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KNOWLEDGE AND PRACTICE OF SELF-CARE MANAGEMENT OF PERSONS WITH TYPE II DIABETES AT A HEALTH CENTRE IN EAST TRINIDAD

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ABSTRACT

Aim: The study was to determine the levels of knowledge and practice of self-care management of patients with type11 diabetes at Manzanilla Clinic in East Trinidad.
Methods: A quantitative descriptive study was undertaken, using all attendees to the health center on a 5-week period. A researchers'-structured Likert-like questionnaire was developed and pretested for the study. Although 88 attendees were targeted, only 66 consented and therefore were recruited for the study. Data was analyzed with SPSS programme version 20. It was presented as frequencies in tables.
Result: Results show that the clinic attendees are mostly literate, of Hindi and Christian faiths, with moderate to high level of knowledge on glucose monitoring test, medication compliance, and foot care. This knowledge is however not commensurate with the proficiency of self-care among the participants.
Discussion: The result was discussed in relation to literature. The implication of the result was also presented particularly on the focus of health education strategies.
Conclusion: Although the respondents showed sufficient knowledge (moderate to high levels), this seeming high knowledge does not reflect in the expected expert level proficiency of practice.

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INTRODUCTION

Epidemiologists have predicted that the number of patients with diabetes will increase to three-hundred and sixty million worldwide by 2030, (Wu, Tung, Liang, Lee & Yu, 2014, p. 187). The world prevalence of diabetes among adults aged 20-79 years was estimated to be 6.4% in 2010 and is expected to increase to 7.7% by 2030 (Sweileh, Zyoud, Nab'a, Deleq, Enaia, Nassar & Al-Jabi, 2014). In Trinidad and Tobago and the Caribbean diabetes is now the second leading cause of death in T&T" (Baboolal, 2012). There are approximately 140,000 persons aged 20-69 years living with this condition in Trinidad and Tobago ("The Ministry of Health - Trinidad and Tobago", 2016). Calls are being made for the need to educate individuals with diabetes (Holder, 2015; Pidduck, 2016).

Ineffective self-care management of Type II diabetes can lead to many complications. Among the complications are high blood sugar can seriously compromise the systems of the body and affect every major organ in the body, increasing the risk of heart attacks, strokes, kidney failure, nerve damage, blindness, impotence and infections that can lead to amputations. (Taylor, 2016). However good self-care, including medication compliance, blood glucose monitoring and foot care, improves glycemic control and lowers the incidence and severity of diabetes complications (Wu. *et al*., 2014, p. 187). Authors have indicated the cost implications of Diabetes Mellitus in many countries. For example, Bagchi and Sreejavan (2012 p.23) quantified the high-priced disease with an extensive economic encroachment of diabetes in the USA, Webb (2013) and Onuoha and Ezenwaka (2014) estimated the direct and

indirect costs of the condition due to complications in Trinidad and Tobago.

Knowledge and practice of self-care

Knowledge of self-care management with regards to glucose monitoring and medication compliance provides immediate feedback and data that enables people with diabetes to assess how food choices and physical activity levels, affect their blood glucose control (Austin, 2011). Self-monitoring of blood glucose is a critical element in diabetes management (Knapp, Manroa, & Doshi, 2016; Austin, 2011; Saleh, Mumu, Ara, Begum, and Ali, 2012). Good knowledge and practice regarding diabetic foot care will reduce the risk of diabetic foot complications and ultimately amputation. For example, in Ethiopia, Seid & Tsige, 2015, revealed that "an estimated 15% of patients with diabetes develop a lower extremity ulcer". There appears to be agreement among authors as to the need for self-monitoring of blood glucose among type 2 diabetes patients, and the need for proper foot care among the diabetes patients. Many researchers opine that compliance to diabetes regimens such as glucose monitoring, medication compliance, and foot care wwere better among patients with good knowledge. (Waghachavare *et al*., 2015; Omar *et al*., 2014) Kheir, Greer, Yousif, Geed & Okkah, 2011; Gustav, 2011; Kenreigh, 2011; Sajit, Pankaj, Pawar, Modi & Sumariya, 2014. Sharma, Kalra, Dhasmana & Basera, 2014; Nwankwo, C; Ezenwaka C; Onuoha P; & Agbakoba N 2015). It has been established that diabetes self-care management plays an important part in reducing incidence of peripheral neuropathy, nephropathy and retinopathy and that have shown that self-care among Type 2 Diabetes Mellitus patients greatly improved glycaemic control and reduced complications (Sajit, Pankaj, Pawar, Modi & Sumariya, 2014, Onuoha and Ezenwaka, 2014; Onuoha, *et al* 2014; Henry & Onuoha, 2016). Also Ezenwaka *et al* (2011) indicated that Caribbean T2DM patients believe that self-monitoring of glucose is beneficial for the management of their diabetes and empowers them in reducing diabetes complications. Given the prevalence of this condition in Trinidad and Tobago, this study aims to document specifically the levels of knowledge of diabetes patients in Trinidad and Tobago about (a) foot care in relation to (i) glucose monitoring, (ii) medication compliance and (iii) foot-care practices; and (b) their level of proficiency of self-care practice care practices with regard to (i) glucose monitoring, (ii) medication compliance and (iii) foot care.

