KNOWLEDGE OF DIABETES MELLITUS, A SURVEY OF
REGISTERED NURSES

by
BACHIR MOHAMMAD ITANI

A project
submitted in partial fulfillment of the requirements
for the degree of Master of Science in Nursing
to the Hariri School of Nursing
of the Faculty Medicine
at the American University of Beirut

Beirut, Lebanon
December 2015
AMERICAN UNIVERSITY OF BEIRUT

Knowledge of Diabetes Mellitus, a Survey of Registered Nurses

by

BACHIR MOHAMMAD ITANI

Approved by:

Samar Noureddine, RN, PhD, FAHA, FAAN
Professor,
Hariri School of Nursing
American University of Beirut

First Reader

Lina Abi Fakhr Kantar, EdD, RN
Assistant Professor
Rafic Hariri School of Nursing
American University of Beirut

Second Reader

Date of project presentation: December 16, 2015
AMERICAN UNIVERSITY OF BEIRUT

THESIS, DISSERTATION, PROJECT RELEASE FORM

Student Name: Itani Bachir Mohammad
Last First Middle

☐ Master’s Thesis ○ Master’s Project ○ Doctoral Dissertation

I authorize the American University of Beirut to: (a) reproduce hard or electronic copies of my thesis, dissertation, or project; (b) include such copies in the archives and digital repositories of the University; and (c) make freely available such copies to third parties for research or educational purposes.

☐ I authorize the American University of Beirut, three years after the date of submitting my thesis, dissertation, or project, to: (a) reproduce hard or electronic copies of it; (b) include such copies in the archives and digital repositories of the University; and (c) make freely available such copies to third parties for research or educational purposes.

Signature: Date: 10-21-16
ACKNOWLEDGMENTS

Special thanks to Dr. Samar Noureddine, for her continuous feedback throughout the program and for Dr. Lina Abi Fakhr Kantar for her valuable advice through the project.

My recognition and gratitude are addressed to the American University of Beirut Medical Center administration, Nursing Services, Nurse managers, and the Registered Nurses for without them I wouldn’t have been able to undertake my study.
AN ABSTRACT OF THE PROJECT

Bachir Itani for Master of Science in Nursing
Major: Adult-Gerontology Track

Title: Knowledge of Diabetes Mellitus, a Survey of Registered Nurses

Diabetes Mellitus is considered one of the major health concerns threatening the world’s population in this modern age. Self-care is a key component of diabetes management and is best achieved through patient education. Since the role of the diabetes nurse educator is still not well-defined, and the structured diabetes educational programs are still scarce in Lebanon; the burden of patient education falls on the bedside nurses. The aim of this study was to assess the Registered Nurses’ diabetes related knowledge at the American University of Beirut Medical Center in order to identify knowledge gaps that would potentially impact the care and education rendered to diabetic patients.

A descriptive study design was used for this cross sectional survey. Data were collected using a self-administered questionnaire that was distributed to the nurses working on the adult medical, surgical, obstetrics, and gynecology units at AUBMC.

A total of 67 nurses participated in this study, making a 43.5% response rate. The mean score for all nurses on the DBKT was 22.64 (SD 6.04). None of the bivariate associations were statistically significant as knowledge score was not associated with the years of experience, educational preparation, attendance of diabetes in-service session. There was no relationship between the nurses’ knowledge score and perceived competence.

The findings suggest knowledge deficit related to important dimensions pertaining to Diabetes Mellitus nursing care. The survey provides evidence of the need for continuous diabetes knowledge assessment and professional development initiatives targeting nurses in acute care settings developing continuing education programs.
CONTENTS

ACKNOWLEDGEMENTS ......................................................... v

ABSTRACT ........................................................................ vi

LIST OF ILLUSTRATIONS ................................................... ix

LIST OF TABLES ................................................................. x

Chapter

I. INTRODUCTION ............................................................. 1
   A. Background ................................................................ 1
   B. Significance ............................................................ 3
   C. Purpose .................................................................... 4

II. LITERATURE REVIEW ..................................................... 6
   A. United Kingdom Prospective Diabetes Study ..................... 6
   B. Diabetes Self-Management Training ................................ 6
   C. Diabetes Self-Management Education ............................ 7
   D. Assessment of Diabetes Knowledge in Nurses .................. 8

III. METHODOLOGY ............................................................. 10
   A. Design ..................................................................... 10
   B. Sample .................................................................... 10
   C. Instruments ............................................................ 11
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Procedures</td>
<td>12</td>
</tr>
<tr>
<td>E. Ethical Considerations</td>
<td>13</td>
</tr>
<tr>
<td>F. Data Analysis</td>
<td>14</td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>16</td>
</tr>
<tr>
<td>A. Sample Characteristics</td>
<td>16</td>
</tr>
<tr>
<td>B. The Diabetes Basic Knowledge Test</td>
<td>18</td>
</tr>
<tr>
<td>C. Relationship between Demographics and Knowledge Score</td>
<td>23</td>
</tr>
<tr>
<td>V. CONCLUSION AND RECOMMENDATIONS</td>
<td>25</td>
</tr>
<tr>
<td>A. Discussion</td>
<td>25</td>
</tr>
<tr>
<td>B. Limitations</td>
<td>28</td>
</tr>
<tr>
<td>C. Recommendations</td>
<td>29</td>
</tr>
</tbody>
</table>

Appendix

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. DEMOGRAPHIC DATASHEET</td>
<td></td>
</tr>
<tr>
<td>B. DIABETES BASIC KNOWLEDGE TEST</td>
<td></td>
</tr>
<tr>
<td>C. AUTHOR’S PERMISSION LETTER</td>
<td></td>
</tr>
<tr>
<td>D. INFORMATION SCRIPT SHEET</td>
<td></td>
</tr>
<tr>
<td>E. COVER LETTER AND INFORMED CONSENT</td>
<td></td>
</tr>
</tbody>
</table>

BIBLIOGRAPHY | 59 |
ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>23</td>
</tr>
<tr>
<td>Figure</td>
<td>Page</td>
</tr>
<tr>
<td>Histogram of Knowledge Score</td>
<td>23</td>
</tr>
</tbody>
</table>

# TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sample Characteristics</td>
<td>14</td>
</tr>
<tr>
<td>2.</td>
<td>Knowledge of Etiology and Management of Diabetes</td>
<td>15</td>
</tr>
<tr>
<td>3.</td>
<td>Knowledge of Insulin and Oral hypoglycemic agents</td>
<td>15</td>
</tr>
<tr>
<td>4.</td>
<td>Knowledge about Complications of Diabetes</td>
<td>16</td>
</tr>
<tr>
<td>5.</td>
<td>Knowledge of Blood and Urine Glucose Monitoring in Diabetes</td>
<td>18</td>
</tr>
<tr>
<td>6.</td>
<td>Knowledge about Exercise, Diet and Foot Care in Diabetes</td>
<td>18</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Diabetes Mellitus is defined as a cluster of metabolic derangements described as chronic hyperglycemia resulting from abnormal insulin secretion or utilization (Craig, Hattersley & Donaghue, 2009). This chronic disease is considered one of the major health concerns threatening the world’s population in this modern age. Recent data from the International Diabetes Federation (IDF) revealed an alarmingly increasing prevalence of diabetes among the world’s population. In 2014, 387 million individuals worldwide had the disease and these numbers are expected to reach 592 million by 2035 (IDF, 2014). In Lebanon, it was reported that almost 1 in 7 individuals have diabetes mellitus. This ratio is expected to increase to reach 1 in 5 individuals in 2035 as diabetes continues to grow especially in the Middle East due to unhealthy lifestyles, obesity, and physical inactivity (IDF, 2014).

