusion:** The study revealed a statistically significant relationship between patients' knowledge and their attitudes, knowledge and self-control, as well as attitudes and self-control. **Recommendation:** It is recommended to design and implement educational programs aimed at diabetic patients experiencing hyperglycemia. These programs should focus on preventing serious complications, teaching effective self-management techniques, promoting healthy lifestyle choices, and supporting patients' mental well-being.

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Keywords: Attitude, Diabetic patients, Hyperglycemia, Knowledge, Type one, Type two.

INTRODUCTION

Diabetes often referred to as a "silent killer," diabetes is one of the most common and rapidly growing health issues worldwide. It affects people across all geographic and demographic boundaries. This chronic condition arises when the body fails to properly control blood sugar levels, either because the pancreas produces insufficient insulin or because the body's cells are resistant to insulin. As a result, blood sugar accumulates in the bloodstream, causing increased urination as the kidneys attempt to eliminate the excess glucose **(Suryasa et al., 2021).**

According to the World Health Organization (WHO), the global population living with diabetes grew significantly from 108 million in 1980 to 422 million by 2014. In 2019, diabetes was directly responsible for approximately 1.5 million deaths, and in 2012, 2.2 million fatalities were attributed to elevated blood sugar levels, or hyperglycemia **(Suryasa et al., 2021).**

Diabetes mellitus is a chronic and diverse metabolic disease with a complex origin. It is marked by persistently high blood glucose levels, known as hyperglycemia, which result from defects in either insulin secretion, insulin action, or both. A central mechanism in the development of diabetes is the progressive loss of insulin-producing beta cells in the pancreas. This mechanism plays a key role in the onset of the two primary forms of diabetes **(Eizirik et al.,2020).**

Type 1 Diabetes Mellitus (T1DM) is an autoimmune disorder in which the body's immune system mistakenly attacks and destroys pancreatic beta cells. This immune response, involving B cells, T cells, and macrophages, is often triggered by environmental factors in individuals with a genetic predisposition linked to MHC genes **(Eizirik et al.,2020).**

Type 2 Diabetes Mellitus (T2DM) is mainly driven by insulin resistance and beta-cell dysfunction. Unlike T1DM, T2DM is strongly associated with lifestyle and metabolic factors such as physical inactivity, obesity, aging, and hereditary risks **(Tesauro & Mazzotta, 2020).**

Type 2 Diabetes Mellitus is more than just a disorder of metabolism—it can result in both acute and chronic complications if not properly managed. Long-term effects often include macrovascular diseases that damage blood vessels, significantly increasing the risk of stroke, heart disease, kidney damage (diabetic nephropathy), and vision loss (diabetic retinopathy). Individuals with T2DM are at twice the risk of developing cardiovascular disease compared to non-diabetics **(Garcia et al., 2020).**

Hyperglycemia, a hallmark of diabetes, disrupts carbohydrate, protein, and fat metabolism. Over time, persistent high blood

glucose can cause both microvascular and macrovascular complications. The term "hyperglycemia" comes from Greek roots— "hyper" (excessive), "glykys" (sugar), and "haima" (blood). Medically, it is defined as a fasting blood glucose level above 125 mg/dL or above 180 mg/dL two hours after eating **(Banday et al., 2020).**

Effective diabetes treatment aims to maintain blood sugar levels within a normal range. This is typically achieved by increasing insulin availability either through direct insulin injections or medications that stimulate insulin release. Other approaches include slowing carbohydrate absorption in the gut, enhancing insulin sensitivity, or increasing glucose elimination through urine. For patients who are overweight or obese, weight loss is also considered an important therapeutic target alongside blood sugar control **(Wexler, 2021).**

Self-monitoring of blood glucose is essential, especially for individuals who may not notice the signs of low blood sugar (hypoglycemia). Patients are advised to maintain a balanced diet, engage in regular physical activity, and check blood glucose levels before and after exercise. Insulin users should also prepare carbohydrate snacks and adjust insulin doses to prevent exercise-induced hypoglycemia **(Putu et al., 2025).**

