Nurse's knowledge and awareness regarding insulin therapy for diabetic patients in the emergency department at al diwaniyah teaching hospital

Sabri Shather Hadi[1*], Haider.Kadhum Aljebore[2], Aqeel Abd Al-Hamza Marhoon[3]

[1]*Adult Nursing, College of Nursing, Al-Qadisiyah University, Al-Diwaniyah, Iraq.*

[2]*Community Health Nursing, College of Nursing, Al-Qadisiyah University, Al-Diwaniyah, Iraq.*

[3]*Pediatric nursing, College of Nursing, Al-Qadisiyah University, Al-Diwaniyah, Iraq.*

[*]**Corresponding Author**
Sabri Shather Hadi, Adult Nursing, College of Nursing, Al-Qadisiyah University, Al-Diwaniyah, Iraq.

Submitted: 15 July 2023; **Accepted**: 20 July 2023; **Published**: 01 Aug 2023

Abstract

Background: Diabetes Mellitus has affected humans for many decades, and the descriptions of it are amazing important, which it's incidence is rising abruptly worldwide, Nowadays, the introduction of new insulin formulations and a new emphasis on tight blood glucose control make inpatient diabetes treatment has become more complicated, and it requires very careful monitoring by the nursing staff, while expanding their knowledge and practical skills to prevent dangerous side effects when giving insulin to patients.

Objectives: The study aims to assess the nurse's knowledge and awareness regarding Insulin Therapy for Diabetic Patients in the emergency department at Al Diwaniyah Teaching Hospital, and finding the association between demographic data which as the gender, educational level, years of experiences in the emergency department, and training course and their level of nurse's knowledge.

Materials and Methods: Descriptive study has been carried out to assess the nurse's knowledge and awareness regarding insulin therapy for diabetic patients in the emergency department at Al Diwaniyah Teaching Hospital for the period from 16 of January 2022 to 10 July of 2022. A purposive sample of (50) nurses who work in the emergency department at Al Diwaniyah Teaching Hospital. A questionnaire format was constructed to assess the knowledge of nurses about insulin therapy for diabetic Patients in the emergency department at Al Diwaniyah Teaching Hospital.The questionnaire was divide to two main parts:

First Part: Demographic data of the sample include (Age, Gender, Educational level, Duration of work as a nurse, Years of experiences and training courses regarding management of diabetic patients and insulin therapy.

Second Part: This part include 18 multiple questions to assess the knowledge of nurses and awareness about insulin therapy for diabetic Patients in the emergency department at Al Diwaniyah Teaching Hospital.

Results: Results of the study shows the highest of nurses' knowledge items are (Moderate). While (Bad) was the main nurses' knowledge regarding to store insulin and perform a physical assessment to establish a baseline before beginning therapy. The majority of nurses 77.8% of nurses' knowledge have Moderate, while 11.1% of them have Bad and 11.1% of them have (Good) regarding to overall Assessment of nurses' knowledge, there are a highly association between education level, and years of experience about management of diabetic Patients undergoing insulin therapy in the emergency department.

Conclusion: The study concluded that the highest of nurses' knowledge items are (Moderate). While (Bad) was the main nurses' knowledge regarding to store insulin and perform a physical assessment to establish a baseline before beginning therapy. Also there are a highly association between level of education, and years of experience about insulin therapy for diabetic patients in the emergency department and their efficacy of nurses' knowledge.

Recommendations: Increasing the knowledge and awareness of nursing staff concerning insulin therapy for diabetic patients by improving training courses. Also establishing education programs to improve nurses' knowledge and awareness toward the newest issues related to insulin therapy in the emergency department.

