

Assessment of Self-Care Knowledge and Practice among Preparatory Diabetic School Students at Aswan City

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Abstract

Background: Type 1 Diabetes Mellitus is one of the most difficult non-communicable disorders to treat in children and is a global health issue. Diabetes self-care is particularly challenging for children. **Aim:** To assess self-care knowledge and practice among preparatory diabetic school students at Aswan City. **Design:** A descriptive cross sectional research. **Study Setting:** At preparatory governmental schools, in the Aswan City. **Sample:** convenience sample of 99 students diagnosed with diabetes from the previous study setting. **Tools for data collection: Tool (I):** Structured interviewing questionnaire include 2 parts: **First part:** demographic characteristics of students, demographic characteristics of parents, and diabetic history of students. **Second part:** Students' knowledge about diabetes. **Tool (II):** Checklists of self-care practice. **Results:** More than half of them had good knowledge about diabetes, while less than one third of them had fair knowledge and less than one fifth of them had a total poor of knowledge. This study also highlighted that nearly one fifth of the students had satisfactory self-care practice, while more than two fifths of them had unsatisfactory self-care practice. **Conclusion:** study confirmed that there was highly statistical considerable difference positive correlation between the overall knowledge and the overall practices. **Recommendations:** Programs for in-service education on diabetes management and emergency protocols for hypo- or hyperglycemia should be made available to school health nurses.

Keywords: Diabetes Mellitus, Self-care & Type 1 Diabetes Mellitus.

Introduction

Type 1 diabetes mellitus (T1DM) is defined as a sickness caused by a lack of producing of insulin and this happens when the immune system of body attacks and abolishes cells of beta class which are normal producers of insulin. In Egypt, 8 out of 100,000 children under the age of 14 have type 1 diabetes (Mohamed et al., 2022).

Type 1 Diabetes Mellitus is the second most common chronic disease in children, and its prevalence has risen by 3% per year globally in recent decades. Furthermore, 75% of all DM one cases diagnosed are in people under the age of 18 years (Abd El Salam et al., 2023).

Diabetes Mellitus is one of the most overall wellbeing troubles with an expansion in diabetes occurrence in kids and adolescents. It's defined as illness of carbohydrate metabolism identified by impaired of body capability to respond or release insulin and thereby maintain adequate levels of sugar (glucose) in the blood. Or a persistent condition of carbohydrate metabolism caused by insufficiency of insulin or failure to respond to insulin, resulting in high blood glucose (Abhishek, & Kaur, 2022).

While school-age children's social and developmental growth accelerates and becomes more complicated, their physical growth progresses slowly over time. Their worldview broadens beyond their immediate

family to include friends, instructors, and other external influences (such as coaches and the media). Acute illnesses like upper respiratory tract infections and gastrointestinal illnesses, as well as infectious diseases like measles and diphtheria, are among the many diseases to which children are exposed. But some children grow up with chronic conditions like Type 1 Diabetes Mellitus (T1DM) (Hussein et al., 2018).

The patient must actively participate in treatment for this chronic illness. This includes managing symptoms on their own, making lifestyle adjustments, adjusting to the physical and psychological effects, and handling tasks like self-administering insulin, monitoring blood glucose, and managing diet and exercise (Diab & Hussein 2023).

Effective management of T1DM requires compliance with a challenging and intricate lifelong routine, and raising awareness of children is essential to this goal. Children and their caregivers' awareness and understanding are crucial in preventing and managing T1DM problems. Uncertainty about the significance of treating T1DM and its consequences is a contributing factor to the unfavorable results experienced by children with the condition (Mohammad et al., 2020).

Diabetes self-care education is critical because it improves patients' knowledge and skills, ultimately

improving patient outcomes and health-related quality of life (El Masri et al., 2020).

Self-care is defined as the actions people take on their own behalf to maintain life, health and well-being. With chronic illnesses, self-care can be described as the health-related activities required to live an everyday life with a disease. (Elsobky et al., 2022) High levels of self-care can greatly enhance health outcomes like wellbeing, health, and stability of sickness. For instance, improved self-care for diabetics has been linked to improved quality of life, fewer problems, and improved glucose management (Fabrizi et al., 2020).

