

Assessment of Nurses Knowledge Concerning Type 2 Diabetes Mellitus Management with Insulin Therapy in Intensive Care Units at Baghdad Hospitals

تقييم معارف الممرضين المتعلقة بعلاج مرض السكري النوع الثاني بالأنسولين للمرضى
الراقدين في وحدات العناية الفائقة في مستشفيات مدينة بغداد

Ali Hussein. Alek Al-Ganmi, MSc, Assistant Lecturer, Fundamentals of Nursing Department, College of Nursing, University of Baghdad

Sabah Abbas Ahmed, PhD Assistant Professor, Fundamentals of Nursing Department, College of Nursing, University of Baghdad.

Khames Bander Abed, PhD/ Lecturer, Pediatric nursing Department, College of Nursing, University of Baghdad

E.mail: alihalek@yahoo.com

الخلاصة:

خلفية البحث: داء السكري يعتبر من المشاكل الصحية الشائعة والمزمنة بطبيعتها والذي يحتاج عناية وتعليم دائمين. لهذه السبب، يحتاج الفريق الطبي وخاصة الممرضين للمعارف المتعلقة بكيفية العناية بمرضى داء السكري النوع الثاني بغض النظر عن المكان الذي يعملون فيه.

الهدف: تهدف الدراسة إلى تقييم معارف الممرضين المتعلقة بعلاج داء السكري النوع الثاني بالأنسولين للمرضى الراقدين في وحدة العناية الفائقة وإيجاد العلاقة بين معارف الممرضين حول علاج السكري بالأنسولين وبعض المتغيرات الديموغرافية وهي العمر، الجنس، المستوى التعليمي، سنوات الخبرة، والدورات التدريبية.

المنهجية: دراسة وصفية أجريت في مستشفيات بغداد التعليمية والتي شملت مستشفى مدينة الطب و مستشفى ابن البيطار لجراحة القلب التعليمي و مستشفى ابن النفيس التعليمي ومستشفى الكاظمية التعليمي ومستشفى الكرخ التعليمي في وحدات العناية الفائقة للفترة بين 15 أيلول 2013 ولغاية 30 آذار 2014. ولتحقيق أهداف الدراسة تم اختيار عينة غرضية (غير احتمالية) شملت (60) ممرض وممرضة الذين يقدمون الرعاية التمريضية للمرضى الراقدين في وحدات العناية الفائقة وفقاً لمعايير خاصة. جمعت المعلومات من خلال استخدام الاستبانة كأداة لجمع المعلومات لتحقيق هدف الدراسة حيث تكونت من جزئين. تم إجراء الدراسة الاستطلاعية لاختبار ثبات الاستبانة وتم تحديد مصداقية الأداة من قبل لجنة من الخبراء. تم تحديد ثبات الأداة من خلال تحديد الفا كرونباخ خلال تقنية النصف على عينة من (10) ممرضين/ممرضات والتي كانت (0.74). تم إجراء تحليل البيانات من خلال تطبيق الإحصاء الوصفي (التكرارات، النسبة المئوية، الوسط الحسابي المرجح والكفاية النسبية).

النتائج: أشارت نتائج الدراسة إلى أن تقويم الوسط الحسابي والكفاية النسبية المتعلقة بمعارف الممرضين حول الصدمة القلبية في وحدات العناية القلبية كانت خارج المقارنة وليس هناك علاقة ذات دلالة إحصائية بين الدورات التدريبية ومعارف الممرضين. في حين أن هناك علاقة معنوية عالية بين معارف الممرضين حول علاج داء السكري النوع الثاني (الأنسولين) في وحدة العناية القلبية والأعمار والجنس ومستوى التعليم، وسنوات الخبرة في مجال الرعاية التمريضية المقدمة.

الاستنتاجات: استنتجت الدراسة إلى أن معظم الممرضين الذين يعملون في وحدات العناية الفائقة يمتلكون معارف متوسطة المستوى حول علاج داء السكري النوع الثاني (الأنسولين) في بعض جوانبها. مع ذلك، نتائج الدراسة أشارت إلى أن هناك نقص بالمعارف المتعلقة بعلاج الأنسولين في بعض الجوانب.

التوصيات: أوصت الدراسة على حث المؤسسات الصحية بضرورة تشجيع الممرضين والممرضات في وحدات العناية الفائقة إلى المشاركة في برامج التعليم المستمر لتعزيز معارفهم حول كيفية التعامل مع علاج الأنسولين للمرضى الذين يعانون من داء السكري النوع الثاني. مع ذلك، العمل على إجراء بحوث أكثر وعلى عينة أكبر ضروري جداً لتحديد المستوى المعرفي للممرضين حول موضوع علاج مرض السكري النوع الثاني بالأنسولين ولتحديد أخطاء إعطائه والتي يمكن أن تؤدي إلى مضاعفات قاتلة.

