

Self-Care Knowledge and Practices among Diabetic School Students in El- Behaira Governorate.

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Abstract: Diabetes in children and adolescents is becoming an increasingly important public health concern throughout the world. It is a chronic disorder of metabolism characterized by partial or complete deficiency of the insulin hormone. Self- cared diabetes involves a complex set of tasks and the key to successful management of diabetes is adherence to these tasks. **The aim of the study** was to assess the self-care practices among diabetic school' students in El-Behaira Governorate. A total number of 300 students constituted the subjects of the study. Data was collected from governmental primary, preparatory and secondary schools in El-Behira governorate. **Results:** More than three quarters of the students had "poor" score of knowledge. Only one fifth of the sample analyzed urine for glucose correctly. Nearly three quarters of the students planned their meal according to the physician' prescription. Two fifth of those who were practicing physical exercise do it regularly. Total practices scores were fair or poor among all age groups of the sample. The results revealed that significant differences were found between students' knowledge and their self-care practices in all areas of diabetes regimen except practice of self-glucose monitoring. Moreover, significant differences were found between students' self-care practices and their fathers' and mothers' education. It is recommended to develop and implement a health educational program to diabetic children to improve their knowledge and practices regarding diabetes self-care and proper management

Keywords: Practices, Diabetes, self-care, school' students

Introduction

Childhood is a developmental period in which a series of complex and interrelated developmental tasks are mastered, so it is a critical period of a person's life which brings many changes physically, emotionally, psychologically, or socially that shape one's personality throughout his life. The school age children experience time of slow progressive physical growth, while their social and developmental growth accelerates and increases in complexity. The focus of their world expands from family to teachers, peers, and other outside influences (e.g., coaches, media). Children are exposed to several diseases either acute or chronic diseases, Acute, short-term diseases such as upper respiratory tract or ear infections, gastrointestinal illness with vomiting and diarrhea, and infectious diseases as measles and diphtheria. However, some children are exposed to chronic, long-term diseases which can alter their quality of life⁽¹⁻²⁾

Diabetes mellitus (DM) is a chronic metabolic Condition affecting the child's physical and psychological growth and development. DM can lead to damage, dysfunction, or failure of various organs specially eyes, kidneys, nerves, heart, blood

vessels, etc . Childhood diabetes is rapid in its onset presenting with the classic triad of symptoms: polyuria (excretion of large amount of urine), polydipsia (excessive thirst), and polyphagia (constant hunger). Despite the hunger and increase food intake, the child loses weight. The symptoms can appear insidiously, with fatigue, anorexia, nausea, lethargy, and weakness. The skin becomes dry and vaginal yeast infections may be seen in the adolescent girls.⁽³⁾

Individual with type 1 diabetes requires a supply of insulin from an outside source (exogenous insulin) in order to sustain life. Without insulin, the patient will develop diabetic ketoacidosis; a life threatening condition resulting in metabolic acidosis.⁽⁴⁾

Demographic transition, combined with urbanization and industrialization, has resulted in drastic changes in lifestyles globally. Consequently, lifestyle-related diseases like DM have emerged as major public health problems. Diabetes is characterized by a state of chronic hyperglycemia resulting from several environmental and genetic etiologies acting jointly.⁽⁵⁾

Non-insulin-dependent DM (T₂DM) in children and adolescents is becoming an important public health concern throughout the world.⁽⁶⁾ Although T2DM is widely diagnosed in adults, its frequency has markedly increased in the paediatric age group over the past two decades. Depending on the population studies, T2DM now represents 8–45% of all new cases of diabetes reported among children and adolescents.⁽⁷⁾

Diabetes is one of the most common chronic diseases of childhood after asthma and mental retardation, and it is a major disease that is becoming more prevalent, affecting about 382 million people around the world leading to around 4.8 million deaths every year. Around 80% of the world's diabetic population lives in developing countries. At 2013, More than 79,000 children developed type 1 diabetes worldwide.⁽⁸⁻⁹⁾

Diabetes is a silent disease: many sufferers become aware that they have diabetes only when they develop one of its life-threatening complications. Knowledge of diabetes mellitus can assist in early detection of the disease and reduce the incidence of complications. Levels of knowledge about diabetes among the at-risk population and among those who suffer from the disease are unknown, but more knowledge is associated with better outcomes.⁽¹⁰⁾ The main treatments goal for patients with diabetes is to prevent or minimize the acute or chronic complications and to reduce serious morbidity and mortality and loss of productivity mainly by following the self care.⁽¹¹⁻¹²⁾

Diabetes is requiring a multipronged approach for its management, wherein the patient has an important role to play. The patients are required to follow certain self-care practices in order to achieve an optimal glycemic control and prevent complications such as neuropathy, nephropathy, and retinopathy. These practices include regular physical activity, appropriate dietary practices, daily foot care

practice, compliance with the treatment regimen, and tackling complications such as hypoglycemic episodes.⁽¹³⁾

Self-care is crucial in diabetes to keep the illness under control. Studies propose that as much as 95% of the self-care is usually provided by the ill persons or their families.⁽¹⁴⁻¹⁵⁾ Diabetes self-care activities in children and young adults were very compliant with taking medication but were only moderately compliant to diet and self glucose monitoring and least compliant to exercise. Besides, people affected with the disease often have inadequate knowledge about the nature of diabetes, its risk factors and associated complications. This lack of awareness may be the underlying factor affecting attitudes and practices towards its care.⁽¹⁶⁾

Inadequate diabetic self-management remains a significant problem facing health care providers and populations in all settings. Inadequate self-management has an impact on the patient's morbidity and mortality as well as on an increasing the costs of medication and laboratory tests and cost in time and effort of the care providers. In contrast, patients who have adequate self-management have better outcomes, live longer, enjoy a higher quality of life, and suffer fewer symptoms & minimal complications.⁽¹⁷⁾

In a study conducted in Thailand, 66.7% of the study subjects reported that they had people around to encourage them for controlling DM and 91.1% received DM related information from health professionals. In the study, 88.6% had good knowledge about diabetes and its selected self care activities; 14.2% had negative attitude towards diabetes self care; and 87% had good self care practice. Age, current occupation, years of suffering from DM, having family members suffering from the illness and knowledge about the illness were significantly related to the level of self-care behaviors.⁽¹⁸⁾

Health-care providers and educators should evaluate perceived patient barriers to self-care behaviors and make recommendations with these in mind. Unfortunately, though patients often look to healthcare providers for guidance, many health-care providers are not discussing self-care activities with patients.⁽¹⁹⁾ Health care providers should begin by taking time to evaluate their patients' perceptions and make realistic and specific recommendations for self-care activities. Some patients may experience difficulty in understanding and following the basics of diabetes self-care activities. When adhering to self-care activities patients are sometimes expected to make what would in many cases be a medical decision and many patients are not comfortable or able to make such complex assessments. Furthermore, these requirements or modifications should be specific for each patient and should be altered depending on the patient's response.⁽²⁰⁾

School health nurse is in a strategic position in this specialized health care team because children spend long periods of time in their schools. So she is the cornerstone in all aspect of diabetes management by assessing the child's needs and problems, giving appropriate care, helping diabetic children and their families to cope with diabetes, maintaining normal growth and development, achieving the best possible diabetes control and preventing complications.⁽²¹⁾

From review of the relevant literature, it is evident that, at the national level there are many studies carried out upon diabetic children for several purposes including studies in self care practice of diabetic patients but there are generally limited studies in El- Behaira Governorate. Therefore, **the aim of this study** was to assess the self-care knowledge and practices among diabetic school' students in El-Behaira Governorate.