The school age period is a critical time in the development of self-care skills. It refers to the middle childhood years, often known as the elementary school years or the developmental stage that spans roughly 6 to 11 years of age. During this period, children begin to develop the ability to reason logically, comprehend the reasons and effects of sickness, and begin to grasp the concepts of the past and future. They learn that the illness needs to be continuously managed. in the classroom. Children want to be in control of their surroundings, but they also want to be accepted by their peers, and in peer interactions, reciprocity is crucial (Mourao et al 2022)

It is crucial for nurses to teach T1DM children how to take care of themselves. Patient outcomes and the care process are improved by patient education about self-care and the strengthening of the role of nurses in the management of diabetes. Nurses have a wide range of duties, including helping the children understand their conditions as best they can and providing them with adequate information on self-care and management to enable them to make lifestyle changes (Attia & Hassan, 2018).

Significance of the study:

A "silent disease," diabetes mellitus (DM) advances rapidly until it damages target organs and has become a major public health concern due to its horrendous adverse effects. For diabetic patients to achieve and sustain an optimal blood glucose level, they need to practice good self-care management (Adhikari Baral, & Baral, 2021).

The prevalence of T1DM in teenagers is not well known in Egypt, where the most recent incidence of the condition was 8/100,000 in children aged 0 to 14, and 8.222,600 cases of the disease in adults, representing a 15.1% prevalence rate (Atlas, 2019).

Aim of the study

This study aims to assess self-care knowledge and practice among preparatory diabetic school students at Aswan City.

Objective

To evaluate self-care knowledge and practice among preparatory diabetic school students at Aswan City.

Research questions

- Q1. What is the level of self-care knowledge among preparatory diabetic school students at Aswan city?
- Q2. What is the level of self-care practice among preparatory diabetic school students at Aswan City?

Subject and Methods

Design:

A descriptive cross sectional design will be used.

Setting:

At preparatory governmental schools, in the Aswan City. According to the statistics of the directorate of education in Aswan, Aswan city contains 59 preparatory schools. Only schools that have students with type 1 diabetes was included in the study and their number is 38 schools, this data collected from Aswan- health insurance system in the scholastic year 2022/2023.

Sample:

A convenience sample of 99 students diagnosed with diabetes from the previous study setting.

Data collection tools:

Two tools were used:

Tool I: Interview questionnaire form: It was designed by the researcher. It was included two parts;

Part I: Demographic characteristics such as (ages, sex, residence, school grade, Birth order, number of child sibling.....etc

Demographic characteristics of parent: it includes age, level of education, occupation, parent's consanguinity, and if parents have diabetes.

Diabetic history of student: It include (time of discovery of the disease, how did the child know the disease, starting treatment, type of insulin that used, units, route of injection, regularity and time of insulin taking, student inject yourself, number of admission to the hospital, monitoring glucose by urine analysis)

Part II: Knowledge Questionnaire: It was adopted from researcher and included MCQ questions form after reviewing literature review adopted from Särnblad et al., (2016). To assess students' knowledge. It consisted of 23 questions and divided into five levels. general questions for diabetes (5 items), questions for proper nutrition's for diabetic patients (4 items), questions for exercise (4 items), Foot care questions (8 items), Follow-up questions (2 items).

Scoring system of Knowledge:

The overall score of Knowledge was 23 marks. The score for each answer was given '1' score for correct and complete answer and '0' for incorrect answer and

don't know. The total score of knowledge level was categorized as following:

- Good knowledge if the score from 75%-100%.
- Fair knowledge if the score equals 50<75%
- Poor knowledge if the score < 50% (Ibrahim et al 2024)

Tool II: Checklists of Self-Care Practices: It is adapted from Wilson & Hockenberry, (2014). To assess level of student's practice regarding diabetes care. It consists of (71 items) and divided into four levels. insulin injection by syringe (24 items), insulin injection by pen (13), Performance of blood glucose testing (17 items), and foot care (17 items).

Scoring system of reported practice:

The total score was 71 marks; each statement was assigned a score according to student's response were mark for each statement. A score of '1' was given for "done" practice, while '0' was given for "not done". The scores of items were summed up and then converted into percentage scores, as the following:

- Satisfactory of self-care practices when the total score more than 60.0%
- Un satisfactory of self-care practices when the total score is 60.0% or less (Saad et al (2022)).

Tools validity and reliability

Tools validity:

Face validity for the questionnaire clarity, relevance, comprehensiveness, understanding, and applicability was reviewed and evaluated by five experts from community health nursing department, faculty of nursing to ensure that the questionnaire was clear and pertinent to diabetic patients and all suggested modifications were applied.