Education from healthcare professionals including doctors, nurses, pharmacists, and dietitians—alongside family support, plays a vital role in helping patients adhere to treatment plans, manage their condition independently, and avoid complications such as hypoglycemia unawareness **(Putu et al., 2025).**

To assess the effectiveness of educational interventions, questionnaires that evaluate knowledge, attitudes, and self-management behaviors can be utilized. Raising public awareness is critical to disease prevention and early intervention. Without proper education, negative attitudes, poor self-discipline, and lack of knowledge about diabetes are likely to persist. Therefore, enhancing public understanding through these tools can help close the information gap and lead to improved health outcomes **(Asante et al., 2023).**

Individuals living with diabetes need to actively manage their condition through a combination of balanced nutrition, regular physical activity, and prescribed medications. They may encounter various difficulties, including tiredness, frequent urination, and an increased risk of serious health issues such as cardiovascular disease, vision impairment, nerve damage, and kidney complications. Consistently monitoring blood glucose levels, adhering to treatment plans, and consulting healthcare providers when symptoms escalate are critical steps in managing the disease. With proper medical care and a healthy lifestyle, many people with diabetes are able to prevent

complications and lead productive, active lives **(World Health Organization, 2023).**

In the light of the above, assessing the knowledge, attitudes, and self-care behaviors of individuals with diabetes concerning hyperglycemia is crucial for applying current treatment recommendations effectively. **(Workneh Fego et al., 2021).**

Significance of the study

The 9th edition of the International Diabetes Federation (IDF) reported that in 2019, approximately 351.7 million working-age adults (20–64 years) worldwide were living with diagnosed or undiagnosed diabetes, with around 90% having type 2 diabetes. Projections suggest this number will rise to 417.3 million by 2030 and reach 486.1 million by 2045 **(Banday et al., 2020).**

Hospital-based observational studies reveal that 38–40% of admitted patients exhibit hyperglycemia, and among individuals undergoing critical care or cardiac surgery, this figure climbs to 70–80%. A 2017 analysis of bedside glucose readings from 3.5 million individuals across 575 U.S. hospitals found that 32.2% of ICU patients and 32.0% of non-ICU patients had blood glucose levels exceeding 180 mg/dL (10.0 mmol/L) **(Dhatariya & Umpierrez, 2024).**

Within Egypt, diabetes represents a major public health challenge. The country ranks among the top ten in the Middle East for diabetes prevalence. Globally, diabetes incidence continues to rise, resulting in increasing morbidity and mortality **(Abouzid et al., 2022).**

These data emphasize the crucial need for diabetes patients to possess accurate knowledge, constructive attitudes, and strong self-management skills to effectively manage hyperglycemia, adhere to treatment regimens, and maintain consistent access to healthcare services.

Aim of the Study

This study aims to assess knowledge and attitude of diabetic patients type one and type two toward hyperglycemia. **This aim was achieved through:**

1- Assess knowledge of diabetic patient type one and type two toward hyperglycemia.

2- Assess attitude of diabetic patient type one and type two toward hyperglycemia.

3- Assess self-control of diabetic patients type one and type two toward hyperglycemia.

Research questions:

1- Does diabetic patients Type one &Type two have correct knowledge about hyperglycemia?

2- What is the attitude of diabetic patients type one and type two toward hyperglycemia?

3- What is the self-control of diabetic patients type one and type two toward hyperglycemia?

SUBJECTS AND METHODS

The subject and methods for this study were divided into four sections:

1- Technical design :

The technical item includes research design, setting, subjects and tools for data collection

A- Research design:

Descriptive exploratory study.

B- Research setting:

Located at the internal medicine department of Beni-Suef University Hospital, which includes a female ward (3 rooms, 14 beds) and a male ward (3 rooms, 10 beds).