The research question of this study was:

What are the self-care knowledge and practices among diabetic school' students in El- Behaira Governorate?

MATERIAL AND METHODS

Research Design:

A descriptive research design was conducted to fulfill the aim of the study.

Setting of study:

Data were collected from governmental primary, preparatory and secondary schools in El-Behira governorate.

Subjects of study:

The study was carried out on a sample composed of 300 diabetic school' students aged 9-18 years.

Sample size

Sample size was 300 based on the prevalence of DM ⁽¹⁴⁾ 24% with a precision of 6%, alpha error = 0.05 and design effect = 2, so sample size equal 300 students.

Sampling technique

By using Multistage cluster sampling technique:

- This study was conducted in governmental schools in El-Beheira Governorate, composed of 18 educational administrative departments.
- According to data collected from El-Behira health insurance system in the scholastic year 2013/2014, the highest number of diabetic students in schools' health insurance system were found in three zones:- kafer Eldawar, Damanhour and Kom Hamada .
- Using proportional allocation for selection of students from three mentioned administrative centers from different educational level (primary, preparatory and secondary) .So, the total number of 300 diabetic students were chosen to be included in the sample.

Tool of the study:

Tool (1) Student's clinical data structured questionnaire

It was developed by the researchers after a thorough review of relevant literature and includes **6 parts:-**

- ✚ **Part one:** - students' socio-demographic data includes data about age, gender, educational level and birth order.
- ✚ **Part two:** - it includes data about general characteristics of the studied diabetic students' parents (age-education- occupation) .Socioeconomic level was determined according to the total socioeconomic score modified after the model developed by Fahmy and El Sherbini (1983). ⁽²²⁾

The maximum score for previous indicators was 34 points and it was classified into three levels as follows:

- ☒ High social level $\geq 75\%$ \longrightarrow " ≥ 25 " points.
- ☒ Middle social level $50 - < 75\%$ \longrightarrow "17 - < 25" points.
- ☒ Low social level $< 50\%$ \longrightarrow "< 17" points.

✚ **Part three** :-Diabetic profile of students includes data about :- fasting blood glucose level, duration of diabetes, discovery of the disease, start of medical treatment and associated diseases with diabetes.

✚ **Part four**:- students' knowledge about DM and its management

1- Basic knowledge about diabetes

Definition, normal levels of fasting blood sugar, risk factors for diabetes and diabetes symptoms.

2-Knowledge about diabetes complications

Causes and symptoms of hyperglycaemia and hypoglycaemia, immediate management of hypoglycemia.

3- Knowledge about treatment regimen

Knowledge related to insulin self monitoring of blood glucose level, dietary pattern, physical exercise, foot care and Importance of follow up visits.

Scoring system for assessing knowledge of students consists of 43 items and the correct answers were pre-determined according to the literature review. A score of (2) was given to the correct complete answer, a score of (1) for correct but incomplete answer and a score of (0) for the wrong or missed answers. So, the total knowledge score ranged from 0 - 86 and was classified into: The total Percentage of the total knowledge score was calculated as follows:

Poor knowledge < 43 ($< 50\%$)

Fair $43- < 65$ ($50 - < 75\%$)

Good ≥ 65 ($\geq 75\%$)

✚ **Part five**:- Source of knowledge regarding diabetes.

✚ **Part six**:-self care practices of the diabetic students regarding:-

- ❖ Self monitoring of blood glucose level
- ❖ Dietary habits
- ❖ Physical exercise
- ❖ Foot care.
- ❖ Follow-up care.

Scoring system for assessing students' practices regarding diabetes includes 52 items. The items were scored as follows: A score "1" was given to performed practice, while, score "0" was given to incorrect or never done. The total practice score was obtained for each participant (0-52). The percentage of total practice score was calculated as follows:

Poor practices	<26	(less than 50%),
Fair practices	26-<39	(50-<75%)
Good practice	≥39	(≥75%)

Methods:

- ☒ Before conduction of the study, official letters from the faculty of nursing, university of Damanhur were directed to the responsible health authorities of study settings (Central Agency for Public Mobilization and Statistics CAPMAS, school health insurance and Directorate of Education in El-Behira governorate) to take their permission to conduct the study after explaining its purpose.
- ☒ A permission was obtained from the Directorate of Education in El-Behira governorate to collect data from schools affiliated to the selected units. The school administrator was met by the researchers to gain his cooperation after explaining the purpose of the study.
- ☒ **Data collection:**
 1. Tools of data collection was designed based on recent relevant literature and was tested for its content validity and relevance by a jury which consisted of three academic staff in Community Health Nursing from Alexandria and Damanhour University.
 2. The purpose and the nature of the study were clarified to students, for full cooperation. The researcher was able to interview about 8 – 10 students daily. Each school was visited twice / week. Each sheet took 15-20 minutes to be answered. Data was collected during the academic years 2013 – 2014.
- ☒ **A pilot study** was conducted on a randomly selected sample of 15 students from schools affiliated to the selected units to ascertain the clarity and applicability of the tools .Based on the result, the necessary modifications was made. The tool was tested for reliability by testing and retesting.
- ☒ **Test- retest reliability** was conducted on 10 students and after 10 days the retest was conducted on the same students. Intra class Correlation coefficient (ICC) was: for knowledge $r= 0.701$ and regarding practices $r=0.949$.
- ☒ **Ethical consideration**, each student was interviewed individually after establishing trustful relationship with him to gain his cooperation and confidence. This was attained through explaining the purpose of the study, promising that the collected data will be used only for the purpose of the study and inform them about their voluntary participation in the study. Oral Informed consent was obtained from every student included in the study.

☒ **Statistical analysis:**

After collection of data, they were coded and transferred into especially designed formats to be suitable for computer feeding. Following data entry, checking and verifying processes were carried out to avoid any errors during data entry.

- Data was analyzed using PC with Statistical Package for Social Sciences (SPSS) version 16.0.
- The level of significance selected for this study was 0.05.

The following statistical measures were used:-

A- Descriptive statistics:

Count and percentage: were used for describing and summarizing quantitative data, Arithmetic means Standard deviation (SD) and range: They were used as measures of central tendency and dispersion respectively to summarize quantitative data.

B-Analytical statistics:

Chi square test (X^2): it was used to test the association between categories of qualitative variables.

Results

Table (1) shows the general characteristics of the studied diabetic students. As regards age group, more than one third (35.7%) of the students age ranged from 12 to 15 years followed by 31.3% of the students with age group of 15 – 18 years, with mean age 13.46 ± 2.60 . However, more than half of the studied students (51.7%) were male and 48.3% of them were female.