Diabetes can affect every organ of the body and result in irreversible and debilitating complications, such as macrovascular and microvascular complications. Cardiovascular disease is the number one cause of mortality and morbidity among
individuals with type 2 diabetes, whereby at least 65% of the people with diabetes suffer from cardiovascular events throughout their lifetime (American Heart Association, 2012). Other complications are not to be undermined, such as diabetic retinopathy, a common microvascular complication of diabetes and estimated to be responsible for approximately 10,000 new cases of blindness every year in the United States (Fowler, 2008). The predominant cause of End Stage Renal Disease (ESRD) in the United States is attributed to diabetic nephropathy whereby at least 7% of the patients with type 2 diabetes show early signs of kidney damage at the time of the diagnosis (Fowler, 2008). Diabetic neuropathies are classified into several subcategories; however, the most common complication is the chronic sensorimotor diabetic peripheral neuropathy. Diabetic peripheral neuropathy affects approximately 50% of the diabetic population (Boulton, 2005).

As a chronic illness diabetes cannot be cured, yet controlled through drug therapy, medical nutrition therapy (MNT), physical activity and lifestyle changes. Therefore, a key component of diabetes care lies in the patients’ self-management, which requires a lot of education and support by nurses and other healthcare professionals. Since nurses are in the best position to provide the needed education for
diabetic patients, it is important to ensure that they are adequately prepared to provide this information. The purpose of this project is to assess the knowledge about diabetes in nurses who work in medical surgical units at the American University of Beirut Medical Center (AUBMC).

Significance

Patients with type 2 diabetes are often diagnosed while being worked up for other health problems or cleared for surgery, and are very unlikely to be hospitalized because of the diagnosis of diabetes itself, rather for the diabetic complications. Patients with diabetes are prone to be hospitalized more often than non-diabetics. In fact, at least 25% of the diabetic patients report being hospitalized once within the past year (McCulloch & Inzucchi, 2015), with most hospitalizations attributed to major diabetic complications (Clarke, Glasziou, Patel, Chalmers, Woodward, & Salomon, 2010).

Patient knowledge about diabetes impacts hospital admission as well as the overall prevention of complications, as it has been postulated that diabetics have significant diabetes knowledge and skill deficits (Celeste-Harris & Maryniuk, 2006). Regardless of new advances in drug therapy, glycated hemoglobin (HbA1c) levels have
not been improving with time (Celeste-Harris & Maryniuk, 2006); a fact that stresses the importance of diabetes education and training to complement drug therapy.

The need for diabetes education programs stems from the need to educate patients about diabetes self-management and prevention of complications. Since such patient centered educational programs are still scarce, bedside nurses are the ones delivering diabetes education to the patients. Education has always been the hallmark of the nursing profession, but in a field that is always advancing with new guidelines and treatment modalities, nurses are being left with outdated knowledge, acquired during their preparation years. The results of a study by Pravikoff, Tanner, and Pierce (2005) on assessing the readiness of nurses in the United States to adopt evidence-based practice supports that claim. Pravikoff et al. (2005) revealed that 58% of the 760 surveyed registered nurses reported not using journals to search for new information, and 82% have never used a hospital library. This raises concerns over the adequacy of the diabetes-related knowledge the nurses are delivering to their patients.

**Purpose**

There has been no prior attempt at AUBMC or in Lebanon to assess Registered Nurses’ diabetes knowledge. A clinical educator for the medical surgical units at the
institution reported unsatisfactory performance of nurses in diabetes related knowledge on the baseline exam for newly recruited nurses (Al Hajj, personal communication, 2014). The aim of this project is to assess the diabetes-related knowledge of medical surgical nurses working at AUBMC. Results of this survey can be used to develop continuing education sessions and professional development initiatives to fill the diabetes knowledge gaps.
CHAPTER II

LITERATURE REVIEW

The effect of self-management education on the outcomes of patients with diabetes was documented in a number of studies. The United Kingdom Prospective Diabetes Study (UKPDS, 1997) examined the effect of intensive glycemic control on the incidence of complications and the outcomes of treatment in 5102 patients from 23 centers over 20 years (King, Peacock, & Donnelly, 1999). Although the glycemic threshold for diabetic complications could not be established for the study (King et al., 1999), it was reported that a decrease of one percent in HbA1c was associated with a 37% reduction in microvascular complication risk (Stratton et al., 2000).

A meta-analysis, undertaken by Cochran and Conn (2008), on the quality of life following Diabetes Self-Management Training (DSMT) revealed significant improvement in the quality of life of the participants that received formal diabetes education. Authors assess quality of life through terms such as “health-related quality of life, life satisfaction, well-being, and psychosocial adaptation to illnesses”. Cochran and Conn analyzed 20 studies which included 1,892 participants (2008). The quality of life
outcome comparisons were made between the treatment group and the control group post DSMT yielding an effect size of 0.281 which was considered to be statistically significant.

A recent randomized controlled trial (RCT) published in 2014 aimed at evaluating the efficacy of diabetes education on metabolic indicators and atherosclerotic characteristics in 76 participants with type 2 diabetes in Hong Kong (Yuan et al., 2014). The participants were randomly assigned into control group (n=40) and experimental group (n=36). Patients in the intervention group were enrolled in a Diabetes Self-Management Education (DSME) program over eight weeks, a 2-hour session weekly, followed by four weeks of nutritional therapy, whereas the control group only received nutritional advice. Data were recorded at baseline and directly after follow up. In the intervention group, the follow-up HbA1c was 6.77 ± 0.76 compared to 7.11 ± 1.3 for the control group with (P = 0.039). Their results revealed significant reductions in HbA1c and body weight between both groups after the DSME (Yuan et al., 2014).

The existing literature in a number of countries reveals that knowledge about diabetes management among nurses is suboptimal (Chan & Zang, 2007; Trepp, Wille, Wieland, & Reinhart, 2010). Chan and Zang (2007) surveyed 245 nurses in two
hospitals in Hong Kong regarding their actual and perceived diabetes-related knowledge and classified the nurses according to their responses using a modified version of the tool developed by Drass et al. (1989). Only 40% of the sample was found to have adequate diabetes-related knowledge, whereas the rest had inadequate and poor diabetes-related knowledge (Chan & Zang, 2007).