Abstract:

Background: Diabetes mellitus is a common health problem of a chronic nature that requires continuing care and education. For this reasons, health care providers especially nurses, irrespective of the discipline in which they work, need to have knowledge of inpatient type II diabetic with insulin therapy.

Objective(s): The study aims to assess the knowledge of nurses concerning type 2 diabetes mellitus (DM) management with insulin therapy in intensive care units and to finding out the relationship between the nurse's knowledge and the demographic characteristics that includes (age, gender, level of education, years of experience, and training session).

Methodology: A descriptive study was conducted at Baghdad Teaching Hospital; In-Alnafes Teaching Hospital, Ibn-Albetta Teaching Hospital, Al-khademia, and al-kharkh hospitals starting from September 15th 2013 up to the March 30th 2014. To achieve the objectives of the study, A non-probability (purposive) samples of (60) nurses who was consisted of all nurses who provides an insulin therapy for patients with type 2 diabetes mellitus (DM) and according to special criteria. Data were collected by an application of direct interview as a means of data collection. Nurses were interviewed while they are working in the Intensive Care Unit during the day. Instrument validity was determined through content validity, by a panel of experts. Reliability of the instrument was determined through detected of Cronbach's alpha via split half technique on sample of (10) nurses, which was (0.74). Analysis of data was performed through the application of descriptive statistics (frequency, percentage, mean of score, Relative sufficiency) and inferential statistics, significance and correlation coefficient.

Results: The results of the study indicated that the mean of scores and relative sufficiency for nurse's knowledge regarding DM management with Insulin therapy for patients in the intensive care unit was out of comparison and there is no significant association between training session of sample and nurses' knowledge. While there is high

significant association between ages, gender, level of education, years of experience in cardiac care unit and nurses' knowledge.

Conclusion: The study that the most of nurses whom work in intensive care unit have knowledge deficit about insulin therapy. However, the findings of the study indicated that there is a knowledge deficit of nurses in some aspects related to insulin therapy.

Recommendations: The study emphasize that hospitals and health organizations should be applying flexible and responsible steps to facilitate passages for better level for junior nurses and those who need high graduated level to improve their skills and knowledge towards insulin therapy for patients with type II DM. Nevertheless, further studies are necessary in order to assess nurses' knowledge toward DM management with insulin therapy in ICUs and demonstrate the errors that occur, which are lead to fatal complications.

Keywords: Assessment, Insulin Therapy, Intensive Care Unit, Nurse Knowledge.

INTRODUCTION :

Diabetes Mellitus (DM) has affected humans for millennia, and the descriptions of it are surprisingly ancient, which it's incidence is rising sharply worldwide⁽¹⁾.

Now days, the introduction of new insulin formulations and a new emphasis on tight blood glucose control make inpatient diabetes treatment has become more complicated ⁽²⁾. Inpatient mortality and prolong hospital stay are significantly resulting from diabetes ⁽³⁾. In addition, adverse patient outcomes may occur because the errors that results from insufficient knowledge of insulin using by medical staff ⁽²⁾. Moreover, diabetes mellitus is a common health problem of a chronic nature that requires continuing care and education. For this reasons, health care providers especially nurses, irrespective of the discipline in which they work, need to have knowledge of inpatient diabetic with insulin therapy⁽³⁾.

Identifying the knowledge of the staff in using insulin therapy for patients in critical care units will allow for educational programs to be developed to bring the knowledge base of the staff nurse forward to achieve best practice. Keeping updated with the ongoing research is one of the challenges that the registered nurse faces in caring for patients with hyperglycemia⁽⁴⁾. The insulin therapy requires coordination and understanding of both the individual with diabetes and those responsible for diabetic care. There is no definite 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⁽⁴⁾.

Therefore, insulin treatment must be individualized to fit 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 registered nurse faces is how to keep the knowledge of the best practice at the forefront 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 has been identified as the greatest barrier to overcome when lowering the glycemic goals to improve outcomes. The treatment for Diabetic Mellitus (DM) includes administration of oral hypoglycemic agents and injectable insulin therapy along with life style modifications⁽⁶⁾.