C- Sampling:

Convenience sampling.

D. Subjects:

Approximately 60 diabetic patients (Types 1 and 2).

E- Data Collection Tools :Three assessment instruments

Tool I: Knowledge Questionnaire toward hyperglycemia.

Developed in Arabic language based on reviewing the associated literature **(Alrub et al., 2019; AlSadrah, 2019; Kuang et al., 2021).**It aims to assess knowledge of diabetic patients toward hyperglycemia and included three parts:

Part one: demographic characteristics such as: sex, age, residence place, occupation, educational level and marital status … etc.).

Part two: Medical data (e.g., history of patient which include present, past and family history of health. Aimed to assess patient's medical and family history including the following: duration of disease, type of DM, type of diabetic medication, period of hospitalization, main cause of current hospitalization admission, history of chronic diseases, family history of DM and history of symptoms during exercise.

Part three: Questionnaire of knowledge assessment. Adapted from *(Zubair et al., 2020)* aimed to assess the knowledge of patients regarding diabetes mellitus and hyperglycemia there are (5 items)about meaning of DM and hyperglycemia, (5 items)about common symptoms ,(10 items) about causes, (4 items) about treatment and (7 items) about preventive steps before high blood sugar occurs for diabetic patients.

Scoring system:

The correct = 1 grade, incorrect = 2 grade then this score were transformed to a percent score.

classified as:

- If the score ≥ 60% of the total score is satisfactory
- If the score < 60% of total score is unsatisfactory

Tool II: **Self-Control Scale of diabetes and high blood sugar.**

Adapted from (**Schmitt et al., 2013**); included 7 items about self-control of diabetes and high blood sugar. Patients' responses measured by (agree, disagree, neutral).

Scoring system:

It scored on three parts likert scale: agree=3 grades, unsure= 2 grades, disagree= 1 grade.

- High self control (≥75%), (13.3% of participants).
- Moderate self control (50% <75%), (60% of participants).
- Low self control (<50%), (26.7% of participants).

Tool III: **Attitude scale toward diabetes mellitus and hyperglycemia.**

Also adapted from *(Schmitt et al., 2013). By the researcher after reviewing the associated literature*. Aimed to assess attitude of diabetic patient toward hyperglycemia. Patients' responses measured by (agree, disagree, neutral).

Scoring system:

It scored on three parts likert scale, the agree toke 3 grades, unsure toke 2 grades, disagree toke 1 grade. Scores for the statements under each element were added together and adapted into percent score and were classified as:

- If the score ≥ 90% of the total score is positive attitude.
- If the score < 90% of total score is negative attitude.

2. Operational design: This section involves several stages: preparation, content validation, a pilot study, reliability testing of tools and fieldwork.

a- preparatory phase:

This phase involved an in-depth review of relevant literature and theoretical concepts using various sources such as books, journal articles, periodicals, magazines, and online databases. The purpose was to aid in the development of appropriate data collection tools. During this period, the researcher also visited the chosen study location to become familiar with the environment and personnel. Tool development was conducted under the supervision of academic advisors, and expert opinions were taken into account**.**

b- validity:

The tools used in the study underwent face and content validity checks. **Face validity**; assessed whether the tools measured the intended variables. **Content validity**; evaluated

whether the tools comprehensively addressed the research objectives. A panel of five experts from the Faculty of Nursing at Beni-Suef University, consisting of three assistant professors and two lecturers specializing in medical-surgical nursing, reviewed the tools for clarity, relevance, accuracy, completeness, simplicity, and usability. Minor revisions were made based on their feedback.