Tools Reliability

Reliability of the tools for knowledge and practices tested using Cronbach's Alpha were (0.77, 0.83) respectively.

Methods:

Preparatory stage:

A formal letter of approval to conduct the study was obtained from the dean of the faculty of nursing and given to the director of preparatory schools government at Aswan City.

Pilot study:

A pilot study was conducted before data collecting began on 10% of sample (10 students) who were included in the study. The necessary adjustments based on the pilot study results and the questionnaire was reconstructed for ready. This was done to test the tools clarity and determine the time needed to complete it.

Ethical consideration

The faculty of nursing ethical committee gave its approval to the research proposal and there was no risk to the students being studied when the study being conducted. The study followed the common ethical principles in research and student's oral agreement was obtained after they had been informed of the study's nature and objectives. They were informed that they had the right to refuse participation in the study at any time and that they could withdraw from it any time without providing a reason. The privacy of study participants was taken into account when data was collected. Data was confidential and coding system was used for it. Total of data collection did not touch students dignity or traditional and culture issues.

Field work:

The researchers began collecting data from the middle of February to the end of June 2023, two days a week. After obtaining permission to conduct the study, the researchers went to preparatory schools and selected all patients with diabetes. Next, the researchers met with the affected students to assess their eligibility and give details about the purpose of the study. The interview took place in the school library. It took between 45 and 60 minutes to complete the questionnaire for each interview. Two to four students are taken daily.

Statistical analysis:

Data were categorized, coded and analyzed according to appropriate statistical methods and tests then results were presented in suitable tables, figures, and graphics. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20) software for analysis. Quantitative data were presented as mean and standard deviation (SD) while qualitative data were expressed as frequency and percentage. The observed differences and associations were considered statistically significant when $P \leq 0.05$

Results

Table (1): Distribution of the studied students regarding to socio-demographic characteristic (N=99)

Socio-demographic data	N	%
Age (years)		
Less than 13	33	33.3
13 – 15	51	51.5
More than 15	15	15.2
Mean \pm SD (Range)	13.57 \pm 2.83	(12.5-16)
Gender		
Male	51	51.5
Female	48	48.5
Residence		
Rural	7	7.1
Urban	92	92.9
School Grade		
First year of preparatory school	27	27.3
Second year of preparatory school	33	33.3
Third year of preparatory school	39	39.4
Birth Order		
First	39	39.4
Second	30	30.3
Third	18	18.2
Fourth	12	12.1
Number of siblings		
1 – 2	36	36.4
3 – 4	39	39.4
5 and more	24	24.2

Table (2): Distribution of the studied students regarding to their parents' education and occupation (No=99)

Parents' data	N	%
Father's Age		
< 40 years	30	30.3
40<50	45	45.4
50 – 60	18	18.2
> 60	6	6.1
Father's Level Education		
Illiterate	3	3.1
Reads and writes	3	3.1
Preparatory	6	6.1
Secondary or diploma	62	62.5
Higher/university	22	22.1
Postgraduate studies	3	3.1
Father's Occupation		
Government employee	51	51.5
Private employee	14	14.1
Worker	15	15.2
Self-employed	10	10.1
Retired	6	6.1
Died	3	3.0
Mother's Age		
< 40	63	63.6

Parents' data	N	%
40 – 60	24	24.2
> 60	12	12.1
Mother's level of Education		
Reads and writes	3	3.0
Primary	3	3.0
Preparatory	9	9.1
Secondary or diploma	47	47.5
Higher/university	30	30.3
Postgraduate studies	7	7.1
Mother's Occupation		
Housewife	75	75.8
Workers	24	24.2
Parents' consanguinity.		
Yes	39	39.4
No	60	60.6
Are your parents diabetic		
Yes	45	45.5
No	54	54.5

Table (3): Distribution of studied students regarding to knowledge about diabetes (No =99).

