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Nurses' Knowledge on The Nature and Scope of Diabetic Complications in Selected Hospitals in Kisumu County, Kenya

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Abstract

According to World Health Organization (WHO) 2010 report, diabetes mellitus complications affect 10% of adults globally, and it is estimated to become the seventh cause of death of adults by 2030. Diabetic complications do occur as a result of poor glycemic control, lack of optimal maintenance of glycemic control, lack of evidence based treatment, constant stress levels and work pressures. Nurses' knowledge in assessing diabetic patients has been known to be the indicator in the assessment of patients who have the potential of developing diabetic complications. These complications can lead to an increase in morbidity, mortality rates and increased health care costs. The purpose of this study was to determine nurses'knowledge on the nature and scope of diabetic complications in diabetic patients in selected hospitals in Kisumu County.A cross sectional descriptive study design that employed both quantitative and qualitative approaches was used in the study. The study population involved 96 nurses working in the medical wards, surgical wards and diabetic clinics of selected hospitals. Simple random sampling and proportionate simple random sampling methods were used. Diabetic self-assessment report tools and observation checklists were used to collect data from the nurses. The instruments were piloted before administration to establish their validity and reliability. Data files were collected, coded, cleaned, prepared, filtered, and entered in a statistical computer package SPSS version 20.0. Data analysis was done using specific tests according to variables as guided by the objective. Descriptive statistics yielded means, frequencies and standard deviation. Chi square was used to relate the relationship between variables. The study results found out that there is a strong relationship between the nurses' knowledge, education levels, experience and their ability to identify the nursing needs of patients who are likely to develop diabetic complications. The study also found that 56(58.3%) nurses could not explain how stress affects diabetic control. Based on the findings, the study recommends that; nurses be educated on the effects of stress on diabetic control, since diabetic care is specialized, nurses should be specialized and be deployed to diabetic care areas in the health care facilities and additional training for practicing nurses.

Keywords

Assessment, Diabetic Complication, Diabetic Ketoacidosis, Diabetes Mellitus, Education, Insulin Derivatives, Knowledge, Nursing Assessment, Nurses' Knowledge.

Background of the Study

Diabetes mellitus is a chronic systemic disease that alters carbohydrate, fat, and protein metabolism; it's the most common endocrine disorder and the third leading cause of death in the United States (WHO, 2009).

Over the past few decades, both the number and prevalence of diabetes have steadily increased. According to (WHO, 2016), diabetes is one of the four priority's Non Communicable Diseases (NCD), and has become an important public health problem. Globally,WHO guidelines have shown that an estimated 422 million adults were living with diabetes in 2014 compared to 108 million people in 1980 indicating a rise from 4.7% in 1980 to 8.5% currently in the adult population.

In 2012 diabetes caused 1.5 million deaths by the increased risks of cardiovascular diseases and other complications. Diabetes of all types can cause multi organ complications to include heart attack, kidney failure, leg amputation, vision loss and nerve damage. Poorly controlled diabetes in pregnancy increases the risks of fetal death and other premature deaths. Economically people with diabetic complications, their families and the health sector system bear huge economic losses, contributed by the cost of drugs like insulin derivatives, oral agents, thus a rise in economic impacts (WHO, 2016).

The quality of healthcare services mainly depends on practitioners' knowledge and technical skills according to Benner 2010. Benner continues to say that these skills are gained through continuous education, updates, use of evidence based practice, and internet services through self-initiatives and this can also occur through staff development and career path.

Nursing knowledge in assessment of patients with diabetes is a frequent healthcare approach where, nurses attend to the patients due to diabetes related issues, for complications of their chronic illnesses, or unrelated health problems. Each visit can be viewed as an opportunity to assess and improve the patient's understanding of their illness, and their ability to control the potential complications and prevent further development of diabetic complications. (WHO, 2015).

Modic 2014 in his study stated that, recent trends in caring for patients with DM in the hospital have focused on blood glucose targets and insulin management. These trends require registered nurses to stay abreast of new knowledge and gain competency that translates into evidence-based practice changes

Atieno (2014) denotes that, the nurses should be knowledgeable in the management of hyperglycemic crisis per protocol, which is a simple four step process that entails blood sample collection for metabolic profile before administration of intravenous fluids, after blood sample collection an infusion of saline follows, the nurse ensures that the potassium levels are greater than 3.3mEq/l before initiation of insulin therapy and supplement potassium if needed and finally an initiation of insulin therapy once the steps have been followed up.