Objectives

1. To identify socio-demographic characteristics of persons with Type II Diabetes attending Manzanilla Health Center.
2. To determine the levels of self-care knowledge of persons with Type II Diabetes attending Manzanilla Health Center, with regards to i) glucose monitoring ii) medication compliance iii) foot care.
3. To determine the proficiency of self-care practice of persons with Type II Diabetes attending Manzanilla Health Center, with regards to i) glucose monitoring ii) medication compliance iii) foot care.
4. To identify relationships between level of self-care knowledge with regards to

i) glucose monitoring ii) medication compliance iii) foot care, and their socio-demographic characteristics of persons with Type II Diabetes Mellitus namely age, gender, marital stays, ethnicity and Religion.

5. To identify relationships between proficiency of self-care practice with regards to

i) glucose monitoring ii) medication compliance iii) foot care, and socio-demographic characteristics of persons with Type II Diabetes Mellitus.

Research questions

1. What are the socio-demographic characteristics of persons with Type II Diabetes attending Manzanilla Health Center?
2. What levels of self-care knowledge do patients with Type II Diabetes attending Manzanilla Health Center possess regarding blood (a) glucose monitoring, (b) medication compliance, and (c) foot care in their self-care management regimen?
3. To what extent do patients with Type II Diabetes perform self-care skills, specifically (i) blood glucose monitoring, (ii) medication compliance, and (iii) foot care in their self-care management regimen?
4. Is there a relationship between levels of self-care knowledge and socio-demographic characteristics of person with Type II Diabetes?
5. Is there a relationship between proficiency of self-care practice and socio- demographic characteristics of persons with Type II Diabetes?

Conceptual Framework

The conceptual framework explains the relationship between the Independent Variables and the Dependent Variables. The Independent Variables of the study include: Age, Gender, Ethnicity, Religion, Highest Educational Level, Employment Status and Length of time since diagnosis of Type II Diabetes Mellitus. The Dependent Variables of the study are: Level of self-care knowledge on blood glucose monitoring, Proficiency of self-care practice of blood glucose monitoring, Level of self-care knowledge on medication compliance, Proficiency of self-care practice of medication compliance, Level of self-care knowledge on foot care and Proficiency of self-care practice of foot care. Figure. 1 illustrates the relationship between the Independent Variables and Dependent Variables. The notion that age is associated with cognition is widely accepted. According to Soederberg Miller, 2009, “aging is associated with two areas of change that may increase the importance of knowledge in later life”. First, aging is associated with declines in the efficiency of cognitive processes. Second, knowledge, representing the long-term products of processing, is relatively well-preserved in later life as reflected in stable levels of crystallized ability (Soederberg Miller, 2009). This study will explore the existence of associations between age and levels of self-care knowledge and proficiency of self-care practice of persons diagnosed with Type II Diabetes Mellitus. Gender differences in self-care management is a phenomenon explored periodically. There are gender differences in factors affecting self-care, even though at the baseline men and women have similar knowledge levels, physical, psychological, and behavioral status (Heo, Moser, Lennie, Reigel & Chung, 2008). Similarly, the belief that gender can influence the levels of self-care knowledge and proficiency of