Knowledge	Correct		Incorrect	
	N	%	N	%
General Knowledge about diabetes				
Definition	57	57.6	42	42.4
Causes	66	66.7	33	33.3
Risk factors	51	51.5	48	48.5
Symptoms of hyperglycemia	78	78.8	21	21.2
Symptoms of hypoglycemia	63	63.6	36	36.4
Nutrition for diabetic patient				
The importance of nutrition for a diabetic patient	77	77.8	22	22.2
The components of healthy food	87	87.9	12	12.1
Calculating the required number of food	90	90.9	9	9.1
Types of food that increased blood sugar	51	51.5	48	48.5
Exercise for diabetic patient				
Importance of exercise for a diabetic patient	57	57.6	42	42.4
Sports activities for diabetic patient	72	72.7	27	27.3
Measuring of blood sugar during exercise	69	69.7	30	30.3
Insulin dose needed during exercise	72	72.7	27	27.3
Foot care				
Self-feet care	66	66.7	33	33.3
Importance of foot care	63	63.6	36	36.4
Daily Foot care	72	72.7	27	27.3
Drying feet	57	57.6	42	42.4
Suitable type of socks for wear	21	21.2	78	78.8
Suitable type of shoes wearing	90	90.9	9	9.1
Wearing slippers at home	51	51.5	48	48.5
Using mirror to discover any wounds	3	3.0	96	97.0
Follow – Up				
Importance of follow – up for diabetic patient	84	84.8	15	15.2
The harms due to lack of follow –up	84	84.8	15	15.2

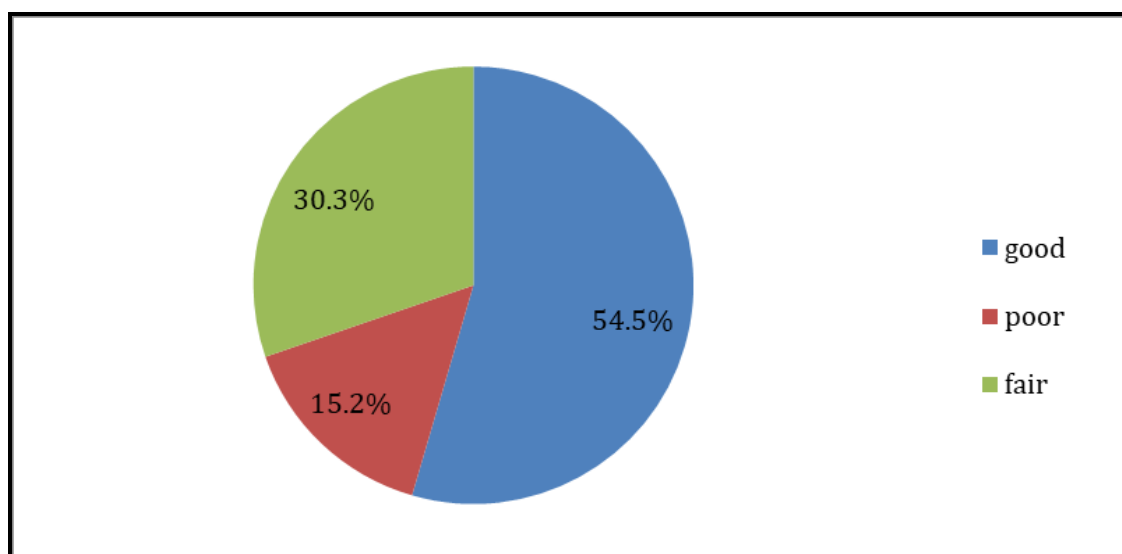


Figure (1): Distribution of studied students regarding to their total level of knowledge about diabetes

Table (4): Distribution of studied students regarding to their total level of reported practice about diabetes (No=99).

level of reported practice about diabetes	Satisfactory		Unsatisfactory	
	N	%	N	%
Performance of insulin injection by syringe	30	30.3	69	69.7
Performance of insulin injection by pen	40	40.4	59	59.6
Performance of blood glucose testing	55	55.6	44	44.4
Performance of foot care	65	65.7	34	34.3