Similarly, Trepp et al. (2010) assessed diabetes-related knowledge among nursing students, nurses, and medical staff in internal medicine, surgery, and gynecology in a hospital in Switzerland. Nurses in all the three departments (surgery, medicine, and gynecology) were found to be the most deficient in diabetes-related knowledge among participants from the other disciplines, scoring less than 50% on the 42 multiple choice item questionnaire versus 62% among physicians in internal medicine, 48% in physicians in surgery, and 47% among gynecologists.

The above findings are supported by Yacoub et al.’s (2014) work using the Diabetes Self Report Tool (DSRT) and a modified version of the DBKT developed by Drass et al. (1989) on 277 nurses in seven hospitals in Jordan. The mean score of the nurses was 63.4%, thus reflecting deficiencies in both theoretical and clinical knowledge which necessitates continuing education activities.
Further to the above, the literature reveals that nurses do not possess enough knowledge about diabetes in order to be able to educate diabetic patients; however, such information is not available in Lebanon. The need to assess diabetes-related knowledge among nurses in Lebanon is paramount. The research questions that guided this study were:

1- What is the level of diabetes-related knowledge among nurses working on the in-patient adult medical, surgical, obstetrics, and gynecology units at AUBMC using the Diabetes Basic Knowledge Test?

2- Is there a difference in diabetes-related knowledge among nurses on the adult AUBMC units by nurses’ educational preparation?

3- Is there a relationship between diabetes-related knowledge of the nurses on the adult AUBMC units and their perceived competence in managing patients with diabetes Mellitus?
CHAPTER III

METHDOLOGY

Design

A descriptive study design was used for this cross sectional survey. Data were collected using a self-administered questionnaire that was distributed to the nurses working on the adult medical, surgical, obstetrics, and gynecology units at AUBMC.

Sample

The target population for this study were all registered nurses (RNs) working on the adult medical, surgical, and obstetric gynecology units at AUBMC with no exceptions, making a total of 154 RNs. The targeted inpatient units were Neuro Medicine, 5 South, 6 South, 8 North, 9 North, 9 South, 10 North, 10 South and 7 North. An attempt was made to recruit all nurses available during the data collection period, as some nurses may have been on vacation or leave. For an independent sample t test with 80% power and alpha of 0.05, a sample size of at least 120 nurses was needed (Polit & Beck, 2010). Thus, the sample size would be adequate provided the response rate is at least 80%. Out of the 154 questionnaires distributed, 70 were completed and returned;
however, three of the 70 participants did not complete 20% of the items, and thus were removed from the sample to avoid misleading results. The response rate of this study was 43.5%.

**Instruments**

The questionnaires administered to the RNs included a demographic datasheet that was developed for this project and the Diabetes Basic Knowledge Test (DBKT) to assess the nurses’ actual knowledge (Drass et al., 1989). The demographic datasheet included six items: gender, years of experience, highest level of education, estimate number of diabetic patients the nurses take care of per month, in-service education of diabetes management, and perceived competence in caring for patients with diabetes (Appendix A).

The DBKT, developed by Drass and colleagues (1989) is a-45-multiple choice test that emphasizes the etiology of Type 1 and 2 Diabetes Mellitus, treatment and diet plans, management of hypoglycemia, and insulin therapy (Appendix B). Content validity of the DBKT was established by a panel of experts. The DBKT has a reported Cronbach’s alpha reliability coefficient of 0.79 (Drass et al., 1989). Permission to use the tool was acquired from the author (Appendix C). The cultural appropriateness of the
questionnaire was assessed by two faculty members at the Hariri School of Nursing, and the knowledge test items were carefully reviewed and updated to reflect current standards of diabetes practice and education, thus questions that included blood glucose levels were adjusted to the latest American Diabetes Association practice guidelines (2015). Each correct item in the questionnaire was given a score of one and each missed or incorrect item was given a score of zero. The total scores for the DBKT range from 0 to 45; the higher the score, the higher the level of diabetes knowledge.

**Procedures**

After securing the approval of the institutional review board at the American University of Beirut (AUB), the approval of AUBMC’s administration was sought. The nurse managers of the targeted units were approached by the study coordinator to secure access to the unit’s RNs and to introduce the study using the study’s script (Appendix D). In an attempt to capture the attention of the nurses and improve response rate on the nine designated units, the script was orally delivered to the RNs during the unit’s periodic staff meeting and a copy was pasted on a box placed on the unit’s nursing station. The questionnaire packages which were also placed at the nursing station included: a cover letter that served as the informed consent (Appendix E), the
demographic data sheet, the DBKT, and a return envelope. Since staff meetings are held at different timings, it was difficult to distribute the questionnaires on the same day. Daily rounds were conducted on the nine units and sometimes on shift-basis to answer any question about the survey and to emphasize the procedure for returning the completing the questionnaire. The collection boxes were emptied once daily over a seven-week period; then were removed from all units. Participants were instructed to complete the questionnaire and return it in a sealed envelope to the designated box. Data collection commenced on the 15th of July, 2015 and ended on the 26th of August.

**Ethical considerations**

The participants were provided an informed consent document, which explained the objectives, procedure, and confidentiality of the information collected. The consent document highlighted that participation is completely voluntary and refusal to take part or withdrawal at any point in time from the study will not impact their relationship with AUBMC or their work. The participants in this study were assured that only the investigators will have access to the data and that no individual results will be reported. No identifiers were used; only code numbers to facilitate data entry. The participants were not asked to sign the consent document in order to protect their
anonymity. Returning the completed questionnaire served as implied consent to participate in the study.

Although the nature of the topic may have required supervision of questionnaire filling since it is a knowledge assessment, the nurses were allowed to fill in the questionnaire without supervision to avoid any perceived coercion or undue influence by the study coordinator. This was a minimal risk study as no intervention was undertaken and no sensitive questions were included. The ultimate aim of the study was explicitly stated as getting information as a basis for developing a continuing education course on diabetes management for registered nurses at AUBMC if needed.

**Data analysis**

Data were analyzed using the Statistical Package for Social Sciences software (SPSS) version 23. Descriptive statistics were used for sample characteristics; means and standard deviation for continuous variables, and frequencies and percentages for categorical variables. A score of one was given to each correct answer and a score of zero was given to each incorrect item on the DBKT, and a summative score calculated. Scores ranged from 0 to 45, higher scores indicate higher level of diabetes knowledge.
Reliability of the DBKT was assessed in this study using the Kuder-Richardson (KR) 20 coefficient. The value of KR was 0.726.