Regarding the educational level of the sample, 45.3% were enrolled at the preparatory school, while about one third of them (32.3%) were enrolled at the secondary school. However, more than two third of the students (67.3%) were either the first or the second child in their families, followed by more than one fifth of them (22.3%) were the third child in their families. . The table also reveals that the highest percentage of patients (43.3%) was among low socio-economic status followed by 36.3% which belonged to middle and 20.4% to the high socio-economic status.

Table (1):General characteristics of the studied diabetic students.

Characteristic	No. (n=300)	%
Age		
9-	84	28.0
12-	107	35.7
15-	94	31.3
18	15	5.0
Mean \pm SD	13.46 \pm 2.60	
Gender		
Male	155	51.7
Female	145	48.3
Educational level		
Primary	67	22.4
Preparatory	136	45.3
Secondary	97	32.3
Birth order		
First	79	26.3
Second	123	41.0
Third	67	22.3
Fourth or more	31	10.4
Socio-economic status		
Low "< 17 "	130	43.3
Middle "17 - < 25"	109	36.3
High " \geq 25"	61	20.4

General characteristics of the diabetic students' parents are shown in **Table (2)**. It was observed that 59.2% of fathers and 63.6% of mothers' age group ranged from 40-50 years with the mean age 48.60 ± 5.47 and 43.61 ± 4.75 respectively.

As regards education of the parents, it was observed that 37.7% of fathers and 46.1% of mothers were illiterate, followed by 34.9% of fathers and 30.6% of mothers who had completed secondary education. The least percentage was for high education (17.6% of fathers, and 8.8% of mothers).

Concerning parents' occupation, it was observed that nearly half of the fathers (49.1%) were skilled worker, while 30.1% of them worked as employees. On the other hand, the majority of mothers (82.8%) were housewives, while only 10.8% of them worked as employees.

Table (2): General characteristics of the studied diabetic students' parent

Education / occupation	Father		Mother	
	No. (n = 289)*	%	No. (m = 297)**	%
Age				
< 40	6	2.1	66	22.2
40-	171	59.2	189	63.6
50 and more	112	38.7	42	14.2
Mean \pm SD	48.60\pm5.47		43.61\pm4.75	
Education				
Illiterate.	109	37.7	137	46.1
Primary / preparatory	28	9.8	43	14.5
Secondary	101	34.9	91	30.6
High education.	51	17.6	26	8.8
Occupation				
Housewife	0	0.0	246	82.8
Don't work	4	1.4	0	0.0
Skilled worker	142	49.1	13	4.4
Employee	87	30.1	32	10.8
Professional	24	8.3	5	1.7
Private business	14	4.9	1	0.3
Retired	18	6.2	0	0.0

* Dead fathers = 11 (3.7%)

** Dead mother = 3 (1%)

Concerning the diagnostic profile of the students', **table (3)** presents that more than half of the sample (52.3%) had a high level of fasting blood glucose (ranged from 200 mg/dl to 300 mg/dl). Regarding duration of diabetes, it was observed that , less than half of sample (48%) had diabetes from 4 to 8 years . while about three quarters of them (74.7%) discovered their disease through the manifestations of diabetes such as polyuria, polydipsia, and weight loss. 23.7% of them discovered it through occurrence of acute complications of diabetes such as diabetic ketoacidosis. However, the majority of the students started medical treatment immediately after discover it, while, only 4.3% of them delayed the starting of treatment either because they deny the disease as stated by 38.5% of them, or, family negligence as stated by 61.5% of the sample. Moreover, the majority of students had no associated diseases, While, 5.7% had rheumatic arthritis, bronchial asthma, eczema, anemia, or other diseases such as epilepsy, hypothyroidism, irritable colon and renal disease.

Table (3): Distribution of study sample in relation to their Diabetic profile

Profile	No. n=300	%
Fasting blood glucose level		
- < 100	2	0.7
- 100-	108	36.0
- 200-	157	52.3
- 300-	31	10.3
- 400 and more	2	0.7
Mean ± SD	219.73 ±62.37	
Duration of diabetes		
< 1 year	6	2.0
1 year-	120	40.0
4 years-	144	48.0
8 years-	25	8.3
12 years and more	5	1.7
Mean ± SD	4.28 ± 2.94	
Discovery of the disease		
- Manifestations of diabetes.	224	74.7
- Complications of diabetes.	71	23.7
- During check up.	5	1.6
Start of medical treatment		
Immediately	287	95.7
Delay for starting treatment	13	4.3
Reasons for delaying medical treatment:		
Denial of the disease	5	38.5
Family negligence	8	61.5
Associated diseases*		
- No	284	94.6
- Rh. Arthritis	7	2.3
- Bronchial asthma	2	0.7
- Eczema	2	0.7
- Anemia	2	0.7
- Others	4	1.3

* More than one answers

Figure (1) presents the studied sample total score of knowledge about diabetes and its management. More than three quarters (78.7%) of the studied sample had poor knowledge, while more than one fifth (20.7%) of them had fair knowledge and the rest of them (0.7%) had good knowledge.

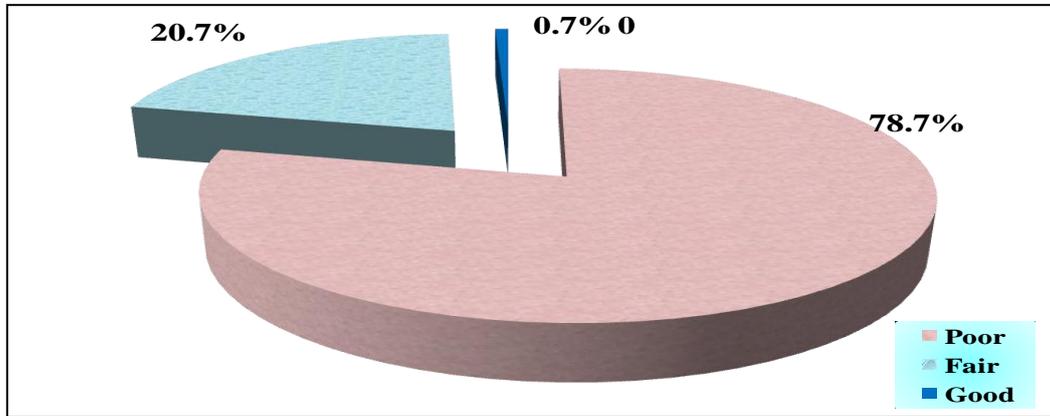


Figure (1) Total score of knowledge about DM and its management among study sample

Figure 2 show the distribution of the studied sample according to the source of knowledge about diabetes mellitus. The highest percentage of patients mentioned physicians and nurses as the source of knowledge (61.3%), followed by mass media (49.5%), friends (45.8%) and only 9.5% mentioned other patients with a statistically significant difference between both sexes ($p < 0.05$).