Clinical practice by nurses in the prevention of diabetic complications plays a great role (Donnelly *et. al;* 2005).

Donnelly 2005 said that ongoing education in the rapidly changing field of DM care must include current research, evidence based protocols, and competency assessments to increase professional

nursing knowledge.

Statement of the Problem

Health care professionals treating patients with DM have limited understanding, knowledge, and resources to adequately care for and educate patients with DM and improve self-management (Holt et al., 2013; Korytkowski, Koerbel, Kotagal, Donihi, &DiNardo, 2014).

A study assessing DM-related knowledge among registered nurses found that overall knowledge was lacking, with a mean score of 48.5%, and a score of 47.8% for knowledge of hypoglycemia and 51.3% for knowledge of chronic complications of DM (Abduelkarem, 2013).

In Kenya and sub-Saharan Africa, diabetes is the number four contributor in the cause of acute complications (WHO, 2010). In a study done in Kenyatta National Hospital (KNH) in 2005, 30% of patients who died within 48 hours of admission were from acute diabetic complications. Patients who had developed foot ulcers were from the many tertiary clinics in Kenya due to hyperglycemic control, infections, hypertension and dyslipidemia (Atieno, 2014).

In the recent past there has been a rise in the number of patients who present to the health facilities with undiagnosed diabetes as a result of lifestyle factors (WHO, 2015).WHO estimates that the prevalence of diabetes in Kenya is at 3.3% and predicts a rise to 4.5% by 2025; however two thirds of diabetics may remain undiagnosed (WHO, 2012).However, this excludes to 60% of diabetics that doctors and health officials in the country claim are not yet diagnosed. A recent estimate by the Kenya Educational Medical Research Institute (KEMRI) places prevalence as high as 10% by 2030.The burden of diabetes as a disease is increasing at a rate that should be explored further (WHO, 2010). In Kisumu County (Kenya), there is a rise in the number of patients with diabetes mellitus due to lifestyle factors, urbanization and due to low knowledge levels about diabetes accounting for 2% of deaths (WHO, 2012).

According to Forbes (2004), in many hospitals it is the responsibility of staff nurses to assess and administer insulin and recognize the potentially harmful directions and impending hypoglycemic scenarios. Forbes 2004 continues to say that patient assessment is highly interdependent with the nurse's knowledge of commonly occurring health challenges.

Young (2011) asserted that registered nurses have knowledge deficits related to managing patients with DM in the hospital. Nursing knowledge was most needed on the topics of pathophysiology, medication management, nursing assessment and care, diabetic complication assessment like hyperglycemia outcomes, and current guidelines.

Therefore, it is against this background that the study aimed at determining the nurses' knowledge on the nature and scope of diabetic complications in diabetic patients in selected hospitals in Kisumu County.

Research Design

The study set out to determine the nurses' knowledge on the nature and scope of diabetic complications in diabetic patients in selected hospitals in Kisumu County.

A descriptive cross sectional design that employed both qualitative and quantitave approaches was used in the study. Data was collected from the nurses in relation to their knowledge on the nature and scope of diabetic complications. The research design provided the necessary detail and depth of data analysis to make the findings relevant to practice. The data included the nurses' knowledge on the nature and scope of diabetic complications.

Study Area

The study was conducted in Kisumu County in the western region of Kenya. This study was done in Kisumu County since there has been a rise in the prevalence of patients presenting with diabetic complications and has never been addressed. The study was conducted to determinethe nurses' knowledge on the nature and scope of diabetic complications in diabetic patients in selected hospitals in Kisumu County.

Kisumu Countyis one of the 47 Counties in Kenya. It is located between latitudes 15^{o} N and 45^{o} S, longitudes 15^{o} E and 34^{o} E.

The County is bordered by Homa Bay and Kisii Counties to the South, Nandi County to the North East, Kericho County to the East, Vihiga County to the North West and Siaya County to the West. The County covers a total land area of 2086 km^2 and another 567 km^2 covered by water. Administratively it is divided into seven sub-counties namely: Kisumu Central, Kisumu East, Kisumu West, Seme, Nyando, Nyakach and Muhoroni. The names and boundaries of the sub-counties coincide with the political constituencies in the County. Kisumu County has nine major urban centres namely; Kisumu City (the County headquarters), Ahero, Muhoroni, Chemelil, Awasi, Katito, Maseno, Sondu, Kombewa and many other small market centres.