Bivariate relationships between the knowledge score and demographic characteristics were examined using independent sample t tests and ANOVA. Spearman Rho correlation coefficient was used to assess the relationship between the knowledge score and the perceived competence in diabetes care in the sample. Values were considered to be significant if P values were < 0.05.
CHAPTER IV
RESULTS

Sample characteristics

A total of 67 nurses participated in this study, making a 43.5% response rate (see Table 1). The sample was nearly equally distributed by gender (48% males and 52% females), over two thirds (67%) were BSN holders while the rest were Master prepared. Slight more than half of the nurses had up to five years of experience in nursing, 77% reported taking care of more than 10 diabetic patients a month, and more than half (58%) had never attended an in-service session on diabetes. Concerning perceived competence about taking care of a diabetic patient, 68% reported feeling competent in taking care of a patient with type I or type II diabetes.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency*</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>31</td>
<td>47.7</td>
</tr>
<tr>
<td>Females</td>
<td>34</td>
<td>52.3</td>
</tr>
<tr>
<td>Highest level of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSN</td>
<td>44</td>
<td>66.7</td>
</tr>
<tr>
<td>MSN</td>
<td>22</td>
<td>33.3</td>
</tr>
<tr>
<td>Number of Years of Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 3 years</td>
<td>21</td>
<td>31.8</td>
</tr>
<tr>
<td>3 – 5 years</td>
<td>16</td>
<td>24.2</td>
</tr>
<tr>
<td>6 – 10 years</td>
<td>18</td>
<td>27.3</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>11</td>
<td>16.7</td>
</tr>
<tr>
<td>Number of diabetic patients you take care of per month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 Patients</td>
<td>7</td>
<td>10.6</td>
</tr>
<tr>
<td>6-10 patients</td>
<td>8</td>
<td>12.1</td>
</tr>
<tr>
<td>&gt; 10 patients</td>
<td>51</td>
<td>77.3</td>
</tr>
<tr>
<td>Most recent in-service session about Diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within the past 6 months</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>6 months-1 year ago</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>1-2 years ago</td>
<td>22</td>
<td>33.3</td>
</tr>
<tr>
<td>Never</td>
<td>38</td>
<td>57.6</td>
</tr>
<tr>
<td>Perceived competence in caring for a patient with type I or type II diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very competent</td>
<td>7</td>
<td>10.6</td>
</tr>
<tr>
<td>Competent</td>
<td>45</td>
<td>68.2</td>
</tr>
<tr>
<td>Uncertain</td>
<td>13</td>
<td>19.7</td>
</tr>
<tr>
<td>Incompetent</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Very incompetent</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Some counts do not add up to 67 due to missing data. Percentages are calculated out of those who responded.
The Diabetes Basic Knowledge Test

The mean score for all nurses on the DBKT was 22.64 (SD 6.04). None of the nurses answered all items correctly, as the highest score was 35 and the lowest score was 6. Tables 2 through 6 show the results of the knowledge in various domains.

As shown in table 2, the general knowledge of nurses was better regarding management of diabetes (80.6% for type 1 and 65.2% for type 2) than its etiology (67.2% and 16.4% respectively). Concerning pharmacologic therapy, the mean knowledge score on insulin such as action and peak effect was >50%, where knowledge related to its storage and administration was <50% (see table 3).

Table 2. Knowledge of Etiology and Management of Diabetes (N = 67)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percent Correct scores (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management of Type I Diabetes</td>
<td>80.6</td>
</tr>
<tr>
<td>Etiology of Type II Diabetes</td>
<td>67.2</td>
</tr>
<tr>
<td>Management of Type II Diabetes</td>
<td>65.2</td>
</tr>
<tr>
<td>Etiology of Type I Diabetes</td>
<td>16.4</td>
</tr>
</tbody>
</table>
Table 3. Knowledge of Insulin and Oral hypoglycemic agents (N = 67)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percent Correct Scores (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin effect on blood glucose</td>
<td>97.0</td>
</tr>
<tr>
<td>Insulin injection contamination</td>
<td>81.3</td>
</tr>
<tr>
<td>Peak of regular insulin</td>
<td>81.0</td>
</tr>
<tr>
<td>Peak of NPH and Lente insulin</td>
<td>62.5</td>
</tr>
<tr>
<td>Physiologic actions of insulin</td>
<td>55.8</td>
</tr>
<tr>
<td>Side effect of Oral hypoglycemic agents</td>
<td>50.0</td>
</tr>
<tr>
<td>Correct sites for subcutaneous insulin injections</td>
<td>47.5</td>
</tr>
<tr>
<td>Insulin administration when undergoing surgery</td>
<td>38.7</td>
</tr>
<tr>
<td>Regular and NPH insulin preparation</td>
<td>35.5</td>
</tr>
<tr>
<td>Illness effect on insulin requirements</td>
<td>35.5</td>
</tr>
<tr>
<td>Duration of action of Chlorpropramide</td>
<td>6.3</td>
</tr>
<tr>
<td>Storage of insulin</td>
<td>3.1</td>
</tr>
</tbody>
</table>

In table 4, more than 90% of the nurses were able to identify the causes of hypoglycemia in diabetic patients on insulin or on hypoglycemic agents, symptoms of hyperglycemia, and long term complications of diabetes. As for knowledge on hypoglycemia, responses demonstrated deficient knowledge as only 45.3% of them were able to identify symptoms of hypoglycemia, and only 14.3% could identify initial action to be taken if a patient with type 1 diabetes experiences hypoglycemia. Nurses’ knowledge of Somogyi phenomenon was the lowest (6%).
Table 4. Knowledge about Complications of Diabetes (N = 67)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percent Correct Scores (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause of hypoglycemia in diabetic on insulin or oral hypoglycemic</td>
<td>93.8</td>
</tr>
<tr>
<td>Symptom of hyperglycemia</td>
<td>90.6</td>
</tr>
<tr>
<td>Long term complications associated with Diabetes</td>
<td>90.5</td>
</tr>
<tr>
<td>Symptom associated with Diabetic Ketoacidosis</td>
<td>88.7</td>
</tr>
<tr>
<td>Cause of hyperglycemia</td>
<td>82.5</td>
</tr>
<tr>
<td>The effect of stress on diabetes control</td>
<td>77.8</td>
</tr>
<tr>
<td>Blood glucose in a known diabetic who was found unresponsive</td>
<td>59.7</td>
</tr>
<tr>
<td>Cause of diabetic ketoacidosis in Type 1 diabetic</td>
<td>51.6</td>
</tr>
<tr>
<td>Symptom of hypoglycemia</td>
<td>45.3</td>
</tr>
<tr>
<td>Initial action when Type 1 diabetic is experiencing hypoglycemia</td>
<td>14.3</td>
</tr>
<tr>
<td>Somogyi phenomenon</td>
<td>6.6</td>
</tr>
</tbody>
</table>

Nurses’ knowledge regarding blood and urine glucose monitoring in diabetes was the lowest (see table 5), whereas nurses demonstrated adequate knowledge of only normal fasting blood glucose (97%) and HbA1c testing (72.7%). Nurses showed deficient knowledge on all items related to urine and ketone testing, as only 45.2% recognized the need to check for urine ketones and 22.7% knew the significance of a negative urine test in relation to blood glucose. In terms of the knowledge regarding the importance of foot care, 77.8% recognized the need for adequate foot care and 62%
knew the measures to be taken in case of a corn (see table 6). Slightly more than half of the nurses (55.6%) recognized the components of a diabetic diet and the effect of exercise on blood glucose, whereas 47% recognized the effect of exercise on food intake. The nurses’ knowledge of diet planning for a type 1 or type 2 diabetic showed no difference (38.1% and 38.3% respectively).