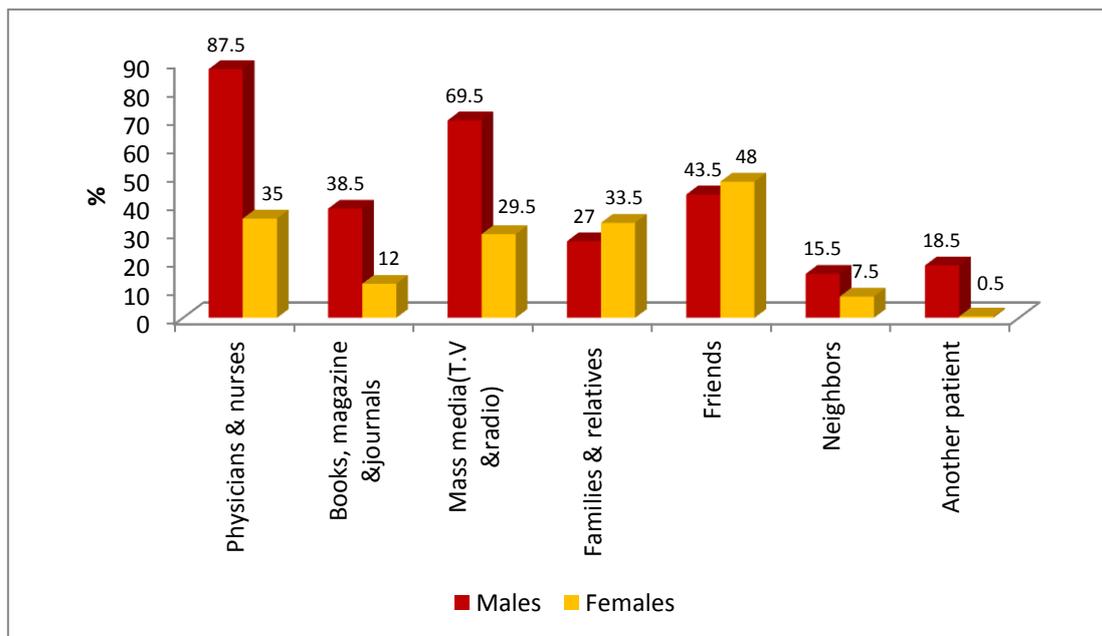


Figure (2): Distribution of the studied sample according to the source of knowledge about diabetes mellitus

Regarding Self- care practices of the diabetic students in different areas of diabetics' regimen, **Table (4)** presents the correct self care practices related to self monitoring of blood glucose level, insulin therapy, and practices during hyper and hypoglycemia.

Concerning self monitoring of urine glucose level, this table shows that more than one fifth of the sample (22.3%) analyzed urine for glucose correctly. However, 7.7% of the sample analyzed it at the correct time. Only 19.7% interpreted correctly the results of urine analysis. On the other hand, 20.7% of students perform self monitoring of blood glucose at home, while, 20.3% and 20.0% measured it at the correct time and could interpreted the results respectively. But very few students (0.7%) monitor blood glucose level at regular time.

Regarding the correct practice of insulin therapy regimen, it was observed that more than one quarter of the studied students (28.7%) inject themselves at regular times. However, the majority of the sample (81.3%, 99.3%) had correct injection techniques and correct timing. However, only 11.0% of those students had correct period between insulin injection and intake of food.

Concerning the correct practices of health-care measures during hyperglycemia, it was observed that the majority of the sample (94.0%) followed correct self care practices during hyperglycemia. While, the majority of students (95.0%) were eating correctly in case of hypoglycemia. However, the identification card was kept by only 11.3% of the students, whereas, 88.7% of them always keep pieces of sweet in their pocket.

Table (4): Correct self care practices of the studied diabetic students related to self monitoring of urine and blood glucose level, Insulin injection, and during hyper /hypoglycemia.

Correct self-care practices	No. n=300	%
<u>Self monitoring of urine glucose level:</u>		
- Urine analysis for glucose	67	22.3
- Time of urine analysis	23	7.7
- Interpretation of the results of urine analysis	59	19.7
<u>Self monitoring of blood glucose level:</u>		
- Self monitoring of blood glucose at home	62	20.7
- Regular monitoring of blood glucose	2	0.7
- Time of blood glucose test	61	20.3
- Interpretation of the results	60	20.0
<u>Insulin therapy regimen:</u>		
- Practice of injection techniques.	244	81.3
- Inject insulin regularly	86	28.7
-Timing of insulin intake -	298	99.3
- Period between insulin administration and intake of food	33	11.0
<u>Practices during hyperglycemia:</u>		
-Self care practices during hyperglycemia	282	94.0

Practices during hypoglycemia		
-Self care practices during hypoglycemia	285	95.0
- keeping Identification card	34	11.3
- Keeping sweet piece	266	88.7

Table (5) illustrates the correct self-care practices of the studied diabetic students related to their dietary habits. As regards meal planning, nearly three quarters of the students (74.3%) planned their meal correctly according to the physician's prescription, based on the results of blood glucose test, and or their degree of physical activity. More than three quarters of the students (76.7%) took proper snacks such as vegetables, fruits and sandwich. Moreover, 45.7% of them had correct numbers of meals. However, more than one quarter of the students (29.7%) were able to adjust their food intake according to the insulin dosage.

Concerning the student's practices of weight control, the table also shows that 38.7% of the students weighed themselves regularly (weekly or monthly). In case of weight change, 28.3% of them mentioned correct practices as following their diet regimen, consulting physician or increasing their daily physical activity. The majority of the students (87.0%) had some regularity in their meals.

This table also shows that less than half of the students (42.3%) were completely adherent to the therapeutic dietary regimen, which includes all the food groups with the required amount as decided by the physician. However, more than one fifth of the sample (23.0%) did not adhere to any dietary regimen.

Table (5): Correct self-care practices of the studied diabetic students related to their dietary habits/behaviors

Correct practices	No. (n=300)	%
Meal planning	223	74.3
Intake of snacks	230	76.7
Number of daily meals	137	45.7
Adjust of food intake according to insulin dosage	89	29.7
Weight Control		
Regular weighing	116	38.7
Action taking in case of weight changes	85	28.3
Regularity of meals		
- Often	33	11.0
- Sometimes	261	87.0
- Never	6	2.0
Adherence to therapeutic dietary regimen		
- Complete adherence	127	42.3
- Partial adherence	104	34.7
- No adherence	69	23.0

Correct self care practices of the diabetic students regarding physical exercise and related behaviors are illustrated in **table (6)**. The majority of the students (85.0%) adhered to certain types of physical exercise such as (football ball, walking, aerobics,...etc) However, 39.7% of those who were practicing physical exercise do it regularly. More than half of the students (56.7%) were practicing physical exercise after meals. While, more than one third of them (35.3%) were practicing exercise gradually, and nearly two thirds of them (65.%) had snacks before starting exercise. Also, only 6.7% of them were

monitoring their blood glucose level before, during and after practicing physical exercise. 16.3% of them took their insulin injection before practicing exercise. Only, 3.3% and 5.3% of the students were changing sites of insulin injection according to the type of physical exercise and adjust the dose of insulin according to the type of exercise they practice respectively. However, more than half of the students (58.3%) did not practice physical exercise when their blood glucose level is more than 250mg/dl.