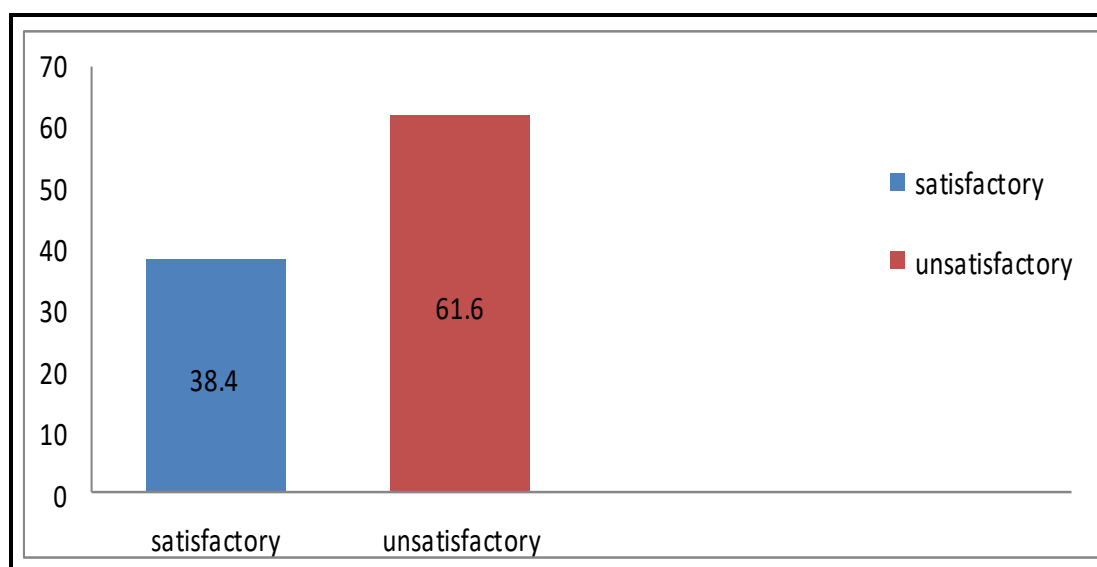


Figure (2): Distribution of total reported practice among studied students.

Table (5): Relation between personal data of students and their total level of knowledge (No=99)

	Good Knowledge (n=54)		Fair Knowledge (n=30)		Poor Knowledge (n=15)		Chi – Square / Fisher's exact test	
	N	%	N	%	N	%	X ²	P
Age (years)								
Less than 13	6	11.1	18	60.0	9	60.0	32.224	<0.001**
13 – 15	33	61.1	12	40.0	6	40.0		
More than 15	15	27.8	0	0.0	0	0.0		
Gender								
Male	24	44.4	18	60.0	9	60.0	2.378	0.305
Female	30	55.6	12	40.0	6	40.0		
Residence								
Rural	2	3.7	2	6.7	3	20.0	4.755	0.092
Urban	52	96.3	28	93.3	12	80.0		
School Grade								
First years of preparatory schools	6	11.1	6	20.0	15	100.0	76.629	<0.001**
Second years of preparatory schools	12	22.2	21	70.0	0	0.0		
Third years of preparatory schools	36	66.7	3	10.0	0	0.0		
Birth Order								
First	18	33.3	15	50.0	6	40.0	8.058	0.234
Second	18	33.3	6	20.0	6	40.0		
Third	12	22.2	3	10.0	3	20.0		
Fourth	6	11.1	6	20.0	0	0.0		
Number of siblings								
1 – 2	24	44.4	6	20.0	6	40.0	7.704	0.103
3 – 4	21	38.9	12	40.0	6	40.0		
5 and more	9	16.7	12	40.0	3	20.0		

*Statistically significant differences $p > 0.05$ **Table (6): Relation between personal data of students and their total level of reported practice (No=99)**

	Satisfactory (n=38)		Unsatisfactory (n=61)		Chi – Square / Fisher’s exact test	
	N	%	N	%	X ²	P
Age (years)						
Less than 13	20	52.6	13	21.3	16.441	<0.001**
13 – 15	18	47.4	33	54.1		
More than 15	0	0.0	15	24.6		
Gender						
Male	22	57.9	29	47.5	1.005	0.316
Female	16	42.1	32	52.5		
Residence						
Rural	3	7.9	4	6.6	0.064	0.801
Urban	35	92.1	57	93.4		
School Grade						
First years of preparatory schools	19	50.0	8	13.1	22.684	<0.001**
Second years of preparatory schools	14	36.8	19	31.1		
Third years of preparatory schools	5	13.2	34	55.7		
Birth Order						
First	12	31.6	27	44.3	4.326	0.228
Second	10	26.3	20	32.8		
Third	9	23.7	9	14.8		
Fourth	7	18.4	5	8.2		
Number of siblings						
1 – 2	8	21.1	28	45.9	6.341	0.042*
3 – 4	18	47.4	21	34.4		
5 and more	12	31.6	12	19.7		

*Statistically significant differences $p > 0.05$

Table (7): Correlation between level of students' knowledge and practice scores

Variable	Total Knowledge	
	R	p.value
Total level of Practice	0.285	<0.001**

*Statistically significant differences $p > 0.05$

Table (1): Shows distribution of the studied students according to their socio-demographic characteristics. It was cleared that 51.5% of the studied students were males and aged from 13 to 15 years with mean \pm SD 13.57 ± 2.83 years. Regarding their residence, the majority 92.9% of them are living in urban areas. As regards the school grades, nearly two-fifths of them 39.4% were at the third level of the preparatory school. Moreover, 39.4 % of them had 3 to 4 siblings and 36.9% of them were the oldest of their brothers.