<table>
<thead>
<tr>
<th>Table 5. Knowledge of Blood and Urine Glucose Monitoring in Diabetes (N=67)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic</strong></td>
</tr>
<tr>
<td>Normal fasting blood glucose level</td>
</tr>
<tr>
<td>HbA1C</td>
</tr>
<tr>
<td>Action to take when diabetic has hyperglycemia and glycosuria</td>
</tr>
<tr>
<td>Checking for urine ketones</td>
</tr>
<tr>
<td>Reason to utilize blood glucose testing</td>
</tr>
<tr>
<td>Negative urine glucose test</td>
</tr>
<tr>
<td>Factors that affect accuracy and precision of blood glucose strips</td>
</tr>
<tr>
<td>Description of a double voided urine sample</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 6. Knowledge about Exercise, Diet and Foot Care in Diabetes (N = 67)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic</strong></td>
</tr>
<tr>
<td>Rationale for Special attention to the feet in diabetic patients</td>
</tr>
<tr>
<td>Food substitution for Type 1 diabetic</td>
</tr>
<tr>
<td>Corn removal from diabetic foot</td>
</tr>
<tr>
<td>Diabetic diet</td>
</tr>
<tr>
<td>Topic</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Effect of exercise on blood glucose</td>
</tr>
<tr>
<td>Effect of exercise on diabetic's food intake</td>
</tr>
<tr>
<td>Abrasion treatment in a diabetic</td>
</tr>
<tr>
<td>Meal plan for patient with Type II diabetes</td>
</tr>
<tr>
<td>Meal plan for patient with Type I diabetes</td>
</tr>
<tr>
<td>Snack for diabetic patients</td>
</tr>
</tbody>
</table>

Figure 1 shows the distribution of the total knowledge score. The distribution is skewed to the left with a mean of 22.6 and a mode of 23. Nineteen participants scored within the 25th percentile, 23 participants scored within the 50th percentile, and 27 participants within the 75th percentile.
Figure 1. Histogram of Knowledge score.

Relationship between nurses’ demographics and Knowledge score

Spearman Rho correlation coefficient was utilized to analyze the relationship between the nurses’ knowledge score and perceived competence. The result was non-significant (Rho=-0.19, p=0.119). Moreover, ANOVA was conducted to examine the
differences in knowledge of diabetes by years of experience, educational background, experience in caring for diabetic patients, and attendance of in-service sessions on diabetes. None of the results were statistically significant.

Knowledge score was not associated with the years of experience $F_{(3, 62)} = 1.53$, $P=0.216$, although it’s worth mentioning that participants with more than 10 years of experience had a mean score lower than those who had up to 3 years of experience.

Similarly, knowledge score was not associated with the educational degree as mean scores of BSN holding participants and Masters holders were very close, (mean score= 22.9 and 22.5 respectively). Diabetes knowledge score did not differ as well by how recent the attendance of diabetes in-service session was; $F_{(3, 62)} = 0.55$, $P=0.646$.

Results were not statistically significant when the knowledge score was compared between participants who attended a diabetes session within the past 2 years and those who have never attended any diabetes in-service session (mean scores 22.75 and 22.5 respectively). Knowledge score also did not differ by the number of diabetic patients that the nurses took care of per month ($F_{(2, 63)} = 0.44$, $P=0.643$).
Chapter V

Conclusion and recommendations

Discussion

The study examined the knowledge of diabetes mellitus and its management in 67 registered nurses working on adult in-patient medical, surgical, obstetric, and gynecology units at AUBMC. The mean score of the nurses on the DBKT was 22.64 (equivalent to 50% correct score). Accordingly, the nurses’ knowledge of inpatient diabetes care is inadequate if we consider 70% to be a passing grade. In addition, the scores did not differ by education, years of experience, experience in taking care of patients with diabetes, or attendance of in-service education sessions about diabetes.

The results in this study are lower compared to the results of other reported studies. In the original study by Drass et al. (1989), the mean score was 28.6 which is equivalent to 64%. In Yacoub et al.’s (2014) study, the mean score using the same test was 28.53 (64.3%), whereas in Findlow and McDowell’s (2002) study using the same instrument, the mean score was 69%.
Based on the findings, several areas of deficient knowledge among nurses were identified. Nurses in this study demonstrated deficient knowledge related to dealing with Type 1 diabetic patients in terms of identifying the etiology, taking the initial action when the patient experiences hypoglycemia, and describing the cause of diabetic ketoacidosis in type 1 diabetes. This deficient knowledge regarding type 1 diabetes could be explained by the infrequent hospitalization of the patient population because of diabetes itself; rather these patients often get admitted due to chronic complications such as cardiac or renal disease. Concerning insulin, knowledge deficit was mostly related to the practical aspect (preparation and administration). Nurses were unable to identify the terms for insulin storage (3.1%), mixing of NPH and regular insulin (35.5%), and insulin administration when patients are undergoing surgery (38.7%).

Regarding diet, the participants had a low score on planning a diabetic diet (for both type 1 and type 2), and for not recognizing the components of the diabetic diet. These results reflect the strong reliance of registered nurses on dieticians in this institution when it comes to diabetes education. Such elements are crucial because nurses use insulin on the units on daily basis. Moreover, participants showed low scores
on the side effect of oral hypoglycemic agents (50%) and the correct sites for subcutaneous insulin injections (47.5%).

Nurses in this study demonstrated strong knowledge of diabetic complications as this section of the study received the highest knowledge scores (see Table 4). This can be attributed to the fact that most patients get admitted for diabetic complications, hence the nurses are more familiar with the long term implications of diabetes.

Despite the low knowledge score, it is worth noting that 70% of the sample reported being competent to very competent in caring for a patient with type 1 or type 2 diabetes. This may be related to the social desirability or lack of the nurses’ awareness of their knowledge deficit. Similar results were revealed by Yacoub et al. (2014) who found a weak association between the nurses’ perceived competence and actual knowledge. In Drass et al.’s (1989) study, nurses had higher competence on the DSRT, yet scored lower on the DBKT. The weak association between knowledge score and competence raises concern about the quality of care the nurses provide to diabetic patients, especially when deficits are noted in basic aspects of care like insulin administration.
The lack of significant association between knowledge and education, years of experience, experience in caring for diabetic patients and attendance of in-service sessions may be related to the limited sample size and distribution within the categories. Collapsing the categories of the covariates and repeating the analyses did not change the results. These findings support the possible lack of emphasis on the care of diabetes per se in the hospital settings as mentioned above, since patients get admitted for other comorbidities rather than just diabetes. With 58% of the sample never having attended an in-service session about diabetes and the low knowledge score, the findings strongly suggest the need for continuing education programs on diabetes and its management.