Table (6): Correct self care practices of the studied diabetic students regarding physical exercise and related behaviors.

Correct Practices	No. (n=300)	%
Adherence to certain physical exercise	255	85.0
Regular practicing of physical exercise	119	39.7
Correct time of practicing physical exercise in relation to meals	130	56.7
Practicing physical exercise gradually	106	35.3
Intake of snacks before starting physical exercise	195	65.0
Monitoring blood glucose level before during and after practicing exercise	20	6.7
Intake of insulin injection before practicing exercise	49	16.3
Change sites of insulin according to the type of exercise	10	3.3
Adjust the dose of insulin according to the type of exercise	16	5.3
Avoidance of practicing physical exercise when blood glucose level is more than 250 mg /dl with presence of urine ketones	175	58.3

Figure (3) shows correct practice of foot care of the studied diabetic students. It was observed that the majority of the sample (93.0%) cleaned their foot correctly and frequently. While, regular examination of the foot was done by only 42.7% of the students. More than three quarters of them (76.7%) dried their foot and between toes correctly. 79.0% of them cut the toes nails correctly. The majority of them (98.0%) wore proper socks. More than three quarters of them (67.7%) wore proper shoes. Warming of feet at winter was done correctly by only about one tenth (11.0%) of the sample, while only 22.3% of them examined their shoes carefully before wearing it. Less than one third of the students (30.7%) wore slippers at home.

Regarding the wound care of the foot, it was observed that the majority of the students (98.0%) practiced it correctly as they went to the physician or used sterile dressing. 78.7% of them took correct actions to treat dried skin of the foot as they put lubricant cream or went to the physician if needed, while, slightly more than one third

of the sample (34.0%) were treated calloosing and fissure in the skin of the foot correctly.

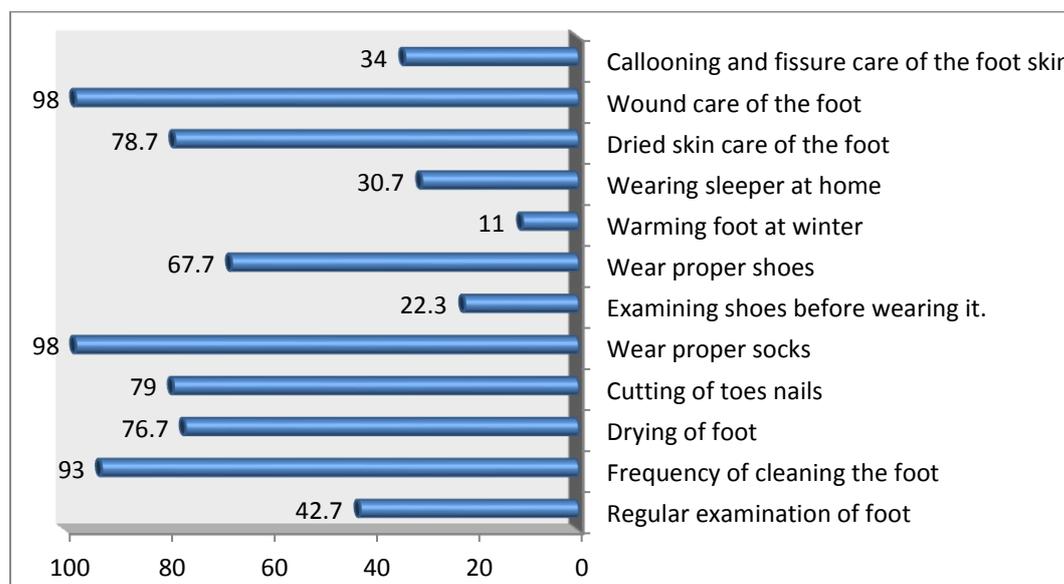


Figure (3): Correct practices of the studied sample regarding foot care.

Table (7) presents the follow up care of the diabetic students. It was observed that all the studied students had physical examination, fasting blood glucose monitoring and urine test for glucose and acetone as a routine of the clinic activities. But, the glycated hemoglobin test (HbA1c) was done for only 26.7% of the sample according to the availability of the test at the clinic. However, 91.3% of the students had follow up on a regular basis, while 8.7% of them had irregular follow up because some of them feel that there is no need for follow up (65.4%). Also, 19.2% had excessive school duties which delayed their follow up, or their family was negligent and no one could accompany them to the clinic (15.4%).

Table (7): Follow-up care of the studied diabetic students.

Care	No. (n=300)	%
Follow up activities		
- Physical examination	300	100
- Fasting blood glucose monitoring	300	100
- Urine test	300	100
- Glycated hemoglobin(HbA1c)	80	26.7
- Other lab. Investigation*	4	1.3
- Optical care	40	13.3
- Dental care	86	28.7
Regularity of follow up		
- Regular	274	91.3
- Irregular	26	8.7
<i>Reasons of irregularity of follow-up care:</i>		
✚ No need for follow up	17	65.4
✚ Excessive school duties	5	19.2
✚ Family neglect	4	15.4

*Other investigations: lipid level, blood urea, creatinine, uric acid, and microalbuminurea test

Table (8) illustrates self care practices of the diabetic students in relation to their age. The table shows that the total practices' scores were fair or poor among all age groups of the sample. It was observed that young age had fair practices in comparison with old age. The total score gained by students with the age group of 9-12 years and 12-15 years (40.5% and 41.1% respectively) were more than the total score gained by students with the age group of 18 years or more (33.3%).

Concerning self insulin injection techniques, the table shows that 46.7% of the students with the age group of 18 years or more had good practices as compared to nearly one third of the students (31.8% and 31.0%) with the age group of 12-15 years and 9-12 years respectively. Regarding the practices during hyper or hypoglycemia, most of the student's practices were good in the age group from 9-12 years (88.1%), followed by the age group of 15-18 years (81.9%) and the age group of 12-15 years (80.4%). The table also shows that all students had poor practices regarding self urine and blood glucose monitoring, even those who in age group of 18 years and more.

The result shows that poor practices of dietary regimen were observed among 29.8% of students with age group of 9-12 years. This percentage increased to reach 46.7% among students with age group of 18 years and more. While fair physical exercise practices were done by the majority of the students (93.3%) with age group of 18 years and more, while only 14.3% of the students with age group of 9-12 years had fair practices. This denotes that practices of physical exercise increase with age increase. On the other hand, good practices of foot care were observed among 13.1% of the students with the age group of 9-12 years and 7.5% of the students with the age group of 12-15 years. Whoever, none of the student with the age group of 18 years and more had good foot care practices. Regarding the follow up care, most of the students (77.4%) with the age group of 9-12 years had poor practices. This percentage decreased to reach 66.7% among students with the age group of 18 years and more. However, the results revealed that there was a statistically significant difference between students age and their practices concerning self insulin injection techniques, practices during hyper or hypoglycemia, and dietary regimen.

Table (8): Self care practices' scores of the studied diabetic students in relation to their age.