Economic resources of Kisumu are Agricultural, Fisheries and water. Main economic activities include subsistence farming, livestock keeping, fishing, rice farming, sugarcane farming, and small scale trading. Notable hospitals in Kisumu County include Jaramogi Oginga Odinga Teaching & Referral Hospital, Kisumu County Hospital, The Aga Khan Hospital Kisumu and Avenue Health Care Hospital in Kisumu.

Target Population

The target population comprised of registered nurses who worked in medical, surgical wards and diabetic clinics of selected hospitals included in the study.

Inclusion Criteria

Registered nurses at diploma and bachelor's degree level who had been in the institution for more than 6 months, who agreed to participate in the study, both male and female and those who had signed the informed consent. All nurses who were working in the medical, surgical wards and diabetic clinic at the time of data collection.

Sample Size Determination Calculation

Sample Size calculation was done using Fishers method of the total target population of all nurses working in the medical, surgical wards and diabetic clinics. Given that the proportion of the population having the required characteristics is estimated at 50% (p=0.5) the sample size was determined using the following formula Mugenda, (2003). $n=Z^2pq/n$ where:

z = the standard normal deviate at the required confidence level at 95% (equivalent to 1.96)

p = the proportion in the target population estimated to have characteristics being measured. q = 1-p, d = the level of statistical significance set at + or – 5% or 0.05

Since the target population is less than 10,000, the final sample estimate (nf) was calculated as follows (Fisher *et al.,* 1983):

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$$nf = \frac{n}{1+n/N}$$

Where: nf = the desired sample size (when the population is less than 10,000).
N = the estimate of the of the population size which is 112
In this study the proportion of the target population with a certain characteristic is 50, the z-statistic is 1.96, and the error risk assuming 95% CI is 0.05 therefore, the sample size is:

$$n = \frac{(1.96)^2_{(0.5)\ (0.5)}}{(0.05)^2}$$

n=384
Therefore n=384 divide by 1+n/estimate of the population
nf=384/1+384/112
nf=384/1+3.4
nf=384/4.4
nf=87
10% of the population was selected to cater for non-response rates. This was 10% of 87 that gave 9 participants. Therefore the sample size became 96.
Since the respondents were drawn from diverse working hospital environments it was believed that they would provide rich and helpful data. The researcher sought permission to conduct the study in the identified hospitals. The researcher then obtained the nurses' consent for participation in the study after giving full information about the study and clarifying all issues of concern to the respondents. This was done through signing the informed consent forms.

Sampling Procedure

Kisumu County has both public and private hospitals, from this 3 of the 9 major public hospitals were picked using simple random sampling method. These hospitals were: Jaramogi Oginga Odinga Teaching and Referral Hospital (JOORTH), Kisumu County Hospital (KCH), Ahero Sub County Hospital (ASCH), The Aga Khan Hospital Kisumu (AKHK) and Avenue Health Care Hospital (AHC). This selection involved 3 public and 2 private hospitals given that they are the major and prominent hospitals within the county. The total number of nurses in the sampled hospitals was 112. Total sample as determined was 96 and the research included proportionate simple random sampling method to pick registered nurses from selected hospitals under study as follows:

Table 1 : List of Public and Private Hospitals visited and Sample Size Calculation

Public Hospitals	Total number of Nurses	Sample
JOORTH	40	96/112x40=34
Kisumu County Hospital	20	96/112x20=17
Ahero Sub County Hospital	2	96/112x2=2
Private Hospitals		
The Aga Khan Hospital	30	96/112x30=26
Avenue Health Care	20	96/112x20=17
Total	112	96

In simple Random Sampling each nurse had an equal chance of being selected in the sample. Using the sampling unit as shown in Table 1, randomness is assured by a sampling procedure, where a given number is written down on small papers bearing the name of the hospital where the nurses were to choose from. The papers were mixed well in a small container and the required slips were picked by the nurses at random.

Nurses who were present on the selected wards were asked to complete a diabetic self-assessment report tool after signing the consent form. No internet or reference materials were allowed in the wards, this ensured that the nurses did not seek external assistance to answer the questions. A research assistant, who utilized the checklist, observed two to three nurses on shift each ward under study. The research assistants had not previously interacted with the nurses, and the nurses did not know that they were being observed. This helped in minimizing changes the staff could in their usual routine care if they knew that they were being observed. The finding from the nurses on how they assessed patients and their practice was also noted down.