C- Tool reliability:

The reliability of the tools was verified using Cronbach's Alpha to ensure they consistently produced similar results under the same conditions. Acceptable reliability is generally indicated by alpha values above 0.7. The results were as follows: the knowledge questionnaire (43 items) had a Cronbach's alpha of 0.876, the self-control scale (5 items) scored 0.798, and the attitude scale (45 items) scored 0.854. Participants involved in the pilot study were not included in the final sample.

d. Pilot study:

A pilot study was carried out with approximately 10% of the total sample (about six patients). The aim was to test the clarity of questions, tool applicability, and estimate the time required for data collection. These participants were excluded from the main study sample.

e. Fieldwork:

-Approval was obtained from the Scientific Ethical Committee of the Faculty of Medicine at Beni-Suef University, and written consent was gathered from each participant.

-Data collection occurred over a six-month period, from October 2023 to March 2024, conducted twice weekly between 9:00 a.m. and 1:00 p.m.

-Data were collected through interviews with diabetic patients using structured questionnaires and scales, with prior explanation of the study's purpose. Participation was voluntary, take consent from the participants before starting the study and confidentiality was maintained throughout.

-Each interview took approximately 60–90 minutes, broken down as follows:

Socio-demographic and medical history questionnaire take (10–15) minutes. Knowledge questionnaire take (20–35) minutes. Self-control questionnaire take (5–10) minutes. Attitude scale towards hyperglycemia take (25–35) minutes.

III- Administrative item:

Official approval was obtained from the Dean of the Faculty of Nursing, Beni-Suef University. Another official litter containing the title and aim of the study was directed to the director of the Beni-Suef University Hospital for approval to conduct the study. An consent was taken from patients for permission to share in research process.

Ethical consideration:

Prior to fieldwork, ethical clearance was granted by the Scientific Research Ethics Committee at the Faculty of Medicine, Beni-Suef University. Participants were thoroughly informed about the study's goals and procedures and asked to provide voluntary consent. Confidentiality and anonymity were upheld throughout the process. Participants retained the right to refuse participation or withdraw at any point without justification. All cultural, ethical, and personal values were respected during the research.

IV-   Statistical design:

Statistical analysis was conducted using SPSS version 24. Data were coded and entered into the system, then summarized using descriptive statistics (frequencies and percentages for categorical variables, means and standard deviations for continuous variables). To compare qualitative variables, the Chi-square test was used. Pearson's correlation coefficient was applied to explore relationships between variables. A p-value below 0.05 indicated statistical significance, while a value under 0.001 denoted high significance **(Siregar, 2021).**

RESULTS

Table 1 presents the socio-demographic profile of the diabetic patients included in the study. Approximately one-third of the participants were between 20 and 40 years old, with a mean age of 43.27 years (±18.75). More than half of the respondents were women (53.3%) and married (56.7%). In terms of educational background, nearly half (46.7%) were illiterate. Regarding employment status, one-third (33.4%) were employed, while 23.3% were unemployed. Additionally, the majority of participants (60%) lived in rural areas.

Table 2 outlines participants' knowledge levels related to hyperglycemia. It was found that a significant proportion (90%) demonstrated an inadequate understanding of the condition.

Table 3 provides data on the participants' self-regulation practices concerning diabetes management. A large portion of the respondents disagreed with statements about making healthy food choices and attending scheduled medical appointments, with 63.3% and 53.3% expressing disagreement, respectively. The mean self-control score was 11.23 (±2.12), which corresponds to an average control level of 53.5%.

Table 4 displays data related to participants' attitudes towards hyperglycemia. A majority of the respondents (86.7%) exhibited negative attitudes, while only a small percentage demonstrated a positive outlook toward managing the condition.

Table 5 shows the correlation between participants' knowledge, self-control, and attitudes. Statistically significant positive correlations were found between knowledge

and attitude (r = 0.549, P = 0.000), knowledge and self-control (r = 0.653, P = 0.000), and attitude and self-control (r = 0.345, P = 0.001).

Table 6 examines the relationship between socio-demographic characteristics and participants' knowledge about hyperglycemia. The results revealed statistically significant associations between knowledge and marital status (χ^2 = 9.345, P = 0.008), as well as employment status (χ^2 = 8.765, P = 0.033).