Introduction

The term diabetes mellitus (DM) describes a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. The effects of diabetes mellitus include dysfunction and failure of several organs, DM may causes obvious symptoms such as thirst, polyuria, blurring of vision, and weight loss, in severe status, ketoacidosis may develop and lead to stupor, coma and, in absence of effective treatment developed to death [1]. The long-term effects of diabetes mellitus include progressive development of the specific complications of retinopathy with potential blindness, nephropathy that may lead to renal failure, and/or neuropathy with risk of foot ulcers, amputation, Charcot joints, and features of autonomic dysfunction, including sexual dysfunction. People with diabetes are at increased risk of cardiovascular, peripheral vascular and cerebrovascular disease [2]. Insulin therapy is a cornerstone of treatment in type 1 diabetes and many cases, also critical to the management of type 2 diabetes, despite evidence documenting the benefits of insulin therapy in achieving glycemic control and reducing risk of long-term diabetes complications, insulin therapy remains underutilized, 29% of adults with diabetes in the United States using insulin, this under use reflects numerous barriers to treatment initiation as well as obstacles that hinder treatment adherence [3]. Inpatient mortality and prolong hospital stay are significantly resulting from diabetes, in addition, adverse patient outcomes may occur because the errors that results from inadequate knowledge of insulin therapy using by nursing staff, Moreover, diabetes mellitus is a common health problem of a chronic nature that requires continuing care and education, for this reasons, nursing staff, regardless of the discipline in which they work, need to have knowledge of inpatient diabetic with insulin therapy [4]. The insulin therapy requires coordination and understanding of both the patient and the nurse that responsible for diabetic care, there is no clear insulin dose that works well for every individual, the dosage of insulin changes based on patient's blood glucose levels and the type of insulin used, Therefore, insulin treatment must be individualized to suitable the life style of the individual and metabolism of individual with diabetes, the changes and modifications are made as needed throughout the life of individual with diabetes [5]. The challenge that the efficient nurse faces is how to keep the knowledge of the best skills at the front of patient care delivery, the role of insulin in managing patients with and without diabetes provides metabolic control to achieve homeostasis reducing the complication that can occur, lack of knowledge and awareness has been identified as the greatest barrier to overcome when lowering the glycemic goals to improve outcomes [6]. Data collection and improving of education gives consequent enhancements in knowledge, awareness and skills which leads to better control of the disease and is widely accepted to be an integral part of comprehensive diabetes care, Patient education has been proven to be an effective method in management of prevailing health problem [7].

Importance of the Study

Hyperglycemia, one of the acute complications of diabetes mellitus, It carries a lot of adverse effects on the patient psychic and mental state plus the bad sequels on the cardiovascular system and central nervous system that may prove to be fatal. Nurses that working in hospitals, are supposed to be reasonably educated and skillful in detecting hyperglycemia and presenting the first aids that may save the patients' life [8]. In Al Diwaniyah Teaching Hospital (The Emergency Department), the knowledge and awareness of nurses about hyperglycemia have not been explored or assessed, a matter that was motivating to study this issue.

Objectives

The study aims to:

1) Assess the nurse's knowledge and awareness regarding insulin therapy for diabetic patients in the emergency department at Al Diwaniyah Teaching Hospital.

2) Finding the association between demographic data which as the gender, educational level, years of experiences in the emergency department, training course and their level of nurse's knowledge.

Definition of Terms
Nurse's Knowledge and Awareness

Is the actual action that is performed to help the patient to reach the goals that are set for them, the nurse uses his or her knowledge, awareness and critical thinking to decide which interventions will help the patient **[9,10]**.

Insulin Therapy

Insulin therapy is a energetic for replacing the insulin in the body that doesn't produce. Occasionally, people with type 2 diabetes or gestational diabetes need insulin therapy if other treatments haven't been able to keep blood glucose levels within the desired range.

Diabetic Patients

Patient that suffer from metabolic disorder characterized by chronic hyperglycaemiaas a result of disturbances in carbohydrate, fat and protein metabolism.

Materials and Methods
Study Design

Descriptive study was conducted on female and male nurses in Al_Diwaniyah hospital to assess the knowledge and awareness level about diabetic Patients undergoing Insulin Therapy in the emergency department at Al Diwaniyah Teaching Hospital. Starting from 16 of January 2022 to 10 July of 2022. A purposive sample of (50) nurses who are working in the emergency department at Al Diwaniyah Teaching Hospital.

Administrative Arrangement

The official permission was obtained from competent authorities within Al_Diwaniyah public hospital to collect required data and interviewing nurses.

Selective Criteria

Inclusion criteria:
- It includes 50 male and female nurses who are working in the emergency department at Al Diwaniyah Teaching Hospital.
- Nurses who agreed to participate in the present study.

Exclusion Criteria:
- Nurse who refused to participate in questionnaire.
- Nurses who have less than one year experience.
- Nurses suffering from chronic diseases.

Instrument Construction

For the purpose of the study, a questionnaire format was constructed to assess the knowledge and awareness of nurses about insulin therapy for diabetic Patients in the emergency department at Al Diwaniyah Teaching Hospital. The questionnaire was divided to two main parts:

❖ **First Part:** Demographic data of the sample include (Age, Gender, Educational level, Duration of work as a nurse, Years of experiences in the emergency department and training courses regarding management of diabetic patients and insulin therapy).