Development of a Research Instrument

To collect data in this research a diabetic self-assessment report tool was used. The tool administered was organized in the following two sections: socio demographic characteristics and knowledge on the nature and scope of diabetes. All the research tools were piloted to ascertain their validity and reliability in the study.

Pre-test of Research Instrument

Pretest refers to a trial administration of an instrument to identify flaws. When a study tool is used as a data gathering instrument, it is used to determine whether questions and directions are clear to study participants and whether they understand what is required from them. The diabetic self-report tool was piloted in a different hospital other than the ones identified for the study. A pilot study was conducted to clarify instructions, check the appropriateness of the language used in the research instruments and to determine the difficulty of the items in the instruments in order to make adjustments in the study tool.
However before the study some precautions were taken into consideration to include: First and foremost, short, clear and straightforward questions in order to eliminate ambiguity. Secondly, the researcher had a discussion with the nurses prior to presentation of the tool on the purpose of the study. This was to motivate the nurses to own up to the process by filling in the items required in the tool.

Validity of the Instrument

This was ensured by providing a pretested diabetic self-reported tool with the statements based on the content from the literature review and the study objective.

Reliability of the Instrument

This was achieved by consistency in the administration of the research tool during data collection period and on individual basis.

Data Collection Procedure

The researcher first obtained a letter of introduction from the School of Graduate Studies of Masinde Muliro University of Science and Technology. This letter enabled the researcher to get a permit from the National Council of Science and Technology (NACOSTI), Kenya. The researcher also collaborated with the County Director of Health Kisumu County. Data was collected during a four- week

period to avoid intrusion of too many confounding variables. The tool was administered on individual basis by the researcher or her research assistants to ensure independent responses. Prior to data collection the researcher requested the heads of hospital involved to allow their nurses participate in the study. The researcher ensured that there was privacy and confidentiality before presenting each instrument for the study.

Data was collected using a diabetic self-assessment report tool that was administered to registered nurses who were working in the medical, surgical wards and diabetic clinics of the selected hospitals identified for study. The tools were personally distributed by the researcher to the registered nurses. The tool had parameters which were to explore the study participants' knowledge in the assessment of diabetic complications.The tool had yes/no responses.

Ethical Consideration

Prior to conducting the study, approval was sought from the Institutional Review Board Committee of the University of Masinde Muliro University of Science and Technology, where logistical and ethical considerations were included, as well as from the Executive Administrative Team at the facilities in which the study was conducted. In compliance with the outlined regulations brought forth by the facility, the principal investigator provided contact information to each nurse participant in lieu of questions regarding participation in the study. Registered nurses were assured of anonymity in joining the study; they were also informed of it's voluntary to participate and that there was no penalty for those not willing to participate.

The researcher avoided strategies that would compromise the nurses' values or put them at risk. Informed consent and maintaining confidentiality were the ethical issues considered in this study. The researcher accurately represented what the nurses reported without biases.

Informed Consent

Consent refers to the process of giving respondents an opportunity to decide whether to participate in a particular study or not. Adequate information and opportunity to enquire was availed before nurses were asked to fill in the informed consent forms. The respondents in this study were all registered nurses working in the medical, surgical and diabetic clinics. The nurses were given all the relevant information about the study that was to be undertaken. This was important for the nurses to give consent without coercion, pressure or undue enticement. The researcher ensured that the nurses' anonymity was maintained, and this was to allow them to choose to either participate in the study or not.

Confidentiality

The material and information provided by the respondents would be destroyed afterwards to protect their confidentiality. The researcher had no intention whatsoever to use the nurses' names in any publication.

Privacy

This was safeguarded where no disclosure of information was done by researchers to others at any point during the study. No identification of nurses involved in the study was done during data collection and coding was done during this time.

Beneficence

In this study the registered nurses involved were given information on what the study was about and a debriefing after the study. This gave the nurses involved in the study room to ask questions and clarifications about the study. This ensured that the risks incurred will not be greater than the normal.

Non maleficence

This would entail the duty to benefit others and prevent any harm in the study.

Justice

In this research fairness and equity was observed, where a procedure of selecting registered nurses to be involved in the study was done using an inclusive criteria.