Table 7 explores the connection between socio-demographic variables and participants' attitudes toward hyperglycemia. Significant associations were found with employment status (χ^2 = 9.808, P = 0.020) and place of residence (χ^2 = 4.172, P = 0.030).

Table 1: *Distribution of socio-demographic Characteristics among the diabetic patients (n=60).*

Characteristics of Socio-Demographic	No.	%
Age (years)		
– < 20	10	16.7
– 20 < 40	20	33.3
– 40 < 60	18	30
– ≥ 60	12	20
Mean±SD	43.27±18.75	
Gender		
– Male	28	46.7
– Female	32	53.3
Marital status		
– Single	12	20
– Married	34	56.7
– Widow	14	23.3
Education		
– Not read or write	28	46.7
– Diploma	12	20
– Intermediate	8	13.3

− High	12	20
Work		
− Employee	20	33.4
− Freelancer	8	13.3
− Housewife	18	30
− Not work	14	23.3
Residence		
− Rural	36	60
− Urban	24	40

Table (2): *Frequency distribution of knowledge levels about hyperglycemia among the studied patients (n=60).*

Patients' Knowledge Levels	Unsatisfactory (<60%)		Satisfactory (≥60%)	
	No.	%	No.	%
− General	50	83.3	10	16.7
− Signs and Symptoms	55	91.7	5	8.3
− Causes	52	86.7	8	13.3
− Complications	56	93.3	4	6.7
− Treatment	57	95	3	5
− Prevention	51	85	9	15
Levels of Patients' Overall Knowledge	54	90	6	10

Table 3: *Distribution of studied diabetic patients' self-control for diabetes (n=60).*

Self-control	Disagree		Neutral		Agree	
	No.	%	No.	%	No.	%
1. Check my blood sugar levels carefully and attentively.	20	33.3	16	26.7	24	40
2. Choose food that makes your blood sugar levels ideal.	38	63.3	18	30	4	6.7
3. Adhere to the appointments recommended by doctors to treat diabetes.	32	53.3	16	26.7	12	20

4.	Take diabetes medication (insulin tablets) as prescribed.	24	40	18	30	18	30
5.	Occasionally, I consume large amounts of sweets and carbohydrate-rich in foods.	48	80	4	6.7	8	13.3
6.	Exercise regularly to maintain regular blood sugar levels.	30	50	4	6.7	26	43.3
7.	strictly follow the dietary guidelines provided by my physician.	46	76.7	14	23.3	0	0
Min – Max	7 – 21					
Mean±SD	11.23±2.12					
Mean Percent	53.5					

Table 4: *Frequency distribution of studied diabetic patients' attitude levels regarding hyperglycemia (n=60).*

	Negative (<90%)		Positive (≥90%)	
Patients' Attitude Levels	**No.**	**%**	**No.**	**%**
_ Cognitive	55	91.7	5	8.3
_ Affective	50	83.3	10	16.7
– Psychomotor	51	85	9	15
Patients' Overall Attitude	52	86.7	8	13.3

Table 5: *The correlation matrix between studied diabetic patients' knowledge, self-control and attitude (n=60)*

Variables		Self-control	Total Attitude
Total Knowledge	*r*	0.653	0.549
	P-Value	0.000**	0.000**
Self-control	*r*		0.345
	P-Value		0.001**

Table 6 : *Relation between studied diabetic patients' knowledge and their socio-demographic characteristics regarding hyperglycemia (n=60).*

Socio-demographic Characteristics	Knowledge Levels				χ^2	P-value
	Unsatisfactory		Satisfactory			
	No.	**%**	**No.**	**%**		
Age						