Practices	Students Ages								X ²
	9-		12-		15-		18+		
	No. n = 84	%	No. n = 107	%	No. n = 94	%	No. n = 15	%	
Insulin injection techniques									
- Good	26	31.0	34	31.8	23	24.4	7	46.7	37.050 (0.001)*
- Fair	31	36.9	66	61.7	62	66.0	8	53.3	
- Poor	27	32.1	7	6.5	9	9.6	0	0.0	
Practices during hyper or hypoglycemia									
-Good	74	88.1	86	80.4	77	81.9	11	73.3	#13.407 (0.001)*
- Fair	9	10.7	16	15.0	17	18.1	2	13.4	
- Poor	1	1.2	5	4.6	0	0.0	2	13.3	
Self glucose monitoring									
- Good	4	4.8	4	3.7	1	1.1	0	0.0	#6.972 (0.5138)
- Fair	4	4.8	3	2.8	8	8.5	0	0.0	
- Poor	76	90.4	100	93.5	85	90.4	15	100.0	
Dietary regimen									
- Good	21	25.0	10	9.3	6	6.4	1	6.7	17.255 (0.0460)*
- Fair	38	45.2	60	56.1	54	57.4	7	46.6	
- Poor	25	29.8	37	34.6	34	36.2	7	46.7	
Physical exercise									
- Fair	12	14.3	19	17.8	74	78.7	14	93.3	2.769 (0.5138)
- Poor	72	85.7	88	82.2	20	21.3	1	6.7	
Foot care									
- Good	11	13.1	8	7.5	6	6.4	0	0.0	11.678 (0.577)
- Fair	44	52.4	66	61.7	67	71.3	13	86.7	
- Poor	29	34.5	33	30.8	21	22.3	2	13.3	
Follow up care									
- Good	7	8.3	10	9.3	12	12.8	2	13.3	7.880 (0.4807)
- Fair	12	14.3	29	27.1	14	14.9	3	20.0	
- Poor	65	77.4	68	63.6	68	72.3	10	66.7	
Total practices' score									
- Fair	34	40.5	44	41.1	36	38.3	5	33.3	0.442 (0.1143)
- Poor	50	59.5	63	58.9	58	61.7	10	66.7	

* Significant at 0.05 level. #MCP : Monte karlo test

Table (9) presents self care practices of the diabetic students in relation to their gender. It was observed that more than one third (33.8%) of the female students had good practice of insulin injection techniques as compared to about one quarter (26.5%) of the male students. But the majority of the students either male or female (83.9% and 81.4% respectively) had good practice during hyper or hypoglycemia. However, the majority of those students either male or female (92.3% and 91.7% respectively) had poor practice regarding self glucose monitoring either in urine or blood.

As regards the dietary regimen, male and female students who had fair practices were nearly equal. The same for students who had good practice (12.9% and 12.4% respectively). 22.8% of the female students had fair physical exercise practices, compared to 12.3% of male students. The majority of the male students (87.7%) had poor practices of physical exercise compared to 77.2% of female students.

Concerning the practice of foot care, 34.5% of female students practiced it poorly, as compared to 22.6% of male students. However, more than two third of the male students (67.7%) and nearly three quarters of the female students (73.1%) had poor practices of follow up care. Regarding the total self care practices' score, the table shows that more than half of the male students (57.4%) and 63.4% of female students had poor practice. However, there was a significant difference between students' gender and their practices of physical exercise and foot care ($X^2 = 5.764$ and 6.909 $P < 0.05$) respectively.

Table (9):Self care practices' scores of the studied diabetic students in relation to their gender.

Practices	Gender				X ²
	Male		Female		
	No. n = 155	%	No. n = 145	%	
Insulin injection techniques					
- Good	41	26.5	49	33.8	1.973 (0.4807)
- Fair	90	58.1	77	53.1	
- Poor	24	15.4	19	13.1	
Practices during hyper or hypoglycemia					
- Good	130	83.9	118	81.4	0.338 (0.577)
- Fair	21	13.5	23	15.8	
- Poor	4	2.6	4	2.8	
Self glucose monitoring					
- Good	4	2.6	5	3.4	0.206 0.5138
- Fair	8	5.1	7	4.9	
- Poor	143	92.3	133	91.7	
Dietary regimen					
- Good	20	12.9	18	12.4	0.621 0.356
- Fair	85	54.8	74	51.0	
- Poor	50	32.3	53	36.6	
Physical exercise					
- Fair	19	12.3	33	22.8	5.764 (0.001)*
- Poor	136	87.7	112	77.2	
Foot care					
- Good	17	11.0	8	5.5	6.909 (0.001)*
- Fair	103	66.4	87	60.0	
- Poor	35	22.6	50	34.5	
Follow up care					
- Good	13	8.4	18	12.4	4.897 (0.465)
- Fair	37	23.9	21	14.5	
- Poor	105	67.7	106	73.1	
Total practices' score					
- Fair	66	42.6	53	36.6	1.137 (0.633)
- Poor	89	57.4	92	63.4	

* Significant at 0.05 level.

Table (10) illustrates self care practices of the diabetic students in relation to their knowledge about different areas of diabetes regimen. The results revealed that a significant difference was found between students' knowledge and their self care practices in all areas of diabetes regimen except practice of self glucose monitoring ($X^2 = 44.360, 66.693, 66.938, 13.189, 15.337, 32.109$ and 53.553 $P < 0.05$) respectively. It was observed that 43.7% of the students who had good knowledge had good practices regarding self-insulin injection techniques, while 89.6% of the students who had good knowledge regarding self blood glucose monitoring had poor practice compared to 93.7% of the students who had fair knowledge and (100%) who had poor knowledge. Concerning dietary regimen, nearly two third of the students (64.4%) who had good knowledge had fair practices regarding dietary regimen followed by 44.3% of the students who had fair knowledge and 28.6% of the students who had poor

knowledge. On the other hand, the highest percentage of the students who had poor knowledge (71.4%) had poor practices concerning dietary regimen.

However, 25.9% of the students who had good knowledge about physical exercise had fair practice of physical exercises. The table also shows that 71.9% of the students who had good knowledge had fair practices of foot care. As regards follow up care, all the students (100%) who had poor knowledge had poor practices' of follow up care. This percentage decreased to 82.9% of the students who had fair knowledge and 54.0% of the students who had good knowledge.

Regarding total scores of practice, it was observed that none of the sample had good practice. However, 62.2% of the students who had good knowledge had fair level of total self care practices score.

Table (10):Self care practices' scores of the studied diabetic students in relation to their knowledge about different areas of diabetes regimen.