Table (2): Shows distribution of the studied students regarding to their parents education and occupation, it was demonstrated that 45.5% of fathers' were age between 40 to 50 years old. 62.5% & 51.5% of them had secondary education and government employee respectively. For mother data, 63.6%, 47.5% & 75.8% of them were age less than 40 years old, had secondary or diploma and were housewife. Moreover, 39.4% of parents have consanguinity between them and 45.5% of them reported their parents have diabetes.

Table (3): Displays the distribution of the students based on their knowledge about diabetes. Concerning general diabetes knowledge, they had correct knowledge about symptoms and causes 78.8 % & 66.7% respectively. Regarding nutrition knowledge, they had correct knowledge about calculating the required number of different types of food, and the components of healthy food 90.9% & 87.9% respectively. About exercise, 72.7% of them had a correct knowledge about sports activities for adiabatic patients, Concerning knowledge about foot care, 66.7 had correct knowledge about doing foot care daily and the suitable type of socks for wear 72.7% & 90.9% respectively. Also, 84.8% of them had correct knowledge about follow-up importance and the harms due to lack of follow-up.

Figure (1): Distribution of students based on the overall knowledge level, it shows that 54.5% of the studied students had a good knowledge about diabetes. And 30.3% of them had a fair knowledge and 15.2% of them had total poor knowledge.

Table (4): Show distribution of children based on their overall practice level about diabetes, it portrays that 55.6% & 65.7% of the students had satisfactory practices regarding blood glucose testing and foot care respectively. On the other hand, 69.7% & 59.6% of them had unsatisfactory practices of insulin injection by syringe and by pen injection respectively.

Figure (2): Show distribution of total reported practice among studied students portrays that about 38.4% of the studied students had satisfactory practice of diabetic care. While 61.6% of them had unsatisfactory practice of diabetic care.

Table (5): Shows that the relation between personal data of the students and the overall knowledge it reveals that, there is a highly significant variance association between the students' total knowledge and their age and school grade with ($P < 0.001$). While it shows that there is a no considerable difference association between the students' overall knowledge and their gender, residence, order between brothers and number of siblings with ($p > 0.05$).

Table (6): Shows that the relation between personal data of the students and their total reported practice, there is a highly remarkable difference association between the students' total practice and their age and school grade with ($P < 0.001$). Moreover, there is a considerable difference association between the students' total practice and their number of siblings with ($p = .042$). While it shows that there is no significant difference association between the students' overall practice and their gender, residence and order between brothers with ($p > 0.05$).

Table (7): Shows Correlation between the scores of Knowledge and Practice presents that, there is a highly significant positive relationship between the studied students' overall knowledge with their overall practice with highly significant statistical difference ($P < 0.001$).

Discussion

T1DM is one of the most frequent persistent illness in children but can have its onset at any age. Is more common than youth-onset T1DM (Leslie et al., 2021). The incidence and prevalence of T1DM, which affects 5% to 10% of all diabetics, have been steadily rising. According to a comprehensive review and meta-analysis, there were 15. Cases of T1DM for every 100,000 individuals worldwide, or 9.5% prevalence Mobasser et al. (2020). In Egypt 8/100000 of the children under the age of 15 year's (Montalie et al., 2022). Diabetes has a role in the global burden of complications (Suguna et al., 2022). Such complications are primarily linked to sedentary lifestyles, poor eating practices, missing doctor's appointments, and disregarding prescription drug regimens. Therefore, it is essential to give diabetic

school pupils who are in preparation the best treatment possible through self-care interventions, which involve a set of self-care skills and practice. Effective self-care skills and practice in pediatric and adolescent diabetic patients encompasses the collection of advanced modalities and is best achieved by engaging in high quality structured education (**Mbuagbaw et al., (2021)**). Therefore, this research aimed to assess self-care knowledge and practice among preparatory diabetic school students at Aswan City.

Regarding socio-demographic features of the students, this study demonstrated that more than half of them were males. The result was in line with **Fabrizi et al. (2022) & Al-nasrawi & Aljebory (2023)**, whose study reported that more than half of the studied subjects were males. From the research investigator point of view, this could be due to biological factors that predispose males to diabetes at a higher rate compared to females within this specific age group. Hormonal differences, genetic predispositions, or lifestyle factors might contribute to this disparity.

