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# Knowledge and Practice about Diabetic Mellitus and Insulin Injection Technique among Nurses in General Hospitals, Al-Hillah City

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***Abstract:***
***Background:*** *Insulin is a valuable drug in treatment of Diabetic Mellitus (DM)patients. Insulin will have tremendous impact, when it is used properly.* ***Aim of Study: T****o determine the mean differences of nurses' years of practice by socio-demographic characteristics, knowledge about DM as well as with insulin injection technique among volunteering nurses of three main hospitals in Al-Hillah City****Materials and Methods:*** *Ahospital-based cross sectional study design was carried out on 200 volunteering nurses from three main general hospitals. The study duration was from January and May 2014. Categorical variables were presented as frequencies and percentages. Continuous variables were presented as means with their 95% confidence interval (CI). Independent sample t-test was used to compare means between two groups. One way Analysis of variance (ANOVA) was used to compare means between more than two groups. A p-value of ≤ 0.05 was considered as statistically significant.* ***Results:*** *The overall mean age of nurses was 37.07±10.72 years old. The mean year of practice for nurses was 15.85± 11.72 years. Majority 65.0%, 78.0% and 64.0% of nurses were male, married and from urban area. Majority 61.0% of nurses completed high school; meanwhile, only 35.0% of nurses had the position head of nurses.There were significant mean differences of nurses' years of practice by nurses' socio-demographic characteristics except the work shift. Meanwhile, there were significant mean differences of nurses' years of practice by nurses' knowledge about DM. There were significant mean differences of nurses' years of practice by the questions: While giving insulin, did you check expired day, While giving insulin, which angle did you use and While giving insulin, did you use alcohol wipes prior to injection.****Conclusion:*** *This study has explored several aspects of diabetes and or insulin-related knowledge and practice among nurses in General Hospitals of Al-Hillah City. It has identified the need for improvement in their knowledge and practices for educating and treating diabetic patients attending hospitals.*

***Key words:*** *Diabetes Mellitus (DM), Nurses, Years of Practice, Knowledge, Insulin Injection Technique*

## I. Introduction

Diabetes Mellitus (DM) is a metabolic disorder characterized by chronic hyperglycaemiaas a result of disturbances in carbohydrate, fat and protein metabolism. There are different etiological factors attributed to defects in insulin secretion, insulin action or both[1].DM approved to be the most common global public chronic disease that associated with serious long term consequences and escalating healthcare costs. There iscontinuous strain on health sectors as well as governmentsresulted by several physical, social and economic factors which involved in the management of DM[2 and 3]. World Health Organization (WHO) describes DM as the most common endocrine disease in the world [4]. It affects more than 230 million people worldwide and it is expected to affect 370 million people by the year 2030[5]. Although, there is dramatic increase of urban population in developing countries between 2000 and 2030, however, DM is still growing as an epidemic in both developed as well as developing countries[6].

Since the incidence, prevalence anddiagnosis of DM havebeen increased;more peoplewill require care from health professionals[7].Hyperglycaemia has become a common occurrence in hospitalized patients and most of recent studies have shown a strong correlation between hyperglycaemia and the risk of DM complications[8].Therefore, glycaemic control is a key management strategy in critically ill DM patients and controlling blood sugar within euglycemia ranges provides positive outcomes[9].Insulin therapy is a lifesaving treatment for Hyperglycaemic patients in the hospital setting; however, it can be life threatening if administered incorrectly[10]. There are different insulin products and insulin syringes on the market, therefore, administration of insulin continues to be a challenge to both the healthcare providers and the patients[11].

One way to reduce the morbidity and mortality from DM is to educate health care providers. Nurses are often the first point of contact for people seeking information on diabetes care. The quality ofinformation they receive will depend onthe knowledge and experience of the staffin diabetes care[7].Persistent inconsistency of glycemic control due to observe variability in the technique and site of insulin injection among nurses throughout the health system may contribute to hypoglycaemia and hyperglycaemia complication of DM patients. This study has been carried out to determine the mean differences of nurses' years of practice by socio-demographic characteristics, knowledge about DM as well as with insulin injection technique among volunteering nurses of three main hospitals in Al-Hillah City (Merjan Teaching Hospital, Babil General Teaching Hospital, Babil Hospital for Paediatric and Gynaecology).