Limitations

In this study, the participants were recruited using convenience sampling. The low response rate (43.5%) threatens the generalization of the study results to other institutions. Another limitation was the questionnaire itself, as the participants thought it was too long, which may have impacted the low response rate. Nevertheless, the aim of the study was to assess the knowledge of this particular group of nurses in this institution to identify knowledge gaps that can be addressed through continuing education.
Recommendations

A comprehensive update about diabetes mellitus and its management is recommended for nurses working in medical surgical units at AUBMC. An update about the latest guidelines in diabetes management, along with revision concerning the storage and administration of insulin and the dietary management of these patients must be provided. Not all patients get referred to a dietitian even if they have diabetes as this is costly and mostly done for newly diagnosed patients. Should nurses acquire such knowledge they can contribute to ensuring that patients continue to adhere to dietary recommendations. Through promoting self-care, nurses can positively impact the quality of diabetes education given to patients. Continuing education for the RNs may be done using power point sessions, or as an online course on Moodle.

Another recommendation is to administer the DBKT after continuing education sessions are provided as a post test in order to assess improvement in knowledge and efficacy of the education sessions. Collaborating with the Order of Nurses in Lebanon is an option that should be considered in developing continuing education programs nationwide. An initiative has been commenced by Sanofi in association with the Order of Nurses in Lebanon, titled Diabetes Connecting Nurses, to provide training to nurses
in Lebanon based on the latest guidelines and publications related to diabetes management. The program consists of 12 modules given over a year. At the end of the program, the participating nurses are given certificates issued from the Leicester Diabetes Center, UK.

A final recommendation would be instituting a diabetes nurse educator in the medical center to incorporate a multidisciplinary team approach. The diabetes nurse educator can be called upon whenever diabetic patients get admitted in order to assess their knowledge and self-management and intervene accordingly. This will ensure giving education to patients upon discharge about their diabetes self-management (which may be more related to survival skills), as nurses are more focused on the reason for admission and have little time to cover a lot in terms of discharge education.
APPENDIXES
Demographic Datasheet

Please fill in the blanks or circle the answer corresponding to the questions.

1. Gender: □ Male □ Female

2. Years of experience:
   a) Up to 3 years
   b) 3-5 years
   c) 6-10 years
   d) Over 10 years

3. Highest level of educational preparation:
   a) Master’s Degree
   b) Bachelor’s Degree
   c) Technique Superieur (TS)
   d) Technical Baccalaureate (BT)

4. When was the most recent in-service session about Diabetes that you have attended?
   a) Within the past 6 months
   b) Between 6 months and one year ago
   c) One to 2 years ago
   d) Never

5. Roughly speaking, how many diabetic patients do you take care of per month?
   a) 1 – 5 patients
   b) 6 – 10 patients
   c) More than 10 patients

6. Generally speaking, how competent do you feel about caring for a person with Diabetes Mellitus, whether Type I or Type II?
   a) Very competent
   b) Competent
c) Uncertain

d) Incompetent

e) Very incompetent
Instructions:

1. For each item, select the response that first comes to your mind”.

2. Once you have completed this questionnaire, place it in the envelope provided and put it in the designated box on the unit.

Thank you for your cooperation

The Diabetes Basic Knowledge Test was reprinted by permission from authors.
Diabetes Basic Knowledge Test

1. Which statement is characteristic of the etiology of Type I Diabetes?
   a) Strongly associated with obesity.
   b) Predominately genetic
   c) Autoimmune, viral or toxic destruction of the beta cells.
   d) I do not know.

2. Which of these statements about the management of Type I diabetes is true?
   a) Insulin injections are necessary to maintain life.
   b) Insulin injections are not always necessary if diet and exercise are well controlled.
   c) Oral hypoglycemic agents are sufficient for blood control in most patients.
   d) I do not know.

3. Which statement is characteristic of the etiology of Type II diabetes?
   a) Predominately non-genetic.
   b) Frequently associated with obesity and resistance to insulin.
   c) Autoimmune, viral or toxic destruction of the beta cells.
   d) I do not know.

4. Which of these statements about the management of Type II diabetes is true?
   a) Insulin injections are necessary to maintain life.
b) A controlled diet and exercise program is the most effective treatment.
c) Oral hypoglycemic agents are always effective.
d) I do not know.

5. What effect does insulin have on blood glucose?
   a) Insulin causes blood glucose to increase.
   b) Insulin causes blood glucose to decrease.
   c) Insulin has no effect on blood glucose.
   d) I do not know.

6. Which are the physiological actions of insulin?
   1. Transports glucose across cell membrane for use by the cells
   2. Enhances the formation of proteins from amino acids
   3. Enhances the breakdown of fats for energy
   a) 1 & 2.
   b) 1, 2 & 3.
   c) 2 & 3.
   d) I do not know.

7. If a known diabetes is found unresponsive, which of these assumptions about the person’s blood glucose should guide your initial actions?
   a) It may be very high.
   b) It may be very low.
   c) It may be normal.
   d) I do not know.

8. Normal fasting blood glucose level can best be described as
9. Which of the following affect the accuracy and precision of test results obtained with most of the blood glucose monitoring strips?

   1. Size and placement of the blood sample of the reagent pad.
   2. Timing of the test
   4. The patient’s hematocrit level

   a) 1, 2, & 3.
   b) 1, 2, & 4.
   c) 1, 2, 3, & 4.
   d) I do not know.

10. What would a negative urine glucose test indicate about the blood glucose level in a diabetic with a normal renal threshold?

   a) It is less than 180 mg/dL
   b) It is more than 200 mg/dL
   c) It is less than 60 mg/dL
   d) I do not know

11. Which of the following tests can determine the patient’s average blood glucose over an extended period of time?

   a) Glycosylated hemoglobin
b) Plasma Renin Activity
c) Insulin antibodies
d) I do not know

12. Which of these statements indicate one of the best reasons for utilizing blood glucose monitoring rather than urine testing?
   a) Drugs such as penicillin, ASA, cephalosporins, and barbiturates can create falsely negative urine test results.
   b) Urine retention and changes in kidney function can increase the lag time between blood glucose rise and spillover of glucose into the urine.
   c) The diagnosis of diabetes can be more readily confirmed at the patient’s bedside than by laboratory testing.
   d) I do not know.