In additions, the findings of this study indicated that more than half of the students were between the ages of 13 and 15; their mean age \pm SD was 13.57 \pm 2.83 years. According to a study that **Salah Eldin & Abdel Malek (2023)** adopted, the majority of the children in the study were between the ages of 12 and under 14 years old, with a mean age of 12.84 \pm 3.89 years. These results disagreed with those of **Kafi & El Sayed (2020)**, who discovered that the mean age of the study subjects was 10.66 \pm 3.21 years, and that around two thirds of them were between the ages of 6 and less than 12 years.

In relation to residence, the current research revealed that the majority of the studied students are living in urban areas. This finding was supported by **Al-Shormanet al., (2023)** whose study reported that the largest proportion of the studied participants are living in urban areas. In contrast, **Nabeel et al., (2020)**, whose study found that more than two thirds of the studied children were in rural residents.

Additionally, this work reflected that nearly two-fifths of the studied students were at the third level of the preparatory school. Moreover, more than one third of them had 3 to 4 siblings and they were the oldest of their brothers. These results were supported by **Hussein et al. (2018)**, who demonstrated that the highest proportion of the diabetic students were in the third year of preparatory school, also they had from one to three siblings with a mean of 2.42 \pm 1.32 siblings. Likewise, a study conducted by **Awad et al. (2019)** found that the studied students had siblings with mean number 3.0 \pm 0.9 and most of them were ranked the first.

According to the personal data about parents age, our study indicated that less than half of the their fathers aged between 40 to 50 years old, while more than three fifths of their mothers were less than 40 years old. These results matched with those of **Nabeel et al. (2020)**, who stated that most of the children's mothers aged from 30 to 40 years old. On the other hand, a study performed by **Elhawary et al. (2021)**, who found that the largest proportion of the fathers ranged in age between 35 to 45 years old.

Regarding father and mother education, the present study displayed that more than half of the fathers had secondary education, while nearly half of the mothers had secondary education or diploma. These results were confirmed by **Babiker et al. (2021)**, who stated that the highest percentage of the studied children's parents had secondary education. Consistently, a study established by **Akter et al. (2022)** reported that the largest proportion of the studied children fathers and mothers had secondary education.

In addition, the present research cleared that more than half of the fathers were government employee, while three quarters of the studied mothers were housewives. This finding was in harmony with **Soliman et al. (2022)**, who noticed that more than half of fathers were employed. In the opposite line, a research was conducted by **Fabrizi et al. (2022)**, who found that more than three quarters of the studied caregivers were employed.

Moreover, this study demonstrated that more than one thirds of parents had relation between them and over half of them reported their parents had diabetes. These results were supported by **Neda et al. (2020)**, who stated that most of the parents were not relatives. Similarly, **Asghari et al. (2023)** who carried out a study mentioned that most of the studied participants had no family history of diabetes.

Considering the studied students' knowledge about diabetes, this research cleared that more than three quarters and about two thirds of them had correct knowledge about diabetes symptoms and causes respectively. Also, most of them had correct knowledge about calculating the required number of different types of food, and the components of healthy food respectively. From the research investigator point of view, this may be related to the effectiveness of educational interventions or programs targeting diabetic education among school students.

Such findings were in accordance with **Akter et al. (2022)**, whose study reported that about three quarters of the students had correct knowledge about symptoms and risk factors of diabetes. Likewise, a study carried out by **Gazzaz, (2020)** found that, most of the studied students had good knowledge about dietary management for diabetes.

In addition, the current study represented that nearly three quarters of the studied students had correct knowledge about sports activities for diabetic patients, and two thirds of them had correct knowledge about suitable type of socks for wear and doing foot care daily respectively. Also, most of them had correct knowledge about follow-up importance and the harms due to lack of follow-up. Conversely, a study conducted by **Alhilali et al. (2023)** discovered that school students knowledge of diabetes was generally inadequate, and they also had a poor comprehension of its consequences and management. Moreover, the current study showed that most the studied students had good total knowledge about nutrition. Also, more than half of them had good total knowledge about exercise, foot care and follow-up, respectively. In the same line, a study performed by **Aliya & Namitha, (2018)** found that more than half of high school students had a good amount of general knowledge about diabetes, non- medical measures and lifestyle choices respectively.