Data Analysis

Quantitative data were coded, and entered in a statistical computer package SPSS version 20.0 data were edited for errors and corrected accordingly. Data were analyzed using specific tests depending on the variables. Descriptive statistics generated the means and standard deviation, frequencies, and percentages. Inferential statistics such as chi-square, Cramer's V and correlation coefficients were done to test the strength of relationships between the variables to include age, education level, gender, knowledge and diabetic complications.Data analysis was done as per the objective. Analyzed data were presented in tables. Data security was ensured by use of passwords kept by the investigator only.

Diabetic Self-Report Tool

The self-report tools were administered to the nurses who worked in surgical and medical wards during the study period. A total of 96 diabetic self-report tools were completely filled which gave 100% response rate. The response rate was sufficient and representative and conforms to Mugenda and Mugenda (2003), stipulating that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and above is excellent. Thus, a response rate of 100% was fit and reliable for the study.

Results

The objective of the study was to determine nurses' knowledge on the nature and scope of diabetic complications in diabetic patients in selected hospitals in Kisumu County.To enhance quality, the collected data from all the respondents was analyzed using the Statistical Package for Social Sciences version 20.0 (SPSS).

Table 2 : Registered Nurses location of work

Nurses' location of work	Frequency	Percentage %
Diabetic Clinic	10	10 %
Medical/Surgical wards	86	90%
Total 96		**100%**

The total number of nurses who worked in the diabetic clinics of selected hospitals were 10 (10%) and those in the medical surgical wards were 86 (90%) of all the nurses involved in the study.

Distribution of Demographic Characteristics of the Respondents

This section sought to identify the demographic information of the respondents including gender, age, years of experience in nursing in the organization and the level of education. These characteristics

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are important because they are known to influence the variables in a given study.

The gender of the nurses should be an important consideration since diabetic patients who have complications could prefer sharing with persons of same gender e.g. erectile dysfunction. The profession and working period of the nurses in the clinics and wards in the hospitals was important to determine their knowledge level, area of specialization, qualifications and competences' to manage patients with diabetes mellitus. The general information points at the respondents' suitability in answering the questions and vast awareness on management and control of diabetes mellitus complications.

Table 3 : Respondents Bio-Data

Characteristic	Number	%
Age in years		
26-30	22	22.9
31-35	13	13.5
36-40	28	29.2
41-45	25	26.0
46-50	8	8.3
Total	**96**	**99.9**
Gender		
Male	39	40.6
Female	57	59.3
Total	**96**	**99.9**
Level of Education		
Diploma	58	60.4
Bachelor's Degree	38	39.5
Total	**96**	**99.9**
Years of Nursing Experience		
0-5	20	20.8
6-10	32	33.3
Over 10 years	44	45.8
Total	**96**	**99.9**

There were 96 registered nurses involved in the study and all had consented to participate. Nurses in the study aged between 36 to 40 years were 28(29.2%), this age group of nurses had a mean age of 38,nurses who were at the age of 26 to 36 years accounted to 35 (36.4%) and 61 (63.6%) were aged between 36 to 50 years.

Most of the respondents 57 (59.3%) were females compared to the male respondents who accounted for 39 (40.6%) of the population.

On education level, 58 (60.4%) nurses were diploma holders compared to bachelors' degree holders who accounted for 38(39.5%).

The nurses who were involved in the study and had over 10 years of working experience accounted for 44(45.8%) of the study population. Nurses who had worked for six to ten years were 32 (33.3%) and those under five years of experience were 20 (20.8%).

These findings have shown that most of the nurses had worked at the clinics; medical and

surgical wards for more than 10 years long enough to give information on the nature, scope of diabetes mellitus and its complications, and were mostly females and diploma holders.