13. A “Double Voided” urine specimen can best be described as:
   a) Urine that is collected and tested 30 to 60 minutes after the bladder has been emptied.
   b) Urine that is collected and tested twice a day, in the morning and at bedtime.
   c) Urine that is collected and tested twice before the result is recorded.
   d) I do not know

14. When should well controlled diabetes always check their urine for ketones?
   a) Whenever exercising.
   b) Whenever testing urine for glucose
Whenever urine glucose is 2% or blood glucose is greater than 240 mg/dL
I do not know

15. What should a diabetic do when he/she has been showing 2% urine glucose or blood glucose greater than 240 mg/dL for two consecutive days and now has positive ketone urine tests?

a) Omit the next dose of insulin or oral hypoglycemic medication and test urine/blood as usual.
b) Call the doctor, continue to test urine/blood every four hours or as directed by a physician and continue insulin or oral hypoglycemia medication
c) Continue with insulin or oral hypoglycemia medication and urine/blood testing as usual. These are normal for diabetics.
d) I do not know

16. The maximum effect (peak) of regular insulin occurs

a) 2-4 hours after injection.
b) 8-12 hours after injection.
c) 24-48 hours after injection
d) I do not know

17. The Maximum effect (peak) of both NPH and Lente insulin occurs

a) 2-4 hours after injection.
b) 8-12 hours after injection.
c) 24-48 hours after injection.
d) I do not know.

18. Where should one store insulin that is presently being used?
   a) In the fridge near the freezer.
   b) In the fridge away from the freezer.
   c) At room temperature and away from excess light.
   d) I do not know.

19. A diabetic contaminates the needle while preparing an insulin injection. What would be the best action to take?
   a) Dispose of needle even if this means disposing of the insulin and syringe and starting preparation from the beginning.
   b) Wipe the needle with an alcohol sponge and continue preparing the injection.
   c) Continue preparing the injection but wipe the injection site thoroughly with alcohol.
   d) I do not know.

20. When short-acting (regular) and intermediate-acting (NPH) are ordered to be given by injection at the same time, the nurse should:
   a) Use separate syringes to administer each insulin.
   b) Mix them in the same syringe drawing up the intermediate-acting insulin first.
   c) Notify the doctor since these two insulins are not compatible.
   d) Mix them in the same syringe drawing up the short-acting first.
   e) I do not know.
21. The duration of action of chlorpropamide (Diabinese) is?
   a) 6-12 hours.
   b) 12-24 hours.
   c) 24-60 hours.
   d) I do not know.

22. Which is NOT a reported side effect of oral hypoglycemic agents?
   a) Gastrointestinal upset.
   b) Allergic reaction.
   c) Skin rash.
   d) Constipation.
   e) I do not know.

23. A symptom of hypoglycemia is
   a) Frequent urination.
   b) Dry mouth and skin.
   c) Nervousness.
   d) I do not know.

24. A symptom of hyperglycemia is
   a) Frequent urination.
   b) Low grade fever.
   c) Cool, clammy skin.
   d) I do not know.

25. What is one cause of hypoglycemia in a diabetic who is taking insulin or oral hypoglycemic agents?
26. What is one cause of hyperglycemia?
   a) Decreased food intake.
   b) Infection.
   c) Negative urine for glucose.
   d) I do not know.

27. One symptom associated with diabetic ketoacidosis is:
   a) Cold, clammy skin.
   b) Acetone breath.
   c) Negative urine for glucose.
   d) I do not know.

28. What is one cause of diabetic ketoacidosis in the Type I diabetic?
   a) Excessive exercise.
   b) Excessive intake of diet soft drinks over a prolonged period.
   c) Failure to take daily insulin dose.
   d) I do not know.

29. What effect does illness (for example, a “sick day”) have on a diabetic’s insulin requirements?
   a) Illness causes a decrease in insulin requirements.
   b) Illness causes an increase in insulin requirements.
c) Illness causes no changes in insulin requirements.

d) I do not know

30. In general, changes in the pattern of insulin administration for the diabetic undergoing surgery might include:

a) Increase the dose of long acting insulin the night before and the morning of surgery.

b) Discontinue all subcutaneous insulin the day of surgery and infuse long-acting insulin intravenously at a constant drip.

c) On the day of surgery, reduce the usual a.m. dose of insulin and give subcutaneous or IV boluses of short acting insulin per frequent blood glucose monitoring results.

d) I do not know.

31. Which of the following long term complications are associated with diabetes?

a) Eye changes.

b) Renal and cardiovascular changes.

c) Nervous system changes.

d) All of the above.

e) I do not know.

32. The effect of physical and emotional stress on diabetes control includes

a) The secretion of stress hormones that cause an elevation in blood glucose levels.

b) The secretion of stress hormones that cause a decrease in blood glucose levels.
c) The secretion of stress hormones has no effect on blood glucose levels.
d) I do not know.

33. Why is it necessary that diabetics pay special attention to proper care of their feet?
   a) Several years of injecting insulin into the thighs can cause edema in both the legs and the feet.
   b) Flat feet are commonly associated with diabetes unless preventive measures are routinely used.
   c) Persons with diabetes often have changes in sensation and poor circulation to their feet.
   d) I do not know.

34. A diabetic has a small corn on the right foot and wants it removed. What should be done first?
   a) Use a liquid corn remover, following directions carefully.
   b) Refer the diabetic to a podiatrist.
   c) Carefully trim the corn with a sterile cutting instrument.
   d) I do not know.

35. A diabetic just received an abrasion of the left leg. What should be done to treat the abrasion?
   a) Wash gently with mild soap and water, dry with a clean towel, and observe carefully for any signs of infection.
   b) Wash gently with mild soap and water, apply a small amount of iodine and observe carefully for any signs of infection.
c) Apply a small amount of iodine and call the doctor.

d) I do not know.

36. What effect does exercise have on blood glucose when the diabetic’s glucose is no less than 300 mg/dL?
   a) Decreases blood glucose.
   b) Increases blood glucose.
   c) Has little effect on blood glucose.
   d) I do not know.

37. What effect does increased exercise have on a diabetic’s food intake needs if the patient has a well-controlled Type I diabetes?
   a) Decreases the need for food.
   b) Increases the need for food.
   c) Has little effect on the need for food.
   d) I do not know.

38. Which is the most appropriate initial action to take for the Type I diabetic who is having a hypoglycemic reaction?
   a) Drink 120 ml of regular soda.
   b) Drink 120 ml of orange juice with 2 teaspoons of sugar.
   c) Eat 4 crackers with butter or margarine.
   d) I do not know.

39. A type I diabetic does not like one of the food items on the meal tray. What would be the best action for the nurse to take?
a) Advise the patient to eat all other items on the tray and omit the one item.

b) Advise the patient to omit that one item and adjust the next scheduled insulin dose to accommodate this deletion.

c) Explain to the patient that the diabetic diet is carefully calculated and that the dietician will be consulted about exchanging this item for another.

d) I do not know.

40. Which of these is the main objective when developing a meal plan for the person with Type II diabetes?
   a) A calorie-controlled diet that will achieve and maintain ideal body weight.
   b) A high-carbohydrate, high protein diet that encourages an increase in body protein reserves.
   c) A low-carbohydrate, high-protein diet that will prevent fluctuations in blood glucose levels.
   d) I do not know.

41. A diabetic diet is calculated for which of the following nutrients:
   
   1. Carbohydrates
   2. Proteins
   3. Fat.

   a) 1 & 2.
   b) 1 & 3.
c) 1, 2, & 3.

d) 2 & 3.

e) I do not know.