	No.	%	No.	%	χ²	P-value
– < 20	8	13.3	2	3.3	3.951	0.267
– 20 < 40	20	33.3	0	0		
– 40 < 60	16	26.7	2	3.3		
– ≥ 60	10	16.7	2	3.3		
Gender						
– Male	24	40	4	6.7	1.071	0.301
– Female	30	50	2	3.3		
Marital Status						
– Single	10	16.7	2	3.3	9.735	0.008**
– Married	34	56.7	0	0		
– Widow	10	16.7	4	6.7		
Education						
– Not read or write	24	40	4	6.7	3.386	0.336
– Diploma	10	16.7	2	3.3		
– Intermediate	8	13.3	0	0		
– High	12	60	0	0		
Work						
– Employee	20	33.3	0	0	8.765	0.033*
– Freelancer	6	10	2	3.3		
– Housewife	14	23.3	4	6.7		
– Not work	14	23.3	0	0		
Residence						
– Rural	32	53.3	4	6.7	0.123	0.752
– Urban	22	36.7	2	3.3		

Table 7: *Relation between studied diabetic patients' attitude and their socio-demographic characteristics regarding hyperglycemia (n=60).*

Socio-demographic Characteristics	Attitude Levels				χ²	P-value
	Negative		Positive			
	No.	%	No.	%		
Age						
– < 20	10	16.7	0	0	2.500	0.475
– 20 < 40	16	26.7	4	6.7		

− 40 < 60	16	26.7	2	3.3		
− ≥ 60	10	16.7	2	3.3		
Gender						
− Male	26	43.3	2	3.3	1.741	0.187
− Female	26	43.3	6	10		
Marital Status						
− Single	12	20	0	0		
− Married	30	50	4	6.7	4.732	0.094
− Widow	10	16.7	4	6.7		
Education						
− Not read or write	24	40	4	6.7		
− Diploma	10	16.7	2	3.3	2.926	0.403
− Intermediate	6	10	2	3.3		
− High	12	20	0	0		
Work						
− Employee	18	30	2	3.3		
− Freelancer	8	13.3	0	0	9.808	0.020*
− Housewife	12	20	6	10		
− Not work	14	23.3	0	0		
Residence						
− Rural	34	56.7	2	3.3	4.712	0.030*
− Urban	18	30	6	10		

DISCUSSION

Diabetes mellitus remains a significant contributor to the global burden of health complications **(Suguna et al., 2022).** These complications are frequently linked to sedentary behaviors, poor dietary choices, missed medical consultations, and failure to adhere to prescribed treatment regimens **(Co et al., 2021).**

The outcome for individuals with hyperglycemia is largely influenced by how effectively their blood glucose levels are managed. Positive lifestyle changes including routine physical activity and healthier eating habits are essential for improved prognosis and enhanced quality of life compared to those with uncontrolled hyperglycemia **(Mouri & Badireddy, 2023).**

This study was carried out in both the male and female internal medicine departments at Beni-Suef University Hospital and included 60 diabetic patients. The

objective was to assess patients' knowledge and attitudes concerning hyperglycemia.

Part I: Demographic Characteristics of Participants. The findings indicated that approximately one-third of participants were aged between 20 and 40 years, and just under one-third were aged 40 to 60, with a mean age of 43.27 ± 18.75 years. The researcher suggested that individuals within these age groups may require more education and support, as they are often preoccupied with career and family responsibilities, possibly neglecting their health.

This outcome is in line with a study by **Nasir et al. (2021)** who reported that two-thirds of diabetic patients were between 30 and 55 years, with a mean age of 53.26 ± 13.43. However, **AlSadrah (2019)** reported contrasting results, with over half of his participants aged 40 to 60 and a mean age of 56.8 ± 12.4 years.

Regarding gender and marital status, more than half of the participants were female and married. According to the investigator, this may reflect factors such as societal responsibilities, obesity, limited physical activity, hormonal influences, and a history of gestational diabetes. These findings align with **Gazzaz (2020)** who found that more than half of diabetic patients in their study were female. Conversely, **Alshareef et al. (2020)** foundthat more than half of the patients in the sample were male

during their research conducted amid the COVID-19 pandemic in Jeddah.