Objectives of the study: The study aims to assess the knowledge of nurses concerning type 2 diabetes mellitus management with insulin therapy in intensive care units and to finding out the relationship between the nurse's knowledge and the demographic characteristics that includes (age, gender, level of education, years of experience, and training session).

METHODOLOGY:

Design of the study: Quantitative design (a descriptive study) was carried out to achieve the purpose of the study.

Setting of the study: The study was conducted in ICU at Teaching Hospitals in specialized Cardiac Hospital Ibn-Albetta, Medical City, Al-khademia, Ibn-Alnafes and al-kharkh hospitals. These hospitals provide various nursing care for patients which suffering from diabetes with divergent management included treatment with insulin.

Sample of the study: A non-probability (purposive) samples of (60) nurses' who was consisted of all nurses provided nursing care for patients who suffering from Diabetic Mellitus including management with insulin therapy and according to special criteria starting from September 15th 2013 up to the March 30th 2014.

Instrument construction: In order to assess nurses' knowledge, a constructed questionnaire was design and means of an interview technique with the nurses was constructed to measure the variables underlying study. A permission request was submitted to American Diabetic Association for using part of the questionnaire '*Diabetes Basic Knowledge Test*' and reproduce the article "*Perceived and Actual Level of Knowledge of Diabetes Mellitus among Nurses*". A questionnaire based on comprehensive review of relevant literature and previous studies was also used. These instruments consist of two parts namely; the demographic data of the nurse, and the nurses' knowledge about Diabetic Mellitus management especially, with insulin therapy. The questionnaire was constructed for the purpose of the study consisted of (22) multiple choice questions which include two parts:

Part I: Demographic Data Sheet:

Part one concerned with personal information include, the nurses (gender, age, educational level, numbers of experience years and whether if they participating in continuing course training inside or outside the country).

Part II: Nurses knowledge:

Part two contained multiple choice questions and included (22) items concerning nurses knowledge regarding Diabetic Mellitus management especially, with insulin therapy.

The questionnaire were ordinal according to the right answers which were scored as (a, b, c, and d).

Validity of the instrument: Constant validity determined for questionnaire through the use of panel experts who are faculty members from College of Nursing. The experts were asked to review the questionnaire for content with clarity. Such changes were employed according to their suggestions and valuable comments.

Reliability of the instrument: Pilot study was carried out between the October 10th to November 10th, 2013. On (10) nurses in ICU by the researcher and tested questionnaire was performed for determination of the instrument reliability level. The results indicated that the correlation coefficient was $r = 0.74$ at the percentage of variance (43.223) which was statistically acceptable.

Data collection: The data collected with constructed questionnaire through an application of direct interview as mean of data collection.

Statistical data analysis: Appropriate statistical approach was used that includes descriptive statistics (frequency, percentage, mean of score, Relative sufficiency) and inferential statistics significance, and correlation coefficient.

RESULTS:

Table 1. Distribution of nurses by their socio-demographic

List	Items	Frequency	Percent
	Sex		
	Male	37	61.7
	Female	23	38.3
	Age: (M= 32.18, SD*= 6.8)		
	21-30	29	48.3
	31-40	23	38.3
	41 and above	8	13.4
	Educational Qualification		
	Graduate of Nursing Course	1	1.7
	Graduate of Preparatory School of Nursing	7	11.7
	Graduate of Nursing Institute	20	33.2
	Graduate of Nursing College	31	51.7
	Postgraduate	1	1.7
	Years of Experience in ICU		
	1-5	27	45.0
	6-10	17	28.3
	11-15	15	25.0
	More than 15 years	1	1.7
	Participation in Courses of Continuous Education		
	Always	19	31.7
	Sometimes	29	48.3
	Does not participate	12	20.0

***SD: Standard Deviation**

Table (1) presented that most of the study participants were male nurses (n= 37; 61.7%), less than the half of them were in the (21-30 years-old) age group (n= 29; 48.3%), more than the half of them were graduates of nursing colleges (n= 31; 51.7%), less than the half of them have 1-5 years of working in nursing (n= 27; 45.0%), and less than the half of them reported that they sometimes participate in courses of continuous education (n= 29; 48.3%).