42. Which of these is the main objective when developing a meal plan for the person with Type I diabetes?
   a) A nutritionally balanced, 6 small meals/day plan that will prevent delayed stomach emptying.
   b) An individualized diet plan that will maintain euglycemia and normal growth and development to include foods from the 4 food groups while ensuring that calories are evenly distributed.
   c) A low fat, low fiber diet to prevent excessive weight gain and minimize the risk of cardiovascular disease.
   d) I do not know.

43. A diabetic has refused an evening snack of fruit juice and ½ of a sandwich. You should substitute with
   a) 5 Graham crackers and 245 grams of plain yogurt.
   b) 6 crackers and 55 grams of cheese.
   c) A piece of fresh fruit, 30 grams of peanut butter and 4 crackers.
   d) I do not know.

44. For the past 2 days, a diabetic has demonstrated the following:
   - Urine test results for glucose levels over several hours, often unrelated to meals
   - 2% glycosuria occurring upon wakening, preceded by nocturnal sweating, nightmares or headache
Based on this assessment data, what is the person demonstrating?

a) Pass-through or flashback phenomenon.
b) Somogyi or rebound.
c) Dawn phenomenon.
d) I do not know.

45. Which of the following sets of figures best illustrates the correct sites for subcutaneous insulin administration?
February 22, 2015

Bachir Itani, RN, BSN
MSN student,
American University of Beirut
Hariri School of Nursing,
Maamari Street,
Beirut 1107 2020
Lebanon

Dear Bachir,

Thank you for your recent inquiry regarding tools that were used in the published study “Perceived and Actual Knowledge of Diabetes Mellitus Among Nurses, including the three instruments: “Demographic Data Sheet,” “Self-Report Tool,” and “Diabetes: Basic Knowledge Test.”

It is recommended that you change the Likert scale for the “Self-Report Tool” to a 5-point scale since this is generally accepted as the standard in attitudinal measurement. This change would allow for individuals who truly have “no opinion” regarding the topic of inquiry. Also, the knowledge test items should be carefully reviewed and updated to reflect current standards of practice and education. This tool has been revised and used by multiple researchers over the years since its development. It is recommended that you review the more recent versions of this tool for suggested updates to the questions and answers.

You have our permission to copy these tools as needed for the purpose of your study/project. We ask only that you send a copy of any revisions you make to the tools for your use, as well as a copy of your study results to the address below. Please feel free to contact me should you have further questions. I wish you the best in your project!

Sincerely,
Jan Drass RN, MA, CDE
2908 Carone Drive
Jefferson, MD 21755
American University of Beirut
Information Sheet For

Knowledge of Diabetes Mellitus, a Survey of Registered Nurses

Principal Investigator: Dr Samar Noureddine

Co-Investigator: Dr Lina Kantar

Student: Bachir Itani, MSN student

Are you up to date on the latest developments in managing patients with diabetes mellitus? Do you want to know if you are? If yes, then you are invited to participate in this survey about Knowledge of Diabetes Mellitus, a Survey of Registered Nurses. I am Bachir Itani, a graduate student at the American University Of Beirut; I am conducting this study as my graduation project. I am interested in assessing the awareness of AUBMC nurses related to the latest management guidelines for patients with diabetes mellitus.

You are among 154 nurses who work in medical surgical units that we are recruiting for this study. Your participation in this study will require completion of this questionnaire; this should take approximately 20 minutes of your time. Your participation will be anonymous. You will not be paid for being in this study. This survey does not involve any risk for you; however, your participation will help us know whether there is a need to develop continuing education sessions about diabetes mellitus to the nurses at AUBMC.

You do not have to be in this study if you do not want to be. You do not have to answer any question that you do not want to answer for any reason. We will be ready to answer any question you have about this study. If you have further questions about this study or if you have a research-related problem, you may contact me at AUBMC 01/350000 extension: 6305, email:bmi01@mail.aub.edu or my instructor, Dr Samar Noureddine at Hariri School Of Nursing, 01/350000 extension: 5966, email: sn00@aub.edu.lb. If you have questions about your rights as a research participant, you may contact the AUB Institutional Review Board (IRB) 01-350000 - 5454. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.
Please complete the attached survey without adding your name or any identifier not requested in the questionnaire, seal your envelope, put my name on it and leave it in this box. Thank you.
Dear Colleagues

My name is Bachir Itani, and I am in the Master’s in Nursing Program – Adult Track at the American University of Beirut Hariri School of Nursing. I am inviting you to participate in the study titled “Knowledge of diabetes mellitus, a survey of registered Nurses” that I am conducting with Dr. Samar Noureddine, the principal investigator, and Dr. Lina Kantar for my graduation project. The aim of this study is to assess the current practices of diabetes related knowledge among registered nurses working in medical surgical units. Completing this survey is expected to take around 20 minutes of your time.

Although there is no direct benefit for you from participating in the study, the information you will provide is very important. The findings of this study will assist the clinical educators at AUBMC and the Clinical and Professional Development Center (CPDC) in identifying knowledge gaps and developing in-service continuing education sessions to update you on the management of patients with diabetes mellitus, so that we can provide better quality care for this patient population.

Participation in this study is completely voluntary. Refusal to participate or deciding to withdraw from the study will involve no penalty or loss of any benefits to which you are otherwise entitled and neither will it affect your relationship with AUB or AUBMC. If you decide to participate kindly complete the questionnaire, put in the envelope provided and place it in the designate box in your nursing unit. Please do not use any resources while answering the questionnaire.
This survey is completely confidential and anonymous. Your participation in this survey does not involve any risk beyond what you ordinarily encounter in daily life. No identifying information such as your name or ID number will be obtained, so you cannot be identified. Code numbers will be used to facilitate data entry. Completing and returning the questionnaire implies your consent to participate in this study. Participants may at their discretion retain the consent document.

Access to the study results will only be restricted to the principle investigator and the study coordinator and results will not be shared with your supervisors and will be reported in aggregate form. The data will be stored in a locked cabinet in the primary investigator’s office. Electronic files will be saved on a password protected computer. Data will be destroyed three years after completion of the study. The research records will be monitored and may be audited without violating confidentiality.

If you have any questions or enquiries, Dr. Samar Noureddine, can be reached on 03/579451 or Ext 5966/ sn00@aub.edu.lb.

If you need more information about your right as a participant in this study, you contact the institutional review board office at extension 5454.

Sincerely,

Bachir Itani, RN, BSN
MSN student,
American University of Beirut
Hariri School of Nursing,
Maamari Street,
Beirut 1107 2020
Lebanon

Study PI

Samar Noureddine, PhD, RN, FAHA
Professor,
American University of Beirut
Hariri School of Nursing
Tel: 01/274274, ext 5966
BIBLIOGRAPHY


Pravikoff, D. S., Tanner, A. B., & Pierce, S. T. (2005). Readiness of US Nurses for Evidence-Based Practice: Many don’t understand or value research and have had little or no training to help them find evidence on which to base their practice. *The American Journal of Nursing, 105*(9), 40-51.