## II. Materials And Methods

This hospital-based cross-sectional study was carried out in three main hospitals in Al-Hillah City (Merjan Teaching Hospital, Babil General Teaching Hospital, Babil Hospital for Paediatric and Gynaecology).Two hundreds volunteering nurses from these three hospitals agreed to participate in this study between January and May 2014. All nurses have been adapted to give insulin for diabetic patients. A structured questionnaire consists of one part asking about nurses' socio-demographic characteristics, meanwhile, the other two parts asking about nurses' knowledge about DM and insulin injection technique.The outcome variable was nurses' years of practice; meanwhile, the independent variables werenurses' socio-demographic characteristics, knowledge about DM as well as knowledge about insulin injection technique.

Statistical analysis was carried out using SPSS version 20. Categorical variables were presented as frequencies and percentages. Continuous variables were presented as means with their 95% confidence interval (CI). Independent sample t-test was used to compare means between two groups.One way Analysis of variance (ANOVA) was used to compare means between more than two groups.A p-value of $\leq 0.05$ was considered as statistically significant.

**Ethical Approval**

The work has been approved by the appropriate ethical committees from three main hospitals that included in his study(Merjan Teaching Hospital, Babil General Teaching Hospital, Babil Hospital for Paediatric and Gynaecology)

## III. Results

The overall mean age of nurses was (37.07±10.72) years old. The mean years of practice for nurses was (15.85± 11.72) years. Majority (65.0%), (78.0%) and (64.0%) of nurses were male, married and from urban area. Majority (61.0%) of nurses completed high school, meanwhile, only (35.0%) of nurses had the position head of nurses.

Table 1 shows mean differences of nurses'years of practice by socio-demographic characteristics.There were significant mean differences of nurses' years of practice bynurses' socio-demographic characteristics except the work shift. Meanwhile, table 2 showsmean differences of nurses' years of practice by knowledge about DM.There were significant mean differences of nurses' years of practice by nurses' knowledge about DM.There were significant mean differences of nurses' years of practice by the questions: While giving insulin, did you check expired day, While giving insulin, which angle did you use and While giving insulin, did you use alcohol wipes prior to injection,table 3.

**Table 1: Mean differences of nurses' years of practice by socio-demographic characteristics**

| Socio-demographic Characteristics | N | Years of Practice Mean± SD | P value |
|---|---|---|---|
| **Age group** | | | |
| 20-30 years | 68 | 3.02±3.65 | **<0.001*** |
| 31-40 years | 52 | 16.27± 7.59 | |
| 41-50 years | 54 | 24.00± 5.59 | |
| > 50 years | 26 | 31.69± 4.74 | |
| **Sex** | | | |
| Male | 130 | 20.41± 10.27 | **<0.001*** |
| Female | 70 | 7.39± 9.35 | |
| **Marital status** | | | |
| Single | 38 | 6.75± 10.43 | **<0.001*** |
| Married | 156 | 18.58± 10.76 | |
| Widow | 2 | 1.00± 0.0 | |
| Divorce | 4 | 3.50± 2.89 | |
| **Residence** | | | |
| Urban area | 128 | 13.74± 11.01 | **0.001*** |
| Rural area | 72 | 19.61± 12.09 | |
| **Educational levels** | | | |

| | | | |
|---|---|---|---|
| High school | 122 | 19.32± 11.32 | **<0.001*** |
| Diploma | 66 | 10.73± 10.36 | |
| Bachelor | 12 | 8.83± 9.97 | |
| **Occupational status** | | | |
| Nurse | 26 | 10.43± 13.73 | |
| Elite nurse | 86 | 16.78± 11.03 | **0.003*** |
| Professional nurse | 18 | 10.00± 9.45 | |
| Head of nurses | 70 | 18.24± 11.38 | |
| **Years of work in that hospital** | | | |
| < 5 years | 92 | 7.45± 10.26 | **<0.001*** |
| ≥ 5 years | 108 | 23.02± 7.32 | |
| **Work shift** | | | |
| Daytime shift | 174 | 15.69± 12.15 | 0.595 |
| Night shift | 26 | 17.00± 8.45 | |