In terms of employment status, nearly one quarter of the patients were unemployed. The investigator attributes this to the impact of diabetes and its complications such as visual impairment, renal dysfunction, foot ulcers, or other chronic illnesses as well as factors like age and retirement. Nonetheless, the majority of patients were within the working-age population and capable of working if their condition was managed appropriately. Similar observations were reported by **Mekonnen et al. (2020)** who found that over one-third of diabetic patients were unemployed. In contrast, **Sunny et al. (2021)** who reported that more than half of their participants were jobless.

The study also noted that two-thirds of participants were rural residents. The researcher believes this might stem from limited awareness regarding diabetes prevention and management, in addition to traditional dietary habits rich in fats and carbohydrates and the lack of access to specialized healthcare services. This aligns with **Kusnanto et al. (2021)** who found that more than half of the patients in the sample residing in rural areas. On the other hand, **Shawahna et al. (2021)** reported the opposite, noting that more than two third of the studied sample in the West Bank lived in urban areas.

Moreover, over one-third of the participants had been diagnosed with diabetes for less than a year, while a smaller portion had lived with the condition for 5 to 10 years. The researcher attributes this to a recent increase in diabetes diagnoses, possibly due to unhealthy lifestyles and the increased reach of health education campaigns and screening programs. This finding supports the results of **Wang et al. (2025)** who reported that less than one third of the studied sample had been diagnosed within the past year. Conversely, **Ngo et al. (2021)** found that the majority of their participants had been living with diabetes for five years or more.

Lastly, the study revealed that nearly three-quarters of the participants had type 1 diabetes. The researcher suggests that this may be due to environmental and immunological factors, including dietary habits or viral exposure that may trigger an autoimmune response leading to type 1 diabetes. These results are consistent with those of **Hsu et al. (2021)** who found that three-quarters of insulin-treated patients had type 1 diabetes. However, this contrasts with **Apicella et al. (2020)** who noted that only a small minority of diabetic patients in their study had type 1 diabetes.

Part II: Diabetic Patients' Knowledge Regarding Hyperglycemia. With respect to general knowledge, fewer than two-thirds of the participants recognized that diabetes can be inherited. According to the researcher, this may be due to the fact that a similar proportion of the patients had a family history of diabetes, suggesting a connection between personal experience and awareness of the hereditary nature of the disease. This finding aligns with **Alamri (2021)** who observed that more than two-thirds of university students in Tabuk, Saudi Arabia, believed that having diabetes increases the likelihood of their children developing the condition, confirming widespread knowledge of its genetic aspect.

Regarding knowledge of hyperglycemia treatment, over two-thirds of participants reported consistent adherence to their prescribed medication regimens. The researcher attributes this to patients' desire for effective blood glucose control and their awareness of the need to prevent complications. These findings are consistent with the study by **Alshareef et al. (2020)** who showed that the majority of diabetic patients of the sample took their medications regularly during the COVID-19 lockdown in Jeddah.

However, when evaluating overall knowledge levels about hyperglycemia, the study found that the majority of patients had unsatisfactory knowledge. The researcher suggests that this may be due to a lack of exposure to educational resources or health campaigns, particularly in regions with low literacy or limited healthcare infrastructure.

This result supports the findings of **Jia et al. (2022)** who noted that only about one-third of rural diabetic patients in North China demonstrated adequate knowledge of diabetic foot prevention and management.

Part III: Self-Control Practices Among Diabetic Patients. The study found that more than half of the patients did not regularly attend medical appointments as recommended. The researcher believes this could be due to patients feeling overly reliant on medication whether insulin or oral agents and assuming their condition is under control. Additional barriers may include limited awareness, low education levels, the cost of care, or difficulty accessing healthcare facilities due to geographic distance. These results contrast with those of **Wang et al. (2024)** who reported that more than half of diabetic patients in the sample with hyperglycemia maintained close communication with their healthcare providers and made timely adjustments to their treatment plans.