Table 4 : Knowledge of Etiology, Treatment and Long-term Complications of Diabetes Mellitus

Serial No.		Yes	No	Total	Mean	SD
1	Etiology of Type 1	88	8	96	3.2	0.82
2	Etiology of Type 2	87	9	96	3.16	0.80
3	Treatment plan type 1	83	13	96	3.0	0.84
4	Treatment plan Type 2	83	14	96	3.0	0.78
5	Long term DM complications	85	11	96	3.36	0.88

Table 4 indicates that 88 (91.6%) of the nurses involved in the study, had knowledge on the etiology of Type 1 diabetes while, 8(8.3%) nurses could not describe the etiology of type 1 diabetes mellitus. Nurses who participated in the study and had knowledge on the etiology of type 2 diabetes mellitus, were 87(90.6%).Those who could not describe the etiology of type 2 diabetes mellitus were 9(9.3%). Eighty three (86.4%) nurses described the basic treatment plan for type 1 diabetes mellitus, only 13(13.5%) did not know the treatment plan for type 1 diabetes. Eighty three nurses (86.4%) described the basic treatment plan for type 2 diabetes mellitus and only 13(13.5%) did not provide a description of the basic treatment plan for type 2 diabetes mellitus. Nurses who could identify the long-term complications of diabetes were 85 (88.5%) and only 11 (11.4%) of the nurses could not identify.

Table 5 :Assessment of Diabetic Complication and Age of the nurse

		Age of registered nurses					Total
		26-30	31-35	36-40	41-45	46-50	
Assessment of the development of diabetic complications	No	5	5	11	1	1	23
	Yes	17	8	17	24	7	73
Total		22	13	28	25	8	96

χ^2=14.786 P= 0.05

Registered nurses 9.5% (7) aged 46 to 50 years could assess for the development of diabetic complications and out of this only 1(4.3%) of the nurses could not assess for the development of diabetic complications. Among the nurses aged 41 to 45 years 79 %(24) could assess for diabetic complications and only 1(4%) did not assess on diabetic complication .Five (38.4%) nurses aged 31 to 35 years could not assess for diabetic complications and out of this 61.7 %(8) aged 31 to 35 years assessed for diabetic complications. Nurses aged between 26 to 30 years17 (77%) could assess for the development of diabetic complications and out of this 5(22.7%) could not assess for diabetic complications. There was a significant relationship between diabetic complication and age of the nurses meaning that the age of the nurses influences their ability to assess diabetic complications (χ^2=14.786 P= 0.05; Cramers'V value 0.263).

Table 6 : Knowledge of the basic treatment plan for Type 1 diabetes and Education Level of the nurses

		Education Level		Total
		Diploma	Bachelor's degree	
Basic treatment plan for Type 1 diabetes	No	11	2	13
	Yes	47	36	83
Total		58	38	96

χ^2=7.704 P= 0.05

Table 6 indicates that, registered nurses who had a bachelor's degree holder 36(94.7%) could describe the basic treatment plan for type 1 diabetes mellitus compared to diploma holder nurses 47(81.0%) who could explain the treatment plan for type 1 diabetes.

A further test by chi square and Cramer's V revealed that, there is a significant relationship between education level and the description of basic treatment plan for diabetes type 1. In conclusion there is a strong relationship between knowledge level of the nurse and the care given to patients with diabetes mellitus (χ^2=7.704 P= 0.05; Cramer's' V value 0.270).

Table 7 :Years of experience and knowledge of etiology of type 2

		Years of experience			Total
		0-5	6-10	over 10	
Etiology of Type 2 diabetes	No	2	3	1	6
	Yes	18	29	43	90
Total		20	32	44	96

χ^2=3.680 P= 0.0451

Nurses who had over 10 years of experience 43(47.7%) could describe the etiology of type 2 diabetes mellitus. Out of the total nurses under study 1(16.6%) was not able to describe type 2 diabetes mellitus, 29(32.2%) of the nurses with 6 to 10 years of experience could describe the etiology of diabetes mellitus type 2 and only 3(50%) nurses could not give a description on the etiology of type 2 diabetes mellitus. Finally 18(20%) of the nurses who had an experience of less than 5 years was able to describe the etiology of diabetes type 2, and only 2(33.3%) of the nurses with less than 5 years of experience did not know how to describe the etiology of type 2 diabetes. Eighty three percent (83%) of the nurses who could not describe the etiology of type 2 diabetes had less than 10 years of experience compared to Sixteen percent (16%) of the nurses over 10 years of experience. A further test done by chi-square and Cramers' V revealed that there is a significant relationship between years of experience and the description of type 2 diabetes mellitus(χ^2=3.680 P= 0.0451; Cramers' V value 0.135).