Table 2. Nurses' Responses for Insulin Treatment Knowledge

List	Items with the correct answers	Frequency	Percent
1	Insulin is molecule consists of 2 chains of amino acids	12	20.0
2	Solved insulin is Soluble Insulin can be given intravenously	28	46.7
3	Before injecting insulin, we must consider that Insulin is measured in units	48	80.0
4	Regarding the method of insulin storage Unopened insulin vials should not be stored in the freezer compartment of a fridge	14	23.3
5	The best site for absorbing insulin when it injected subcutaneously is Abdomen (under umbilical area)	17	28.3
6	The method that reduce the pain during the injection of insulin is Using a 29 gauge needle	28	46.7
7	The sites that require wiping with surgical gauze and disinfectant on insulin injection are The skin of site of the injection	53	88.3
8	The immediate measure for dealing with hypoglycemia 50% dextrose intravenously	46	76.7
9	The function of insulin is Transports glucose across cell membranes for use by the cells	52	86.7
10	Humilin is An insulin brand name	39	65.0
11	The mixed solution called 75/25 is 75% protamine, 25% lispro	10	16.7
12	The mixed called 70/30 is 70% NPH, 30% regular	9	15.0
13	Clarigin is Basal insulin	37	61.7
14	Generally, rapid action insulin is Peaks within 1hours	41	68.3
15	Generally, (NPH) Monoprotamin hagdron Peaks within 4-10 hours	13	21.7
16	Glargine cannot be mixed in the same syringe with other types of insulin	17	28.3
17	NPH is a cloudy unclear, rather than a clear solution	15	25.0
18	Generally, The available insulin pumps Use rapid acting insulin	33	55.0
19	The optimal body need of insulin for adults with type-I diabetes mellitus is 0.5-0.7 units/ kg	22	36.7
20	The ratio of daily insulin that the body needs that the basal insulin is 40-50	21	35.0
21	Diabetes Mellitus (Acidotic type) (DKA) can result from Both Type I and II	38	63.3
22	In (DKA) Diabetes Mellitus when changing from the continuous insulin dose to subcutaneous insulin, this dose starts approximately within 2 hours before stopping the infusion	9	15.0

The nurses responses about the insulin treatment knowledge was shows in table 2 which revealed that "the sites that require wiping with surgical gauze and disinfectant on insulin injection" and "the function of insulin is" (n= 53; 88.3%) (n= 52; 86.7%) respectively. While, participants incorrect answers were for the items of "In (DKA) Diabetes Mellitus when changing from the continuous insulin dose to subcutaneous insulin, this dose starts approximately within", " The mixed called 70/30 is", and "The mixed solution called 75/25 is" (n= 9; 15.0%) (n= 9; 15.0%) (n= 10; 16.7%) respectively.

Table 3. Participants' Levels of Knowledge

List	Levels of Knowledge	Frequency	Percent
1	Poor (26-31)	26	43.3
2	Moderate (32-37)	32	53.3
3	Good (38-42)	2	3.4

The findings of table 3 revealed that more than the half of participants have fair level of knowledge (n= 32; 53.3%).

Table 4. Association between Study Variables and Level of Knowledge

	Standardized Coefficients		Df*	F**	Sig.***
	Beta	Bootstrap (1000) Estimate of Std. Error			
Sex	.072	.142	1	.256	.614
Age	-.297-	.413	3	.515	.673
Educational Qualification	.065	.174	2	.141	.869
Years of Experience in ICU	.294	.245	4	1.447	.228
Participation in Courses of Continuous Education	.586	.195	3	9.003	.000

*df: Degree of Freedom

**F: Frequency

***Sig: Significance

Table 4 reveal that there was highly significant association between participation in courses of continuous education and level of knowledge (p= 0.000).

DISCUSSION:

Part I: Discussion of Intensive Care Unit Nurses Demographical Data's.

Throughout the course of the present study, it has been noted that the majority of study sample (61.7%) were male. Concerning the nurses age, the highest proportion of nurses were young with (48.3%) at the age of (21-30). Related to the educational level, the highest percentages (51.7%) of the sample were academic nurses who graduated from Colleges of

Nursing. On the other hands, the highest percentages (45.0%) of nurses were with (1-5) years of experiences in the ICUs while the lowest percentages (1.7%) of them were have more than 20 years of experiences in the ICU's. Finally, concerning the participating in continuous education , the results show that the highest percentages (48.3 %) were sometimes participating in continuous education about insulin therapy while (20.0%) only were not participating in such courses (table 1).

Nurses who are in continuous attendance with the diabetes patient, are in a prime position to ensure that the outcomes for the patient is optimizing when he/she treating them with insulin therapy. This not only requires accurate assessment and management skills, but also the need for educational initiatives regarding insulin formulations and inpatient management of diabetes for health care professionals; and a coordinated team approach would improve patient outcomes⁽²⁾.