*p value ≤ 0.05 is significant

**Table 2: Mean differences of nurses' years of practice by knowledge about DM**

| Knowledgeabout DM | N | Years of Practice Mean± SD | P value |
|---|---|---|---|
| **Who have DM** | | | |
| I have DM | 14 | 23.86± 12.60 | |
| Family member | 48 | 16.11± 10.82 | 0.056 |
| Friend/ relative | 12 | 15.07± 11.06 | |
| No body | 124 | 4.00± 0.0 | |
| **Source of information about DM** | | | |
| Doctors | 40 | 24.70± 8.01 | |
| Head of nurses | 14 | 15.14± 12.68 | |
| Other nurses | 84 | 13.38± 11.09 | **<0.001*** |
| Patients | 4 | 14.50± 9.81 | |
| My knowledge | 58 | 13.61± 12.08 | |
| **Sign and Symptoms of Hypoglycemia** | | | |
| Dizziness | 80 | 13.84± 10.85 | |
| Blurred vision | 10 | 8.92± 11.24 | |
| Blackout | 52 | 19.21± 11.25 | **<0.001*** |
| Dry mouth | 6 | 2.33± 0.52 | |
| Sweating | 52 | 18.50± 12.22 | |
| **Sign and Symptoms of Hyperglycemia** | | | |
| Headache | 96 | 14.42± 11.61 | |
| Dizziness | 28 | 22.36± 11.68 | |
| Dry mouth | 42 | 12.31±9.54 | **0.002*** |
| Polyuria | 28 | 18.43± 11.26 | |
| Sweating | 6 | 21.33± 17.02 | |

*p value ≤ 0.05 is significant

**Table 3: Mean differences of nurses' years of practice by knowledge insulin injection technique**

| Knowledge aboutinsulin injection technique | N | Years of Practice Mean± SD | P value |
|---|---|---|---|
| **When you wash your hand while giving insulin** | | | |
| Before touching the patient | 28 | 14.21± 12.17 | |
| Before drawing insulin | 122 | 16.71± 11.52 | 0.430 |
| I did not | 50 | 14.69± 12.02 | |
| **While giving insulin, did you check expired day** | | | |
| Yes | 162 | 16.94± 11.79 | **0.006*** |
| No | 38 | 11.22± 10.37 | |
| **While giving insulin, did you remove the air from syringe** | | | |
| Yes | 198 | 15.76± 11.75 | 0.269 |
| No | 2 | 25.00± 0.0 | |
| **While giving insulin, did you mix more than one kind of insulin** | | | |
| Yes | 10 | 14.80± 10.82 | 0.771 |
| No | 190 | 15.91± 11.80 | |
| **While giving insulin, did you usually change the site of injection** | | | |
| Yes | 10 | 14.80± 10.82 | 0.771 |
| No | 190 | 15.91± 11.80 | |
| **What is the usual site to inject insulin** | | | |
| Arm | 176 | 16.56± 11.75 | 0.072 |
| Abdomen | 16 | 10.82± 11.21 | |
| Thigh | 8 | 10.50± 9.15 | |
| **While giving insulin, did you examine the site of injection for any pain, inflammation and swelling** | | | |
| Yes | 190 | 16.07± 11.66 | 0.253 |
| No | 10 | 11.72± 12.82 | |
| **While giving insulin, did you bench the skin at the site of injection** | | | |

| | | | |
|---|---|---|---|
| Yes | 177 | 15.80± 11.85 | 0.846 |
| No | 23 | 16.30± 10.94 | |
| **While giving insulin, which finger used to make bench of skin** | | | |
| Index and thumb | 178 | 15.76± 11.83 | 0.742 |
| Index, thumb and middle fingers | 22 | 16.64± 11.10 | |
| **While giving insulin, when you release the bench of skin** | | | |
| Before removal the insulin syringe | 42 | 12.81± 11.81 | 0.058 |
| After removal the insulin syringe | 158 | 16.67± 11.61 | |
| **While giving insulin, did you inject insulin through clothes** | | | |
| Yes | 6 | 13.33± 9.56 | 0.594 |
| No | 194 | 15.83± 11.80 | |
| **While giving insulin, which angle did you use** | | | |
| $25^0$ degree | 2 | 2.00± 0.0 | |
| $45^0$ degree | 106 | 14.30± 11.72 | **0.022*** |
| $90^0$ degree | 92 | 17.95± 11.44 | |
| **While giving insulin, did you use alcohol wipes prior to injection** | | | |
| Yes | 126 | 17.36± 12.12 | **0.018*** |
| No | 74 | 13.30± 10.62 | |
| **While giving insulin, how many times you use the insulin syringe** | | | |
| Once | 198 | 15.76± 11.75 | 0.269 |
| More than one | 2 | 25.00± 0.0 | |
| **While giving insulin, disposed of syringe in sharps container** | | | |
| Yes | 198 | 15.76± 11.75 | 0.269 |
| No | 2 | 25.00± 0.0 | |