Pertaining the studied students' total level of knowledge about diabetes, the present study showed that more than half them had good knowledge about diabetes, while less than one third of them had fair knowledge and less than one fifth of them had total poor knowledge. From the research investigator point of view, this may be related to the effectiveness of educational programs or resources available to the diabetic students within the school.

According to the level of reported practice about diabetes, the current study reflected that more than half and more than three fifths of the studied students had satisfactory practices regarding blood glucose testing and foot care respectively. On the other hand, about two thirds and more than half of them had unsatisfactory practices of insulin injection by syringe and by pen injection respectively. These findings was similar to a study adopted by **Halasa, (2022)**, who stated that more than half of the studied subjects had a satisfactory self-care practices regarding monitoring blood glucose and foot care. Likewise, **Ahmed, & Mostafa (2023)** whose study reported that most of the studied children had poor practices regarding insulin injection by syringe and by pen injection. On the other hand, a study performed by **Bogale et al. (2022)** found that patients with diabetes had trouble taking their medications and taking care of themselves and they didn't take care of their feet.

Pertaining total reported practice among the studied students, the current study also highlighted that nearly one fifth of the studied students had satisfactory self-care practice, while more than two fifths of them had unsatisfactory self-care practice. This result was in agreement with a study done by **Kafil & El Sayed, (2020)** reported that more than three quarters of the

studied children had unsatisfactory reported self-care practices. **Awad et al. (2019)** whose study found that most of the studied diabetic children had unsatisfactory self-care skills pre-intervention. In the opposite line, a study carried out by **Al-nasrawi & Aljebory, (2023)** stated that nearly two thirds of students have moderate level of Self-care practice, while about one third of them have low level of Self-care practice.

According to relation between personal data of the studied students and their total level of knowledge, the current study represented that a higher level of knowledge was found among older students more than 15 years old, and there was a statistically significant difference between total level of knowledge and students' age. This result was compatible with that recorded by **Alhilali et al. (2023)**, who found that there was statistically significant relation between the studied students' level of knowledge about diabetes and their age.

In addition, the current study showed that there was no statistically significant association between the total knowledge of students and their gender, residence, order between brothers and number of siblings. On contrary, a study conducted by **Aliya & Namitha, (2018)** found that there was no statistically significant relation between level of knowledge and the studied students' school grade.

As regard relation between personal data of the studied students and their total reported practice, the present study revealed that there was highly statistical significant association between the studied students' total practice and their age and school grade. This can be interpreted as level of total self-care practice was higher among students who aged less than 13 years old and those at first school grade. a study carried out by **Ogugua et al. (2021)** stated that young age in diabetes was identified as determinant of optimal glycemic control practices at the bi-variate level of analysis.

These findings were supported by **Gazzaz, (2020)**, who found that there was statistically significant relation between the studied students' level of practice related to diabetes and number of siblings, while there was no statistically significant relation with their gender.

Pertaining correlation between Knowledge and Practice scores, the present study in pointed out that there was a highly significant statistical positive correlation between the studied students' total knowledge and their total practice. This result can be explained by the fact that diabetic students who possess greater knowledge about self-care practices tend to implement those practices more effectively. In other words, as their understanding of self-care increases, so does their adherence to beneficial habits.

This result was in accordance with **Ahmed, & Mostafa (2023)** whose study confirmed that there was highly statistical significant positive correlation between studied diabetic children total knowledge level and total reported practices level. Consistently, a study carried out by **Alarfaj et al. (2023)** declared that patients with high knowledge scores had better practice and mentioned that knowledge was revealed to significantly influence self-insulin administration, meal-skipping after taking insulin, use of home glucose monitoring, keeping snacks nearby, and taking insulin in relation to-meals.

Conclusion

Based on the results of the current study, it could be concluded that more than half them had good knowledge about diabetes, while less than one third of them had fair knowledge and less than one fifth of them had total poor knowledge. The current study also highlighted that nearly one fifth of the studied students had satisfactory practice of diabetic self care, while more than two fifths of them had unsatisfactory self-care practice. Study confirmed that there was highly statistical considerable difference positive correlation between the overall knowledge and the overall practices.

Recommendations:

1. Diabetes self- management education video game for children and adolescents on adherence to a self-care regimen.
2. Educating teachers and other school professionals staff about diabetes can create supportive environment for students self-management of diabetes.
3. Provide in-service training programs for school health nurses about diabetes management and emergency measures in school for either hypo or hyperglycemia.

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