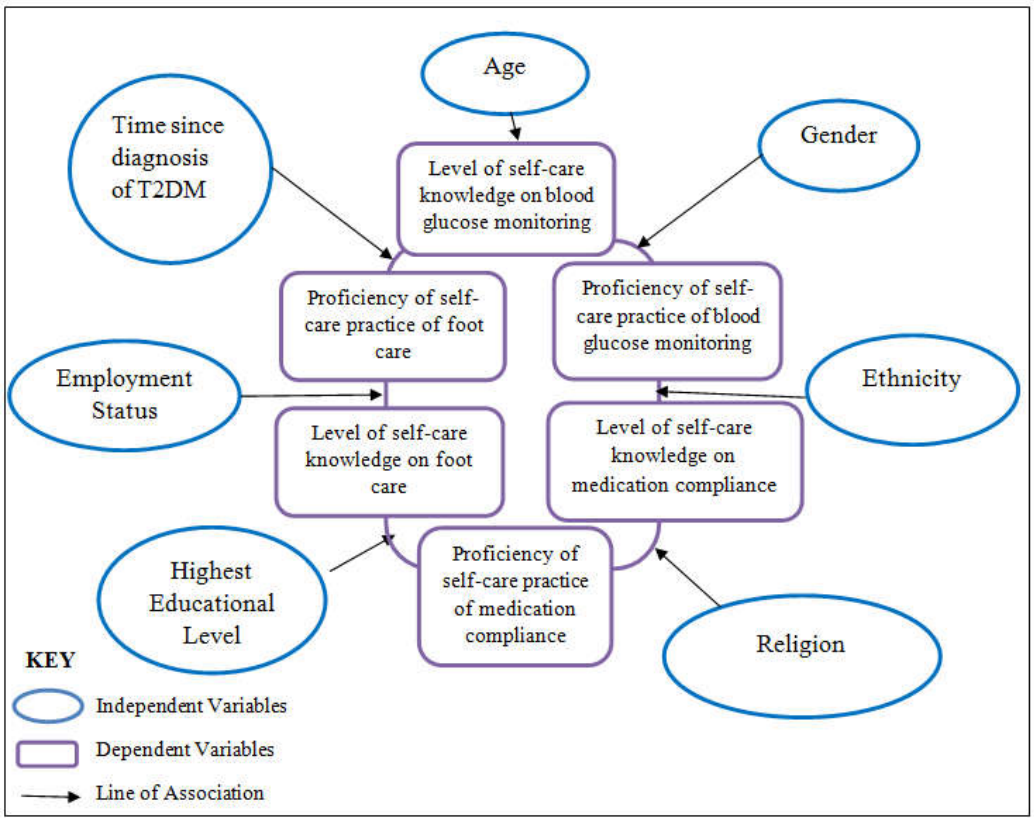

Figure 1. Association between Independent Variables and Dependent Variables

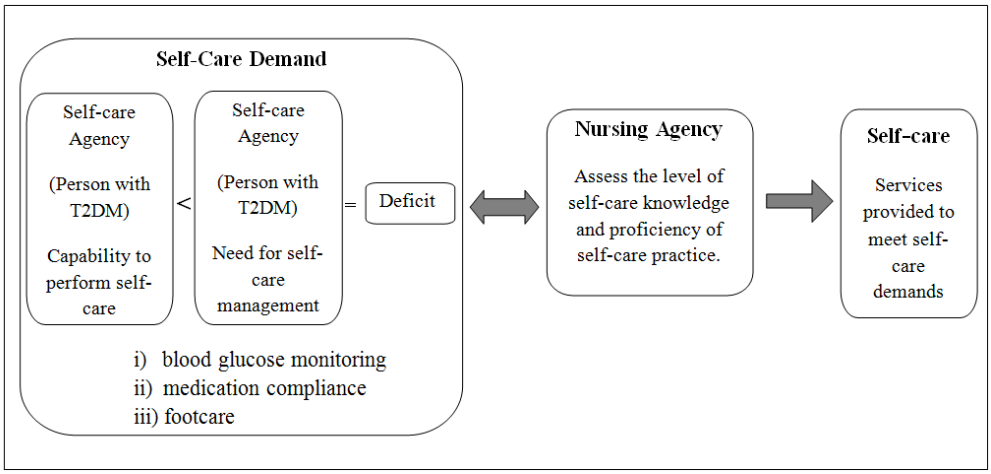

Figure 2. A Modified Orem's Self-Care Theory for Type II Diabetes Self-Care Management

self-care practice of persons has been adopted for this study on persons diagnosed with Type II Diabetes Mellitus.

Diabetes affects patients, employers, and society not only by reducing employment but also by contributing to work loss and health-related work limitations for those who remain employed (Tunceli, Bradley, Nerenz, Williams, Pladevall, & Lafata, 2005). Employment status indirectly represents economic status, since it signifies a source of income required to provide goods and services necessary for optimal self-care management. According to Watkins, Quinn & Ruggiero, 2013, "income was a significant indicator for glucose testing. Employment status is deemed to have an impact on the levels of self-care knowledge and proficiency of self-care practice. Each ethnic group contributes its own perspectives and values to the health care system. Studies have shown that participation in specific diabetes self-care behaviors differs by race/ethnicity. Racial/ethnic differences were apparent for every self-care activity among non-insulin users, but only for glucose monitoring and foot checks among insulin users (Johnson, Ghidayal, Rockwood, & Everson-Rose, 2014). Correspondingly, ethnicity is considered to influence the level of self-care knowledge and proficiency of self-care practice of persons diagnosed with Type II Diabetes Mellitus. Every religion brings their respective belief and practices to the health care system. The reliance on 'Divine intervention' to preserve ones' health may impede implementation of self-care activities. A noteworthy study highlighted "the importance of spiritual and religious beliefs and practices and social support in diabetes self-care activities" (Watkins, Quinn, Ruggiero, Quinn & Choi, 2013). It is plausible to associate religion with the level of self-care knowledge and proficiency of practice to