Part IV: Attitude of diabetic patients toward hyperglycemia. According to cognitive Attitude. The study stated that less than two-thirds of the patients agreed that families should be involved in goal-setting and treatment decisions. According to the researcher, this perspective likely stems from the emotional and motivational support that families can provide, which may help patients adhere to healthy lifestyles. This

result is in agreement with **Alshehri et al. (2020)** who found that more than half of patients reported being actively involved in decisions regarding their medication regimen.

Regarding Affective Attitude of diabetic patients. The study reported that more than three-quarters of the participants did not believe that diabetes affected every aspect of a patient's life. This could reflect cultural attitudes and strong familial or social support systems, which help mitigate the psychological burden of chronic illness. These findings are consistent with **Shamim et al. (2021)** who reported the majority of diabetic patients believed they could lead normal lives if they followed appropriate disease management strategies.

Concerning Psychomotor Attitude of the diabetic patients. This study revealed that The majority of patients indicated that they did not inspect their feet daily for signs of injury, infection, or abnormalities despite the known risks of diabetic foot complications. The researcher attributes this to a lack of awareness about the impact of high blood glucose on circulation and nerve function, as well as busy daily routines that leave little time to examine the feet.

This observation aligns with **Shamim et al. (2021)** who found that more than one quarter of patients in the sample practiced daily foot inspection. However, it differs from the findings of **Abouammoh and**

Alshamrani (2020), who reported that less than three-quarters of participants were knowledgeable about foot care practices.

Regarding total attitude of patients toward DM and hyperglycemia. The study revealed that the minority of participants had a positive overall attitude toward diabetes and hyperglycemia. This supports findings from **Alqahtani et al. (2020**) who noted that just over one-quarter of individuals in Riyadh held a positive attitude toward diabetes management. Conversely, the result differs from **Mekonnen et al. (2020)** who found that more than half of the patients in Ethiopia maintained a positive attitude, also differs from **Jia et al. (2022)** who reported that less than two-thirds of participants in North China expressed positive attitudes.

Part V: Correlations Between Demographic Variables and Knowledge. Analysis of the data revealed statistically significant relationships between patients' overall knowledge of hyperglycemia and their marital and employment status. However, no significant associations were found between knowledge and age, gender, education level, or urban/rural residency. These findings are consistent with **Ede et al. (2018)** who also reported no statistically significant correlation between foot care knowledge and gender among diabetic amputees in Nigeria.

The researcher concluded that adequate knowledge of hyperglycemia is associated with improved self-management and more positive attitudes, while lack of knowledge is often linked to poor control and negative perceptions of the disease.

CONCLUSION

Based on the findings of the current study and in response to the research questions, it can be concluded that:

The majority of the studied diabetic patients demonstrated unsatisfactory overall knowledge regarding hyperglycemia. Approximately two-thirds of the participants exhibited a moderate level of self-control in managing their condition. Most participants also showed a negative attitude toward hyperglycemia. Statistically significant correlations were found between patients' knowledge and attitude, knowledge and self-control, and attitude and self-control, indicating an interdependent relationship among these variables.

RECOMMENDATIONS

In light of the study's findings, the following recommendations are proposed:

- Implement continuous educational programs focused on the management of hyperglycemia and the prevention of its complications among diabetic patients.

- Conduct regular teaching sessions to improve patients' awareness, knowledge, and attitudes toward diabetes and hyperglycemia.

- Develop and distribute instructional booklets that clearly explain how to manage diabetes complications and episodes of hyperglycemia, providing accessible guidance for self-care.

- Promote stepwise diabetes self-care programs tailored to diabetic patients, aiming to enhance their self-management practices and overall quality of life

Recommendations for Future Research

- Further research is encouraged to explore the underlying factors contributing to hyperglycemia among diabetic patients.

- Studies should be conducted using larger, more diverse samples across multiple healthcare settings to allow for broader generalization of the findings.`

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