Practice	Knowledge						X ²
	Poor		Fair		Good		
	No. n = 7	%	No. n=158	%	No. n = 135	%	
Insulin injection techniques							
- Good	1	14.3	30	19.0	59	43.7	44.360 (0.0001)*
- Fair	1	14.3	98	62.0	68	50.4	
- Poor	5	71.4	30	19.0	8	5.9	
Practices during hyper or hypoglycemia							
- Good	3	42.9	117	74.1	128	94.8	66.693 (0.0001)*
- Fair	1	14.2	36	22.7	7	5.2	
- Poor	3	42.9	5	3.2	0	0.0	
Self glucose monitoring							
- Good	0	0.0	4	2.5	5	3.7	2.284 (0.4807)
- Fair	0	0.0	6	3.8	9	6.7	
- Poor	7	100.0	148	93.7	121	89.6	
Dietary regimen							
- Good	0	0.0	6	3.8	32	23.7	66.938 (0.0001)*
- Fair	2	28.6	70	44.3	87	64.4	
- Poor	5	71.4	82	51.9	16	11.9	
Physical exercise							
- Fair	0	0.0	17	10.8	35	25.9	13.189 (0.0001)*
- Poor	7	100.0	141	89.2	100	74.1	
Foot care							
- Good	0	0.0	11	7.0	14	10.3	15.337 (0.0001)*
- Fair	3	42.9	90	57.0	97	71.9	
- Poor	4	57.1	57	36.0	24	17.8	
Follow up care							
- Good	0	0.0	10	6.3	21	15.6	32.109 (0.0001)*
- Fair	0	0.0	17	10.8	41	30.4	
- Poor	7	100.0	131	82.9	73	54.0	
Total practices'score							
- Fair	0	0.0	35	22.2	84	62.2	53.553 (0.0001)*
- Poor	7	100.0	123	77.8	51	37.8	

* Significant at 0.05 level.

Table (11) shows the parents' education in relation to self-care practices' scores of the diabetic students. As regards fathers' educational level, the result shows that more than half of the students' fathers who had high education (52.9%) had fair self-care practices, while, 70.6% and 71.4% of the students' fathers who were illiterate or had primary or preparatory education had poor self-care practices respectively.

Concerning mothers' educational level, it was observed that nearly two third of the students' mothers who had high education (61.5%) had fair self care practices. However, more than two third of the students' mothers who were illiterate (67.2%) had poor self care practices. A significant difference was found between students' self care practices and their fathers' and mothers' education ($X^2 = 13.260$ and 9.864 $P < 0.05$ respectively).

Table (11): Parents' education in relation to self care practices' scores of the studied diabetic students

Self care Practices	Fathers' Educational Level								Mothers' Educational Level							
	Illiterate		Primary or preparatory		Secondary		High education		Illiterate		Primary or preparatory		Secondary		High education	
	No. n = 109	%	No. n = 28	%	No. n = 101	%	No. n = 51	%	No. n = 109	%	No. n = 28	%	No. n = 101	%	No. n = 51	%
Fair	32	29.4	8	28.6	49	48.5	27	52.9	45	32.8	15	34.9	42	46.2	16	61.5
Poor	77	70.6	20	71.4	52	51.5	24	47.1	92	67.2	28	65.1	49	53.8	10	38.5
X^2	13.260 (0.0001)*								9.864 (0.0001)*							

* Significant at 0.05 level.

Discussion

Due to the ongoing increase in the prevalence of diabetes mellitus (DM) in Egypt, diabetes has become a national problem and a real burden. Egypt is ranked the 9th in the global prevalence of DM with 7.5 million patients in 2014 and on expected fear of duplication of these rates to reach 14 million in 2035. It was also reported that 16% of Egyptians above 20 years of age have DM, 8% are borderline and 25% are at risk for complications. ⁽²³⁾

Self-care management is a dynamic mean for maintaining health. It is a behavior to promote health, prevent illness, treat and cope with health problems. Moreover, it comprises those activities performed independently by the individual to

promote and maintain personal well-being throughout life. The effective management of chronic illnesses, as diabetes mellitus is a complex task that touches nearly every important aspect of daily life. It requires significant participation by patients and their families. ⁽²⁴⁻²⁵⁾

The present study was grounded on the research question that diabetic school students encounter low levels of self care. It was done with the aim to assess the self-care practices among diabetic school' students in El- Behaira Governorate. The study was conducted to highlight the diabetic students' /needs knowledge about diabetes along with self care practices. The results of this study should aid parents, teachers, health professionals and care givers to pay special attention to diabetic students that help them have normal life as their mates.

In the present study the age group of the studied students ranged from 9-18 years with the mean age 13.46 ± 2.60 . As regards gender, more than half of diabetic students were males. This result is in line with an epidemiological study of diabetes made in Egypt which found that the gender distribution is 1:1 male to female ratio. ⁽²⁶⁾ Also this result agreed with Abd El-Ghaffar (2003) ⁽²⁷⁾ who found that more than half of the students were males.

The present study revealed that fathers and mothers education had significant impact on self care practices of their diabetic students. This may be referred to the relation between the educational level, which increases the background information and awareness of the family about diabetes and its management, which improves self-care practices. This result partially disagrees with the study done in India (2009) ⁽²⁸⁾ and the UAE (2013) ⁽²⁹⁾ which found that the high educational level of fathers was only associated with better self-care practices while the mother's educational level was not significant predictor of self care of diabetic students; this association can be explained by that the father's educational level was a proxy for income, whereas the mother's educational level was not. Thus, those families with more financial resources may have been more able to furnish the necessary diabetes supplies for blood glucose monitoring and intensive insulin therapy

Glucose levels are "vital signs" to individuals with diabetes. It is important to consistently maintain blood sugar levels within a normal range to help avoid the short and long term complications of diabetes. Day –to-day blood sugar highs and lows prevent people from feeling their best, and make it hard to concentrate and function normally. ⁽³⁰⁾ It was observed from the present study that only few of the patients had normal fasting blood glucose level which mainly reflects the low compliance of patients with the prescribed diabetes regimen. This in accordance with the findings obtained in a study conducted on 103 diabetic patients in Egypt (2011) ⁽³¹⁾ which reported that only 17.5% of the sample had normal glucose level and higher rates were reported in another study performed on 100 diabetic patients (2014) ⁽³²⁾ in India which reported that 40% of participants had their blood glucose under control.

Studies from both developed and developing countries have reported that diabetes knowledge is generally poor among diabetic patients. Improving patients' knowledge about diabetes self-care practices allows them to better contribute to their care and is a small investment with a large benefit. ⁽³³⁻³⁴⁾ Results of the present study demonstrated that the highest percentage of patients had poor knowledge about diabetes mellitus. These results were in agreement with those obtained in other studies performed among diabetic patients attending the diabetes clinic in Nepal (2008) ⁽³⁵⁾ and Ethiopia (2014) ⁽³⁶⁾ which demonstrated that they had poor knowledge. This is in contrast with the findings obtained in a study conducted among patients with type 2 diabetes mellitus attending the diabetes clinic in a teaching hospital in India (2012) ⁽³⁷⁾ which reported that most of the patients had good knowledge. This may be attributed to the unavailability of health education classes for diabetic students about diabetes and its management either in their schools or in the health insurance clinics in which they are registered in El-Behira governorate. Thus, the present study draws the attention to the great importance and need for increasing students knowledge about diabetes through health education.