some extent. Low education levels can enhance non-adherence to the therapeutic plan though, due to difficulties to read and understand the prescription, thus increasing health risks. Besides, low education levels can limit information access, probably due to compromised reading, writing and speaking skills, as well as the understanding of the disease and treatment's complex mechanisms (Rodrigues, Santos, Teixeira, Gonela & Zanetti, 2012). Education plays an important role in cognitive and psychomotor development, which can be impact on self-care capabilities. Considering the previously stated, a relationship may exist between highest educational level attained and both level of self-care knowledge and proficiency in self-care practice.

According to Rodrigues *et al*, 2012, "time since diagnosis is a relevant variable, as it is inversely related with treatment adherence. The longer the diagnosis time, the lesser the prevalence of users' treatment adherence will be and the greater the risk of complications resulting from unsatisfactory metabolic control." In like manner, the length of time diagnosed with Type II Diabetes Mellitus can influence the level of self-care knowledge and proficiency of self-care practice. Numerous publications from various scientific fields are focused on studying knowledge. The major levels of cognitive learning can be classified as memorizing, understanding, and applying. Memorization entails learners encoding facts or information in the form of an association between a stimulus and a response, such as a name, date, event, place or symbol. Understanding entails learners relating a new idea to relevant prior knowledge. Application is learning to generalize to new situations, or transfer learning ("Levels of Cognitive Learning", 2017). Levels of knowledge on blood glucose monitoring, medication compliance and foot care, are proposed to increase from low level to medium level, then peak at high level, depending on the influence from the independent variables. Proficiency of self-care practice is parallel to competency of performing self-care skills. Patricia Benner introduced the concept that expert nurses develop skills and understanding of patient care over time through a sound educational base as well as a multitude of experiences. Furthermore, she described five levels of nursing experience progressing from Novice, Advanced beginner, Competent, Proficient, to Expert ("Patricia Benner's From Novice to Expert", 2017). Subsequently, proficiency of self-care practice of blood glucose monitoring, medication compliance and foot care, is anticipated to ascending from novice to expert under the influence from the independent variables.

Theoretical Framework

The theoretical framework introduces and describes concepts of the theory that supports the purpose for this study. Figure 2 illustrates a modified Orem's Self-Care Theory for persons with Type II Diabetes self-care management. Self-care demand arises when the self-care agents' capability to perform self-care is less than the need for self-care management. The self-care deficit activates the nursing agency to provide services that impact on the level of self-care knowledge and proficiency of practice. The obligation to implement exceptional nursing care for persons with Type II Diabetes, necessitates the use of theoretical reasoning. Concepts from Orem's Theory of Self- Care (1995, 2003) were adopted as the foundation of the theoretical framework. Orem's Theory of Self-Care was applied to this study on the level of self-care knowledge and proficiency of self-care practice of patients with Type II Diabetes Mellitus attending Manzanilla Health Center, East Trinidad. Self-care management is a key element to prevent complications of Type II Diabetes Mellitus. Doubtlessly, improving patient self-efficacy is a critical pathway to enhance self-care management. Self-care according to Alligood, 2010, "is a learned behavior." This study acknowledges that blood glucose monitoring, medication compliance and foot care are priority self-care requirements of persons with Type II Diabetes. The theory of self-care deficit is the core of Orem's grand theory of nursing. The term "deficit" refers to a relationship between self-care agency and self-care demand that is said to exist when capabilities for engaging in self-care are less than or not substantial the demand for self- care (Alligood, 2010).