❖ **Second Part:** This part include 18 multiple questions to assess the knowledge and awareness of nurses about insulin therapy for diabetic Patients in the emergency department at Al Diwaniyah Teaching Hospital. Multiple questions includes (Store insulin ((cool place away from direct sunlight)), knowledge about types of insulin, knowledge about bottle label, right insulin and expired, Carrying out the doctor's orders regarding insulin administration, Dose of insulin, Sites of injection, Correct route, Inspect skin areas that will be used for injection, Perform a physical assessment to establish a baseline before beginning therapy, Monitor possible adverse effects of administered insulin, knowledge about contraindications of administered insulin, Monitor response to insulin, Rotate injection sites to avoid damage to muscles and to prevent subcutaneous atrophy, Monitor patient's food intake and exercise and activities to ensure therapeutic effect and avoid hypoglycemia, Provide comfort measures to help patient cope with insulin effects, Education about insulin effects and warning signs, Observe hyperglycemia and hypoglycemia signs, And Documentation of administered insulin).

Data collection: The data collected through the period from 15 of February to 20 April 2022 by interview with the nurses who are working in the emergency department by ask the questions and documented the answers.

Method of Data Analysis: The following statistical data analysis approaches is used in order to analyze the data of the study under application of the statistical package (SPSS) ver. (20), and the Microsoft excel (2010). In addition, the assessment by cutoff point (0.66%) due to the three points likert scales with three levels of assessment, Bad (1-1.66), Moderate (1.67-2.33), and Good (2.34-3). Chi-Square test for testing the independency distribution of the observed frequencies, and for measuring the association between the studies variables according to its type, and for the abbreviations of the level of measurement for the comparison significant (C.S.), the following are used: NS: Non significant at P value>0.05/S: Significant at P value<0.05

Results of the Study

Data	Classification	Frequency	Percent
Age	29 years or less	17	34
	30-39 years	19	38
	40 years and more	14	28
Gender	Male	32	64
	Female	18	36
Education	Secondary nursing school	8	16
	Technical institute of nursing	23	46
	Bachelor degree	19	38
Duration of work as a nurse	3 years or less	17	34
	4 years and more	33	66
Years of Experience in the emergency department	3 years or less	18	36
	4 years and more	32	64
Training courses about Insulin Therapy	Yes	21	42
	No	29	58

Table 1: Demographic information of participants, (N=50).

Table 1 Shows that 38% of the study sample is at age group (30-39 years). Concerning gender there are 64% of the sample are males. In educational level variable 46% of the study samples were graduated from Technical institute of nursing. In regards to duration of work as a nurse there are 66% of the samples has 4 years and more. In ad- dition, regarding years of experience in the emergency department about 64% of the sample has 4 years and more, and 58% of nurses without history of training courses about management of diabetic patients and insulin therapy.

Items	Levels	Frequency	Percent	M.S	Assessment
Store insulin (cool place away from direct sunlight)	Good	0	0	1.12	Bad
	Moderate	6	12%		
	Bad	44	88%		
Knowledge about types of insulin	Good	0	0	1.92	Moderate
	Moderate	46	92%		
	Bad	4	8%		
Knowledge about bottle label, right insulin and expired	Good	4	8%	2.03	Moderate
	Moderate	42	84%		
	Bad	4	8%		
Carrying out the doctor's orders regarding insulin administration	Good	0	0	1.76	Moderate
	Moderate	38	76%		
	Bad	12	24%		
Dose of insulin	Good	23	46%	2.35	Good
	Moderate	26	52%		
	Bad	1	2%		
Sites of injection	Good	0	0	2.28	Moderate
	Moderate	20	40%		
	Bad	30	60%		
Correct route (onset and duration)	Good	0	0	1.70	Moderate
	Moderate	22	44%		
	Bad	28	56%		
Inspect skin areas that will be used for injection	Good	0	0	1.79	Moderate
	Moderate	37	74%		
	Bad	13	26%		
Perform a physical assessment to establish a baseline before beginning therapy	Good	4	8%	1.52	Bad
	Moderate	18	36%		
	Bad	28	56%		
Monitor possible adverse effects of administered insulin	Good	7	14%	2.06	Moderate
	Moderate	30	60%		
	Bad	13	26%		
Knowledge about contraindications of administered insulin	Good	30	60%	2.44	Good
	Moderate	12	24%		
	Bad	8	16%		
Monitor response to insulin	Good	10	20%	2.02	Moderate
	Moderate	29	58%		
	Bad	11	22%		
Rotate injection sites to avoid damage to muscles and to prevent subcutaneous atrophy	Good	4	8%	1.95	Moderate
	Moderate	41	82%		