Regarding the source of knowledge, the present study shows that the highest percentage of patients mentioned physicians and nurses as the source of knowledge (61.3%) followed by mass media (T.V and radio) 49.5% and friends (45.5%) .In concordance with this finding, a study conducted in United Arab Emirates (2013) ⁽²⁹⁾

Diet is the backbone of any treatment plan for diabetes mellitus. Without effective dietary intervention, good metabolic control usually cannot be achieved. Diet related issues are complex, requiring that behavioral, functional, cognitive, and socioeconomic aspects should be considered. ⁽³⁸⁾

The current study shows that less than three quarters of the patients had planned their meal correctly according to the physician' prescription , based on the results of blood glucose test, and or their degree of physical activity. But, more than one fifth of the sample did not adhere to any dietary regimen which included all the food groups with the required amount as decided by the physician. This poor dietary regimen adherence could be related to poor dietary knowledge among students. This is in agreement with a study about the self-care practices of Chinese diabetic individuals in (2013) ⁽³⁹⁾ which reported that due to the poor knowledge, these individuals are likely to have less of the self-care practices on diet and exercise. This is in distinction with study in the UAE (2013) ⁽²⁹⁾ which reported that 72.3% of patients highly complied with their prescribed diet.

The corner stone of diabetes mellitus management is the use of medication. More than one quarter of the patients inject themselves insulin at regular times. However, only 11.0% of those students had correct period between insulin injection and intake of food. This result is in contradiction with other studies which reported a good compliance with medication treatment. ⁽²⁸⁻³²⁾ The reasons for poor or fair practices of treatment regimen could be attributed to high-out of pocket medication

costs, that are higher among diabetic patients with chronic illnesses. This represents a significant barrier to adherence to prescribed medication regimens

Monitoring of glycemic status, as performed by patients and health care providers is considered a critical component of treatment regimen for individuals with type 1 or type 2 DM. ⁽⁴⁰⁾ Within only a few years, self-monitoring of blood glucose (SMBG) have revolutionized management of diabetes by allowing patients to monitor glycemic responses to their diet, activity, oral medications and insulin therapy. ⁽⁴¹⁾ The present study showed that the majority of the sample had poor practices of self monitoring of blood glucose at home. This was in agreement with the study performed on diabetic patients in India (2014) ⁽³²⁾ which found that 16% of the patients had good practices of blood glucose monitoring. On the other hand, a cross sectional study on rural community diabetics in ElMinia (2011) ⁽⁴²⁾ reported good monitoring glycemic control where nearly three quarters of the studied sample performed glucose self-monitoring. Non adherence to SMBG may be due to cost of testing, inadequate understanding by patients about the health benefits and proper use of self monitoring blood glucose results, in addition to patients' psychological and physical discomfort associated with finger prick for blood sampling and complexity of the technique.

Exercise is extremely important in the management of diabetes because of its effects on lowering blood glucose and reducing cardiovascular risk factors. ⁽⁴³⁾ Despite the proved benefits of physical exercise for treatment and control of diabetes, the present study reveals that about less than two thirds of the diabetic students had poor physical exercise. This could be because of having inadequate knowledge in terms of benefits of regular physical exercise. In contrast, a study done in England among type 1 diabetic 18-24 years old documented that 80% of the patients claimed to be taking regular exercise. ⁽⁴⁴⁾ Also, other studies revealed poor practices in this particular aspect of diabetes management. ⁽⁴⁵⁻⁴⁶⁾ This variation could be due to difference in sample age, culture, concepts and social environment.

The feet of diabetic patients merit special attention. It is extremely important that persons with diabetes should carry out hygienic measures for prevention of skin infection daily with emphasis on foot care. ⁽⁴⁷⁾ Surprisingly, it was noticed that although about half of students had poor knowledge about foot care the highest percentage of them mentioned that they had good foot care practices except some items as warming foot at winter, examining shoes before wearing it, wearing slippers at home and callooning care of foot skin. This goes with the study performed on diabetic patients attending outpatient clinic (2014) ⁽³²⁾ which found that foot care was done by 82% of the patients. On the other hand, a cross-sectional study carried out on patients diagnosed with type I and II diabetes in Nigeria (2011) ⁽⁴⁸⁾ reported that only 10.2% of the patients had good practice of diabetic foot care.

For a good oral health status, oral hygiene and regular dental checkups are needed. High blood sugar increases the risk for tooth and gum problems, thus daily home care and regular check-up can prevent these problems. ⁽⁴⁹⁾ The present study

shows that 28.7% of students stated that they had dental self-care practices. This result goes in line with a study done in Oman (2008) ⁽⁵⁰⁾ which found that less than one third of the patients had good oral care to avoid complications of diabetes.

In the present work, it was noticed that 11.3% of patients always kept the diabetic identification card with them. However, the study performed on a group of diabetic patients in India (2014) ⁽³²⁾ reported that only 3% of patients used the diabetic identification card. In addition, in the present study only 38.7% of the sample monitored their weight regularly. This is similar to a study carried out on adult diabetic patients in Alexandria (2001) ⁽⁵¹⁾ which found that 37.7% of patients monitored their weight regularly.

Concerning the relation between self-care practices and the general characteristics of diabetic students, the present study reveals that the total practices' scores were fair or poor among all age groups of the sample, it was observed that young age had fair practices in comparison with old age. This may be due to the fact younger patients are more careful about their health than older ones as their fear of complications and disability of the disease may disturb their life. Regarding the relation between gender and total self care practices' score, the current study shows that more than half of male students and about two third of female students had poor practice. It might be explained by the cultural sex discrimination in the developing countries specially the rural areas in which the present study was conducted. On the other hand, the study carried out in outpatient diabetes clinic in the UAE (2013) ⁽²⁹⁾ reported that there were no statistically significant association between patients' practice score and family history of DM, sex, age and socioeconomic level.

Concerning the relation between the level of students' knowledge and their practice, the present results reveals a direct relationship between the level of knowledge about diabetes and practice as that none of the sample had good practice. However, 62.2% of the students who had good knowledge had fair level of total self care practices score. These findings were in agreement with several studies which found that knowledge and practices were interrelated. ⁽⁵²⁻⁵³⁾

The results of the present study draw attention to the importance of gaining adequate understanding of patient's knowledge which will continue to be an important foundational procedure in designing appropriate interventions for this vulnerable group. Patients who are more self aware about the disease, who have more knowledge and who are regularly involved in self-care practices, achieve better management of the disease. Health education programs proposed should be tailored and individualized to the needs of patients. They should be attainable and the patient's should be involved in decision-making, monitoring and evaluation all of which are likely to increase compliance.

Conclusion:

Management of diabetes mellitus is multifaceted and multidisciplinary. Moreover, improving clinical outcomes in diabetes requires that the patient should undertake and sustain a complex selection of self care behaviors including taking medication, monitoring blood glucose levels, following any diet regimen, engaging

in regular exercises, and caring for the feet. Moreover, effective management of diabetes requires significant participation of the patients, their families and other healthcare team.

Based on the results of the present study, it is recommended that:-

Periodic national estimation of the prevalence of diabetes among children is highly required to determine the magnitude of the problem. Mass media dissemination of accurate information about juvenile diabetes as classical manifestations, risk factors, short and long term complications and its therapeutic management should be provided. Accurate surveillance system and documentation of diabetic students in their affiliated health insurance record by name, age, scholastic year address should be set to be easily accessible for any researcher to provide body of knowledge to improve their self care practices

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