Grasping the core concepts of self-care, self-care agency, therapeutic self-care demand, self-care deficit, nursing agency, and nursing system, as well as the marginal concept of basic conditioning factors, require understanding Orem's general theory (Alligood, 2010). Dorothy Orem postulated that people have the natural ability and capability to be involved in self-care, and she called this the 'Self-care Agency'. In this study, the persons diagnosed with Type II Diabetes Mellitus are the 'Self-care Agency.' Dependent care agency, according to Renpenning & Taylor, 2011, is "the ability of an individual to identify the therapeutic self-care needs of persons who are socially dependent or to regulate their ability." Evidently, a certain level of self-care knowledge is required for persons with Type II Diabetes to be able to identify their self-care needs. In addition, proficient self-care practice is also imminent to meet the self-care demands of blood glucose monitoring, medication compliance and foot care. The magnitude of self-care demand for persons with Type II Diabetes is dependent on the level of self-care knowledge and proficiency of self-care practice. Nursing agency refers to the capabilities of nurses to meet the self-care demands of self-care deficit individuals; and nursing systems describe the sequence of nursing actions carried out in coordination with actions of their patients (Renpenning & Taylor, 2011). The 'Nurse Agency' in this study is represented by the researchers exploring the level self-care knowledge and proficiency of self-care practice among patients with Type II Diabetes attending Manzanilla Health Center, East Trinidad. From the baseline level of self-care knowledge and proficiency of self-care practice of the patients with Type II Diabetes, self-care deficits can be identified and actions can be implemented to improve self-care management. Alligood & Tomey, 2010, states that "the capabilities of a person to be engaged in self-care is affected by basic conditioning factors." The independent variables of this study; age, gender, ethnicity, religion, highest educational level, employment status and time since diagnosis of Type II Diabetes, are presumed to be conditioning factors that impact on the level of self-care knowledge and proficiency of self-care practice.

Methodology

Research approach and design

The approach of the study is a quantitative type of descriptive, cross-sectional study. The study is quantitative, as the data or information collected during our study will take the form of numeric values (Polit & Beck, 2010). Based on the nature of investigation, our study falls in within the "broad class of nonexperimental" studies which is descriptive research. The purpose of descriptive studies is to observe, describe, and

document aspects of a situation" (Polit & Beck, 2010). We intend to passively describe the levels self-care knowledge and proficiency of self-care practice of persons with Type II Diabetes Mellitus with regards to: (i) blood glucose monitoring (ii) medication compliance and (iii) foot care, and explore relationships between a) level of self-care knowledge and socio-demographic characteristics of patients with Type II Diabetes mellitus attending Manzanilla Health Center b) proficiency of self-care practice and socio-demographic characteristics of patients with Type II diabetes mellitus attending Manzanilla Health Center. This is a cross-sectional study, as data from the cross section of participants will be collected at a single point in time at the Manzanilla Health Center.

Population/Sample

The study targets patients with Type II Diabetes Mellitus attending Manzanilla Health Center. The investigators estimated the number of persons attending the chronic disease clinic per week to be between 30-50 persons. Approximating that half the persons attending clinic on a given Thursday is diagnosed with Type II Diabetes Mellitus and willing to participate in the study, over a period of four weeks, by visiting the clinic every Thursday and using convenience sampling, a sample of 100 participants will be obtained for the study. The inclusion criteria included:

- Persons within the age range 18 - 65 years
- Both males and females
- Persons diagnosed with Type II Diabetes Mellitus, who attend clinic at Manzanilla
- Health Center on Thursdays between the hours 8am - 4pm (Chronic Disease Clinic Day)
- Persons who can read and write
- Persons who give consent to participate in the study.

Individuals who have never been diagnosed with Type II Diabetes Mellitus, or persons not attending the Chronic Disease Clinic at Manzanilla Health Center, and were not able to read and/or write were excluded from the study. Participants totaled 66.

Ethical considerations

The investigators abided by all known protocol including but not limited to (a) seeking for ethical approval from both the University of the West Indies, and the Regional Health authorities from whose hospitals the patients were. Also, permission was sought from the respective hospitals and wards, before informed and signed consent was sought from each of the qualifying patients. All information received was treated within all known ethical principles.

Selection and development of instrument

A questionnaire was designed by the researchers for the exploration of levels of self-care knowledge and proficiency of self-care practice with regards to (i) glucose monitoring, (ii) medication compliance and (iii) foot care.

The instrument consisted of 37 items divided into 7 parts.

(i) Demographics (7 items)
(ii) Section A(i) Knowledge of Glucose monitoring (5 items)
(iii) Section A(ii) Practice of Glucose monitoring (5 items)
(iv) Section B(i) Knowledge of Medication Compliance (5 items)
(v) Section B(ii) Practice of Medication Compliance (5 items)
(vi) Section C(i) Knowledge of Foot Care (5 items)
(vii) Section C(ii) Practice of Foot Care (5 items)

Pretest of Instrument

A pretest of the instrument was done at Port of Spain General Hospital to determine the reliability of the instrument. Data obtained from 10 willing participants diagnosed with Type II Diabetes Mellitus was analyzed using Statistical Package for the Social Sciences (SPSS) Version 20. The instrument has a Cronbach's Alpha of 0.692.