*p value ≤ 0.05 is significant

## IV. Discussion

The success of DM treatment with insulin does not only depend on the type and dose of insulin administration but also in the technique and site of injection [12 and 13]. The present study is the first study has been done in Iraq and region to assess nurses' knowledge and practice about DM and insulin injection technique. (53.0%) of nurses had more than 15 years practice and the years of practice has been increased with increased age, married male nurses and from rural area, However, these findings have been related to the culture of Iraqi society. Moreover, there is increase in year of practice among nurses who completed high school in nursing institutes, equipped head of nurses' positions and spend more than 5 years in present hospitals. There were significant increase in years of practice among nurses who have the source of their information about DM from doctors as well as who agreed that the blackout and dizziness are the most common signs and symptoms of hypoglycaemia and hyperglycaemia, respectively. Nurses neither realize the importance of glycaemic control nor recognize that such control is excellent for patient's long-term outcomes.

Although, there were increase in years of practice with checking the expired day of injected insulin as well as with 900 degree angle for injected insulin. However, this study showed variability and lack of knowledge amongst nurses in technique, site selection and the use of the alcohol. Nurses communicated in the study appeared their willingness to learn further about recommendations on subcutaneous insulin injection. However, in Iraq there were no current educational program on the technique and site selection of subcutaneous insulin injection throughout the hospital systems as well as worldwide. Furthermore, Licensed Nurses require knowledge and skills on the technique as well as the site selection in subcutaneous insulin injection [9]. It is a necessity for the healthcare providers to understand the basics of DM and the types of insulin administered subcutaneously to ensure the safety of diabetic patients in the hospitals [10].

## V. Conclusions

This study has explored several aspects of diabetes and or insulin-related knowledge and practice among nurses in General Hospitals of Al-Hillah City. It has identified the need for improvement in their knowledge and practices for educating and treating diabetic patients attending hospitals. It is recommended that awareness and education programme is necessary for epidemiology, diagnostic criteria of DM. Effective treatment of DM, practice of insulin injection and prevention of the DM complications. It is essential that the clinical practice guideline must be available for each health care provider.

## References

[1]. Shu AD, Myers MG, Shoelson SE. Pharmacology of endocrine pancreas. In: Golan DE, TashjianJr AH, Armstrong EJ, Armstrong AW, editors. Principles of pharmacology the pathophysiologic basis of drug therapy. 2nd ed. New Delhi: Wolters Kluwer (India); 2008.

[2]. Kirtland KA, Li YF, Geiss LS, Thompson TJ. State-specific incidence of diabetes among adults–participating states, 1995–1997 and 2005–2007. MMWR Morb Mortal Wkly Rep. 2008; 57(43): 1169–1173.

[3]. Neelammakol, Manisha Diabetes an emerging health problem in India. Health action. 2008; 6 (10):4, 5, 14, 16.

[4]. World Diabetic Foundation, 2006, Diabetic facts. Available from: http://www.worlddiabetesfoundation.org/composite-35.htm [Last Accessed on 2010 Sep 15].

[5]. Gersten B. 2007, Diabetes in the Eastern Mediterranean and Gulf Regions. Available from: http://memrieconomicblog.org/bin/content.cgi? article=59 [Last Accessed on 2010 Sep 12].
[6]. Wild S, Roglic G, Green A et al. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. Diabetes Care, 2004; 27 (5): 1047-53.
[7]. Lynne AF and Joan RSM. Determining registered nurses' knowledge of diabetes mellitus. Journal of Diabetes Nursing, 2002; 6: 6.
[8]. Smiley D and Umpierrez. Management of hypoglycemia in hospitalized patients.Annals of the New York Academy of Sciences, 2010; 1212, 1 -11.
[9]. Aragon D. Nursing work effort and perceptions about blood glucose testing in tight glycemic control. American Journal of Critical Care, 2006; 15: 4, 370 -377.
[10]. Hellman R. A systems approach to reducing errors in insulin therapy in the inpatient setting.Endocrine Practice, 2004; 10: 2, 100 - 08.
[11]. Phillis-TsimikasA, and Decker S. Scripps Whittier Diabetes Institute Guide to Patient Management and Prevention, 2011. Sudbury, MA: Jones and Bartlett.
[12]. Frid A, Gaspar R, Hicks D et al. Advisory Board for the Third Injection Technique Workshop: New injection recommendations for patients with diabetes, 2009.
[13]. American Association of Diabetes Educator. Strategies for insulin injection therapy in diabetes self-management, 2011.