Table 8 : Knowledge of basic treatment plan for Type 1 diabetes and Age of the nurses

		Age of nurses					Total
		26-30	31-35	36-40	41-45	46-50	
Description of basic treatment plan for Type 1 diabetes	No	2	3	4	1	0	10
	Yes	20	10	24	24	8	86
Total		22	13	28	25	8	96

χ^2=11.179 P= 0.0514

From table 8 above, there is an indication that 8(9.3%) of the nurses aged 46 to 50 years could describe the basic treatment plan for type 1 diabetes, 24(24.9%) nurses aged between 41 to 45 years gave the description of basic treatment plan for diabetes type 1, and only 1(10%) aged 41 to 44 years did not. Those aged between 31 to 35 years 10(11.6%) described the basic treatment plan and 3(30%) did not know the treatment plan for type 1 diabetes. Twenty of the nurses aged 25 to 30 years described the basic treatment plan for type 1 diabetes mellitus, and 2(20%) of the nurses were not aware of the treatment plan for type 1 diabetes mellitus. A further test done by chi-square revealed that there is a significant relationship between age of nurses and the description of the basic treatment plan for type 1 diabetes mellitus(χ^2=11.179 P= 0.0514;Cramers V value 0.214).

Table 9 : Relationship between years of experience and knowledge of Diabetic complication

Diabetic complications			
Nurses years of experience	Knowledgeable	Not knowledgeable	Total
0-5 years	5	15	20
6-10 years	22	10	32
Over 10 years	44	0	44
Total	71	25	96

χ^2=9.785 P=0.04

Table 9 findings on the relationship between years of experience and diabetic complication knowledge shows that, the majority of registered nurses 44(100%), over 10 years of working experience had knowledge on diabetic complications compared to 15(75%) nurses with less than 5 years of working experience who did not have knowledge on diabetic complications.

A further test done by Cramers V and chi square, also confirmed that, there is a significant relationship between nurses years of experience and knowledge of diabetic complication. (χ^2=9.785 P=0.04; Cramer's V value 0.231).

Discussion

Findings from the study have shown that most of the nurses have the knowledge on the ability to determine the nature and scope of diabetes mellitus including differentiating between the various types of diabetes, presentation, causes, and years of onset, assessment of complications and preventive measures as well as managing patients undergoing surgery with diabetes as a disease. In assessing patients with diabetes mellitus, an important factor is the achievement of glycemic, metabolic and complication control. From the study, results have revealed that 88 (91.6%) of the nurses involved in the study, had knowledge on the etiology of diabetes

mellitus compared to 8(8.3%) who were not knowledgeable. In a study done in Benin City on diabetes mellitus knowledge among 191 registered nurses results showed that, the knowledge of the nurses sampled as regards diabetes mellitus was less than satisfactory; areas of knowledge deficits accounted to (61.9%) that included etiology, diet, acute and long term complications. This study was contrary to the findings from the current study. Other studies done on the nurses' knowledge on diabetes mellitus have also shown that nurses have knowledge deficit (Young 2011). Health care professionals treating patients with diabetes mellitus have limited understanding, knowledge, and resources to adequately care for and educate patients with diabetes mellitus and improve self-management (Holt et al., 2013).

A study assessing diabetes mellitus-related knowledge among registered nurses found that overall knowledge was lacking, with a mean score of 48.5%, and a score of 47.8% for knowledge of hypoglycemia and 51.3% for knowledge of chronic complications of diabetes mellitus (Abduelkarem,Sarhan Fand El-Shareif, 2015). These study results can help to identify nurses' knowledge on the nature and scope of diabetic complications and deficits among nursing team members.

The current study findings also revealed that there was a strong relationship between nurses' years of experience, age, education level and knowledge on the nature and scope of diabetic complications.

Summary, Conclusions and Recommendations

Thus, to conclude, this study focused on determining the nurses' knowledge on the nature and scope of diabetic complications in diabetic patients in selected hospitals in Kisumu County. The study results found out that there is a strong relationship between the nurses' knowledge, education levels, experience and their ability to identify the nursing needs of patients who are likely to develop diabetic complications. The study also found that 56(58.3%) nurses could not explain how stress affects diabetic control. Based on the findings, the study recommends that; nurses be educated on the effects of stress on diabetic control, since diabetic care is specialized, nurses should be aware of the current updates on diabetes mellitus, regular appraisal of nurses' knowledge as a requirement followed by educational training to improve nurses' level of knowledge. Since this study concentrated on nurses' knowledge on the nature and scope of diabetic complications in selected hospitals within Kisumu County, further studies could be done in other Counties.

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