Data analysis methods

Data was manually collected and fed into Statistical Package for the Social Sciences (SPSS) Version 20. Responses from A(i), A(ii), B(i), B(ii), C(i) and C(ii) of the questionnaire were scored using a 5point system. The most correct responses were given a score of '5' decreasing in value to the least correct response given a score of '1'. Scores for each Section [A(i), A(ii), B(i), B(ii), C(i) and C(ii)] of the questionnaire of the questionnaire were summed. The summation of scores for each section was then given a point value base on the following scale: 1 point = scores 5 or less, 2 points = scores 6 – 10, 3 points = scores 11 – 14, 4 points = scores 15 – 20, and 5 points = scores 21 – 25. Levels of self-care knowledge was categorized into three levels 'low' (scores in range 0 – 14), medium (scores in range 15 – 20), and high (scores in range 21 – 25). The 'low' level of self-care knowledge scores in range 0 – 14 represents a deficient level of self-care knowledge for a person with Type II Diabetes. The 'medium' level of self-care knowledge scores in range 15 – 20 represents an acceptable level of self-care knowledge for persons diagnosed with Type II Diabetes. The 'high' level of self-care knowledge, scores in range 21 – 25 represents an excellent level of self-care knowledge for persons diagnosed with Type II Diabetes.

Proficiency of self-care practice was categorized into three levels novice (scores in range 0 – 14), competent (scores in range 15 – 20), and expert (scores in range 21 – 25). The 'novice' proficiency of self-care practice, scores in range 0 – 14 represent a deficient proficiency of self-care practice required for a person with Type II Diabetes. The 'competent' proficiency of self-care practice, scores in range 15 – 20 represent an acceptable proficiency of self-care practice required for persons diagnosed with Type II Diabetes. The 'expert' proficiency of self-care practice, scores in range 21 – 25 represents an excellent level of self-care practice required for persons diagnosed with Type II Diabetes. Descriptive statistics such as frequency was done to answer research question 1, 2 and 3, while inferential statistics were done to answer research question 4. Result was presented in tables as appropriate.

RESULTS

Objective 1: To identify socio-demographic characteristics of persons with Type II Diabetes

Chief socio-demographic characteristics of the respondents are illustrated in Table 1. A total of 66 patients with Type II

Diabetes Mellitus consented and participated in the study of whom 23 (34.8%) were male and 43 (65.2%) were female. Age ranged from 18years to above 65 years, with most participants (47%) in the age group 49 years to less than 65 years. Ethnicity encompassed African 16 (24.2%), Mixed 6 (9.1%) and in the majority East Indians 44 (66.7%). Religion incorporated Christian 31 (47%), Hindu 25 (37.9%), Muslim 2 (3%), and Others 8 (12.1%). Employment Status of participants constituted 20 (30.3%) Employed, 16 (24.2%) Retired and 30 (45.5%) Unemployed. Educational Level of participants spanned Primary 34 (51.5%), Secondary 27 (40.9%), Tertiary 4 (6.1%) and Other 1 (1.5%). Participants diagnosed with Type II Diabetes Mellitus less than one year were 20 (10.6%), between two to five years were 16 (31.8%), and more than five years 30 (57.6%).

knowledge of persons with Type II Diabetes with regards to i) glucose monitoring ii) medication compliance iii) foot care are illustrated in Table 2. Pertaining to the level of self-care knowledge specific to glucose monitoring of participants, 0% had low level of knowledge, 34 participants (51.5%) had medium level of knowledge and 32 participants (48.5%) had high level of knowledge. Regarding the level self-care knowledge distinct to medication compliance, 1 participant (1.5%) had low level of knowledge, 21 participants (31.8%) had medium level of knowledge and 44 participants (66.7%) had high level of knowledge. With respect to the level of self-care knowledge explicit to foot care of participants, 0% had low level of knowledge, 40 participants (60.6%) had medium level of knowledge and 26 participants (39.4%) had high level of knowledge.

Table 1. Socio-demographic characteristic of persons with Type II Diabetes attending Manzanilla Health Center (n = 66)

Demographics		Frequency (%)
Gender	Male	23(34.8)
	Female	43(65.2)
Age	18 to less than 29	1(1.5)
	29 to less than 49	15(22.7)
	49 to less than 65	31(47.0)
	above 65	19(28.8)
Ethnicity	African	16(24.2)
	Indian	44(66.7)
	Mixed	6(9.1)
Religion	Christian	31(47.0)
	Hindu	25(37.9)
	Muslim	2(3.0)
	Other	8(12.1)
Employment Status	Employed	20(30.3)
	Retired	16(24.2)
	Unemployed	30(45.5)
Educational level	Primary	34(51.5)
	Secondary	27(40.9)
	Tertiary	4(6.1)
	Other	1(1.5)
Length of time diagnosed with T2DM	Less than 1 year	20(10.6)
	2 to 5 years	16(31.8)
	More than five years	30(57.6)

Table 2. Distribution of levels of self-care knowledge and proficiency of self-care practice of persons with Type II Diabetes attending Manzanilla Health Center (n = 66)