	Bad	5	10%		
Monitor patient's food intake and exercise and activities to ensure therapeutic effect and avoid hypoglycemia	Good	15	30%	1.86	Moderate
	Moderate	24	48%		
	Bad	11	22%		
Provide comfort measures to help patient cope with insulin effects	Good	15	30%	1.94	Moderate
	Moderate	23	46%		
	Bad	12	24%		
Education about insulin effects and warning signs.	Good	11	22%	2.16	Moderate
	Moderate	20	40%		
	Bad	19	38%		
Observe hyperglycemia and hypoglycemia signs.	Good	16	32%	1.84	Moderate
	Moderate	26	52%		
	Bad	8	16%		
Documentation of administered insulin	Good	23	46%	1.68	Moderate
	Moderate	17	34%		
	Bad	10	20%		

Table 2: Assessment of nurses knowledge and awareness about management of diabetic patients and insulin therapy by three applying levels (Bad, Moderate, good), (N=50).

Table 2 Shows the nurses knowledge about management of diabetic patients and insulin therapy, the highest of nurses' knowledge items are (Moderate). While (Bad) was the main nurses' knowledge regarding to store insulin and perform a physical assessment to establish a baseline before beginning therapy.

Overall assessment of Nurses' knowledge and awareness	Levels	Frequency	Percent	M.S	Assessment
	Good	2	11.1%	1.912	Moderate
	Moderate	14	77.8%		
	Bad	2	11.1%		
	Total questions	18			
Total sampling	50				
Mean (2), cut off point (0.66), Good (mean of scores more than 2.33), Moderate (mean of scores 1.67-2.33), Bad (mean of scores less than 1.67). M.S: mean of scores, %: Percent.					

Table 3: Overall assessment of Nurses' knowledge and awareness.

Table 3 Shows that 77.8% of nurses' knowledge and awareness have Moderate, while 11.1% of them have Bad and 11.1% of them have Good regarding to overall Assessment of nurses' knowledge.

Demographical Data	Nurses' knowledge		
	Chi-square value	D.F	p-value
Age	9.064	2	0.011
Gender	3.125	1	0.077
level of education	17.150	2	0.001
Duration of work as a nurse	10.784	1	0.001
Years of Experience in the emergency department	7.451	1	0.006
Training courses about management of diabetic patients and insulin therapy	3.293	1	0.07
D.F: Degree of freedom; p-value: Probability value.			

Table 4: Association between the Overall Assessment of Nurses' knowledge and Awareness, and their demographic data.

Table 4 shows that there is a significant association between overall assessment of nurses' knowledge and awareness, and some variables in demographic data of the study sample, at P. value<0.05. In regards to age of the sample, it shows that there is significant association at P-value (0.011); also, there are a highly significant association at P-value (0.001) regarding levels of education item and duration of work as a nurse. There are a highly significant association at P-value (0.006) regarding to years of experience in the emergency department.

Discussion
Discuss Table 1: Demographic information of participants
This table shows that 38% of the study sample within age group (30-39 years), this result goes with the result of a previous study of (Mohammed and Mona, 2013) [11], she recognized in her study that the majority of the study subject's age were more than 30 years.

Concerning gender there are (64%) of the sample are males, this result match with the result of (Altahan, 2016) [13], who find 61% of the study are males.

Concerning educational level, the majority of the study samples (46%) were graduated from Technical institute of nursing, this result match the result of (Abduelkarem, et al., 2013) [12], who found (48%) of the study samples were graduated from Technical institute of nursing.

In regards to duration of work as a nurse there are (66%) of the samples has 4 years and more, this result match with the result of (Abduelkarem, et al., 2013) [12], who find (62%) of the study samples has 4 years and more in regards to years of working in nursing.

Concerning years of experience about (64%) of the sample has 4 years and more experience in the emergency department, this result goes with the result of (Mohammed and Mona, 2013) [11], who find that the highest percent of nurses were 5 years and more experience. As a matter of fact to have some experience in the emergency department can be valuable because it make the nurse more confident.

In regards to training courses about insulin therapy about (58%) of nurses without history of training courses about insulin therapy, this result is in agreement with the result of (Al-Ganmi, et al., 2014) [14] who find (63%) of nurses without training programs. It is essential for the professional nurses to have nursing educational courses to develop their practice in specific areas of action.

Discuss Table 2: Assessment of Nurses knowledge about management of diabetic patients and insulin therapy by three applying levels (Bad, Moderate, good):
This table shows the nurses knowledge in the emergency department, the highest of nurses' knowledge items are (Moderate). While (Bad) was the main nurses' knowledge regarding store insulin, and perform a physical assessment to establish a baseline before beginning therapy, this result match with the result of (Al-Ganmi, et al., 2014) [14] who find (54%) of the study samples are Moderate, (43%) of the study samples are poor, and (3%) of the study samples are good.