Part II: Discussion of Intensive Care Unit Nurses Knowledge Regarding to the DM Management with Insulin Therapy:

The data analysis was conducted on 22 multiple choice questions that have assessed intensive care unit nurses knowledge regarding to the insulin therapy based on significantly of right answers, which had been reported and manifested out of the mean of scores of these answers. The results indicated that there was a high nurses knowledge grade in the question that demonstrate participants' correct answers were for the items of "the sites that require wiping with surgical gauze and disinfectant on insulin injection" and "the function of insulin is (table 2). While, participants incorrect answers and lower knowledge levels were for the items of "In (DKA) Diabetes Mellitus when changing from the continuous insulin dose to subcutaneous insulin, this dose starts approximately within", "The mixed called 70/30 is", and "The mixed solution called 75/25 is" respectively. Surprisingly, 20% of the participants have knowing what the insulin is, which is an interesting that most of ICU nurses do not have knowledge about what the "insulin" as a form. In conclusion, our study results indicates more than the half of participants who work in intensive care units have fair level of knowledge about insulin therapy. These results evoked our minds to mobilize the efforts for designing a framework to build nurses knowledge in the ICU setting for applying better patient's care and maximizing health outcomes. Otherwise, nurses with poor knowledge about insulin therapy in ICU resulting to occurring medical errors and thus to fateful results. Most of our participants have a high education level, which in this case "Bachelor Degree in Nursing", however, does not correlate with their knowledge regarding insulin therapy, which is similar to nurses with diploma. Intuition is a valuable source of knowledge that should be recognized in the provision of nursing care. Also, at times nurses knowledge has been perceived as a knowing, 'magic' knowing, and an amalgam of

experiences and knowledge⁽⁷⁾. Commonly, medical staff adopts primary responsibility for applying diabetes therapy in teaching hospitals, and staff nurses are in the key position to administer insulin and recognize dangerous orders and impending hyper- and hypoglycaemia. However, they have been reported to be inadequately trained particularly in insulin treatment and generally, diabetes management⁽⁸⁾. Examining and exploring the knowledge ergo intuition of nurses is a necessary undertaking⁽⁹⁾. Diane et al. (2007) concluded that "nurses have to value empirical knowledge above all other forms of knowledge" (p.154)⁽⁹⁾.

CONCLUSION:

The study that the most of nurses whom work in intensive care unit have knowledge deficit about insulin therapy. However, the findings of the study indicated that there is a knowledge deficit of nurses in some aspects related to insulin therapy.

RECOMMENDATIONS:

1. Great emphasize should be direct toward the encouragement for participating in continuous educational programs and courses related to nursing care of patients with diabetic mellitus and insulin therapy.
2. Hospital and health organisations should be applying flexible and responsible steps to facilitate passages for better educational level for junior nurses and those who need high graduated level.
3. Nevertheless, further studies are necessary in order to assess nurses' knowledge toward DM management with insulin therapy in ICUs and demonstrate the errors that occur, which are lead to fatal complications.

REFERENCES:

1. Whittle, A. 'Diabetes Important facts Diabetes', *Ezin Article.com*, (2011). 553: 1-5.
2. Derr L, MD; Sivanandy S, MD; Bronich-HallL, and Rodriguez A "Insulin-Related Knowledge Among Health Care Professionals in Internal Medicine", *Diabetes Spectrum*, (2007), 20(3): 177-185.
3. American College of Endocrinology task force on inpatient diabetes and metabolic control "American College of Endocrinology position statement on inpatient diabetes and metabolic control", *Endocr Pract*, (2004), 10(1): 77-82.
4. Kimball M. "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. Nagarajui B, Padmavathi JV, SC Anand SC, Fayaz P, and Balachandra G., "A study to Assess the knowledge and practice of Insulin Self- Administration among Patients with Diabetic Mellitus", *Asian Journal of Pharmaceutical and Clinical Research*, (2012), 5(1): 63-66.
6. Baumann, L.C., Chang, M., and Hoebeke, R. 'Clinical outcomes for low-income adults with hypertension and diabetes'. *Nursing Research*, (2002), 51(3), 191-198.
7. Anita S, 'Exploring the legitimacy of intuition as a form of nursing knowledge', *Nursing Standard*, (2009), 23(40): 35-40.

8. Trepp R, Wille T, Wieland T, Reinhart H., "Diabetes-related knowledge among medical and nursing house staff", **SWISS MED WKLY**, (2010), 140 (25-26): 37 0-3 7 5.
9. Diane B; Florence M; Florence L and Olive Y 'A Pragmatic View of Intuitive Knowledge in Nursing Practice', **Nursing Forum**, (2007), 42, 3: 147-155.