Dependent Variables		Frequency (%)
Level of self-care knowledge on Glucose Monitoring	Low	0(0)
	Medium	34(51.5)
	High	32(48.5)
Proficiency of self-care practice of Glucose Monitoring	Novice	6(9.1)
	Competent	34(51.5)
	Expert	26(39.4)
Level of self-care knowledge on Medication Compliance	Low	1(1.5)
	Medium	21(31.8)
	High	44(66.7)
Proficiency of self-care practice of Medication Compliance	Novice	11(16.7)
	Competent	35(53)
	Expert	20(30.3)
Level of self-care knowledge on Foot Care	Low	0(0)
	Medium	40(60.6)
	High	26(39.4)
Proficiency of self-care practice of Foot Care	Novice	19(28.7)
	Competent	35(53)
	Expert	12(18.2)

Objective 2: To assess the level of self-care knowledge of persons with Type II Diabetes attending Manzanilla Health Center, with regards to i) glucose monitoring ii) medication compliance iii) foot care

Level of self-care knowledge was categorized into three levels 'low' (scores in range 0 – 14), medium (scores in range 15 – 20), and high (scores in range 21 – 25). The levels of self-care

Objective 3: To determine the proficiency of self-care practice of persons with Type II Diabetes attending Manzanilla Health Center, with regards to i) glucose monitoring ii) medication compliance iii) foot care

Proficiency of self-care practice was categorized into three levels novice (scores in range 0 – 14), competent (scores in range 15 – 20), and expert (scores in range 21 – 25). The

proficiency of self-care practice of persons with Type II Diabetes with regards to i) blood glucose monitoring ii) medication compliance iii) foot care are illustrated in Table 2. Pertaining to the proficiency of self-care practice specific to blood glucose monitoring of participants, 6 participants (9.1%) performed at novice level, 34 participants (51.5%) performed at competent level and 26 participants (39.4%) performed at expert level. Regarding the proficiency of self-care practice distinct to medication compliance of participants, 11 participants (16.7%) performed at novice level, 35 participants (53%) performed at competent level and 20 participants (30.3%) performed at expert level. With respect to the proficiency of self-care practice explicit to foot care of participants, 19 participants (28.7%) performed at novice level, 35 participants (53%) performed at competent level and 12 participants (18.2%) performed at expert level.

DISCUSSION

The present study conducted at Manzanilla Health Center, East Trinidad among persons diagnosed with Type II Diabetes Mellitus assess the level of self-care knowledge and proficiency of self-care practice with regards to i) blood glucose monitoring ii) medication compliance iii) foot care and explored relationships between socio-demographic characteristics and level of self-care knowledge and proficiency of self-care practice with regards to i) blood glucose monitoring ii) medication compliance iii) foot care. From a population of 66 patients with Type II Diabetes Mellitus who consented and participated in the study 23 (34.8%) were male and 43 (65.2%) were female. Indicating that there were almost twice as much female participants than male participants accessing health care at Manzanilla Health Center. Similar findings were evident in a cross-sectional study done in done in Trinidad. Suggested reason for this phenomenon of more women were attending Diabetic clinic than their male compatriots were that women were unemployed and as a result had more time to attend to appointments and collect medication (Babwah *et al*., 2006). From the study, the majority 34 participants (55.1%) had medium level of self-care knowledge with regards to blood glucose monitoring. Regarding the level self-care knowledge distinct to medication compliance 44 participants (66.7%) had high level of knowledge. With respect to the level of self-care knowledge explicit to foot care 40 participants (60.6%) had medium level of knowledge. Evidence suggest that the level of self-care knowledge with regards to medication compliance was generally high and regarding both blood glucose monitoring and foot care the level of self-care knowledge was generally medium. The medium – high level of self-care knowledge may be a result of the teaching sessions done scheduled day of Chronic Disease Clinic starts at Manzanilla Health Center.

Pertaining to the proficiency of self-care practice specific to blood glucose monitoring of participants, most participants 34 (51.5%) performed at competent level. Regarding the proficiency of self-care practice distinct to medication compliance most participants 35 (53%) performed at competent level. With respect to the proficiency of self-care practice explicit to foot care of participants, maximum participants 35 (53%) performed at competent level. Evidence suggest that the proficiency of self-care practice with regards to blood glucose monitoring, medication compliance and foot

Table 3. Relationship between Socio-demographic characteristics and Levels of Knowledge & Proficiency of Practice