Discuss Table 4: Association between the Overall assessment of Nurses' knowledge and awareness, and their demographic data
This table shows that there is a significant association between overall assessment of nurses' knowledge and some variables in demographic data of the study sample, at P. value<0.05. Regarding age of the sample, it shows that there is significant association at P-value (0.011); also, there are a highly significant association at P-value (0.001) concerning levels of education item and duration of work as a nurse. There are a highly significant association at P-value (0.006) regarding to years of experience in the emergency department.

This result agree with the result of (Al-Ganmi, et al., 2014) [14] who find there are significant relationship between the nurses' practices and level of education at P. value<0.05. Also this result agrees with the result of (Altahan, 2016) [13], who find there are highly significant associations at P. value (0.001) concerning to years of experience in the emergency department. The researcher opinion is that years of experience in the emergency department are very necessary to improve nurses' knowledge and awareness, to develop the skill of the nursing staff regarding insulin therapy.

Conclusion
The study concluded the following:
1. The highest of nurses' knowledge and awareness items are (Moderate). While (Bad) was the main nurses' knowledge regarding to store insulin and perform a physical assessment to establish a baseline before beginning therapy.
2. There are a highly association between level of education, and years of experience about insulin therapy for diabetic patients in the emergency department and their efficacy of nurses' knowledge and awareness.

Recommendations
The study Recommended the following:
1. Increasing the knowledge and awareness of nursing staff concerning insulin therapy for diabetic patients by improving training courses in the emergency department.
2. Establishing education programs to improve nurses' knowledge and awareness toward the newest issues related to insulin therapy in the emergency department.

References
1. World Health Organization (1999) Definition, diagnosis and classification of diabetes mellitus and its complications: report of a WHO consultation. Part 1, Diagnosis and classification of diabetes mellitus. No. WHO/NCD/NCS/99.2.
2. Linton A (2012) Introduction to Medical Surgical Nursing. (5th ed.). USA. Elsevier Saunders. P.p. 1050-1055.
3. Mohammed MA, Hafez MZ (2013) Nurses' knowledge, skill and attitudes toward insulin errors for diabetic critically ill

patients. AAMJ 11:4.

4. Kimball M (2006) Perceived Knowledge of the Registered Nurse in Managing Hyperglycemia According to Evidence-Based Practice in the Acute Care Setting. Boca Raton, (2006) Florida, USA.

5. Surendranath A (2012) A study to assess the knowledge and practice of insulin self-administration among patients with diabetes mellitus. Asian J Pharm Clin Res 5:63-66.

6. Anita S (2009) Exploring the legitimacy of intuition as a form of nursing knowledge. Nursing Standard 23(40):35-40.

7. Ramesh (2011) Diabetic knowledge of rural community and drug utilization pattern in a tertian" care hospital. Int J Pharmacy & Life Sci 2:531-535.

8. Kiberenge MW, Ndegwa ZM, Njenga EW, Muchemi EW (2010) knowledge, attitude and practices related to diabetes among community members in four provinces in Kenya: a cross sectional study. Pan African Medical J 7:2.

9. Kamitsuru, Shigemi (2012) Diagnósticos enfermeros: definiciones y clasificación 2012-2014. Ed. T. Heather Herdman. Bercelona: Elsevier.

10. Vikash D (2019) Machine learning tree classifiers in predicting diabetes mellitus. 2019 5th International Conference on Advanced Computing & Communication Systems (ICACCS). IEEE, 2019.

11. Mohammed MA, Hafez MZ (2013) Nurses' knowledge, skill and attitudes toward insulin errors for diabetic critically ill patients.AAMJ 11:4.

12. Abduelkarem, Abduelmula R, Hawa J. El-Shareif (2013) Assessment of diabetes-related knowledge among nursing staff in a hospital setting. J Diabetes Nurs 17:6.

13. Altahan, Yasir Mohammed, Nabeel Najeb Fadhil (2016) Assessment of Nurses' Knowledge and Attitude about Hypoglycemia at Mosul City Hospital. Mosul J Nursing 4:74-80.

14. Al-Ganmi, Ali Hussein Alek, Sabah Abbas Ahmed, Khames Bander Abed (2014) Assessment of Nurses Knowledge Concerning Type 2 Diabetes Mellitus Management with Insulin Therapy in Intensive Care Units at Baghdad Hospitals. kufa J Nursing Sci 4:3.