	Gender	Age	Ethnicity	Religion	Employment Status	Educational Level	Length of time diagnosed with T2DM
Level of self-care knowledge on Glucose Monitoring	.106	0.086	.268	.475	.479	.818	.662
Proficiency of self-care practice of Glucose Monitoring	.105	.626	.221	.280	.244	.447	.039*
Level of self-care knowledge of Medication Compliance	.133	.586	.483	.964	.881	.711	.581
Proficiency of self-care practice of Medication Compliance	.067	.622	.402	.440	.047*	.394	.639
Level of self-care knowledge on Foot Care	.032*	.685	.492	.302	.710	.681	.166
Proficiency of self-care practice of Foot Care	0.011*	.659	.151	.625	.482	.975	.101

* $P \leq 0.05$

Objective 4: To identify relationships between level of self-care knowledge with regards to i) glucose monitoring ii) medication compliance iii) foot care, and socio-demographic characteristics of persons with Type II Diabetes Mellitus

The relationships between level of self-care knowledge with regards to i) glucose monitoring ii) medication compliance iii) foot care, and socio-demographic characteristics of persons with Type II Diabetes Mellitus, are illustrated in Table. 3. A significant association exists between gender and level of self-care knowledge specific to foot care (P = 0.032).

Objective 5: To identify relationships between proficiency of self-care practice with regards to i) glucose monitoring ii) medication compliance iii) foot care, and socio-demographic characteristics of persons with Type II Diabetes Mellitus

The relationships between proficiency of self-care practice with regards to i) glucose monitoring ii) medication compliance iii) foot care, and socio-demographic characteristics of persons with Type II Diabetes Mellitus, are illustrated in Table. 3. There is a correlation between the length of time diagnosed with Type II Diabetes Mellitus and the proficiency of self-care practice specific to glucose monitoring (P = 0.039). In addition, a correlation exists between employment status and proficiency of self-care practice specific to medication compliance (P = 0.47). An association is also present between gender and proficiency of self-care practice distinct to foot care (P = 0.011).

care, were generally on the competent level. Despite the level self-care knowledge distinct to medication compliance 44 participants (66.7%) had high level of knowledge, however only 20 participants (30.3%) proficiency of self-care was at the expert level. Evidence suggest that high levels of self-care knowledge on medication compliance did not liken to expert proficiency in self-care practice of medication compliance. Other studies have also found that "there were self-care knowledge and practice gaps in some areas of diabetes self-care management" (Mukeshimana, Hakizimana, Mwali, Umuhoza, Uwambajimana, & Asingizwe, 2015). There is a relationship between gender and level of self-care knowledge specific to foot care (P = 0.032). A significant association is also present between gender and proficiency of self-care practice distinct to foot care (P = 0.011). Concerning diabetic foot self-care, one study found that men presented greater deficit comparing to women, and suggest women acquired knowledge about self-care necessary to prevent ulceration in the lower limbs (Rossaneis, Haddad, Mathias & Marcon, 2016). There is a correlation between the length of time diagnosed with Type II Diabetes Mellitus and the proficiency of self-care practice specific to glucose monitoring (P = 0.039). Other studies found "the relationship between duration of diabetes and diabetes self-management is low and reversely proportional, which means that as the duration of diabetes increases, diabetes self-management and control decrease and thus become less effective" (Adwan & Najjar, 2017). Long duration of diabetes may impair diabetes self-management, so support from family, peers, and health care providers behaviors by providing cues to action, direct assistance, reinforcement, and knowledge about diabetes (Adwan & Najjar, 2017). In addition, a correlation exists between employment status and proficiency of self-care practice specific to medication compliance (P = 0.47). According to Adwan & Najjar, 2017, "when the client is more able to afford new techniques and methods of diabetes self-management, diabetes will be controlled better."

Conclusion

The study assessed the level of self-care knowledge and proficiency of self-care practice regarding blood glucose monitoring, medication compliance and foot care. Relationships between level of self-care knowledge and proficiency of self-care practice with regards to blood glucose monitoring, medication compliance and foot care, and socio-demographic characteristics; age, gender, ethnicity, religion, employment status, educational level, and length of time diagnosed with Type II Diabetes Mellitus, were explored. The results of the study concluded that there were almost twice as much female participants than male participants accessing health care at Manzanilla Health Center, the level of self-care knowledge with regards to medication compliance was generally high and regarding both blood glucose monitoring and foot care the level of self-care knowledge was generally medium, the proficiency of self-care practice with regards to blood glucose monitoring, medication compliance and foot care, were generally on the competent level and high levels of self-care knowledge on medication compliance did not liken to expert proficiency in self-care practice of medication compliance. There is a relationship between gender and level of self-care knowledge specific to foot care (P = 0.032). A significant association is also present between gender and proficiency of self-care practice distinct to foot care (P = 0.011). There is a correlation between the length of time diagnosed with Type II Diabetes Mellitus and the proficiency of self-care practice specific to glucose monitoring (P = 0.039). In addition, a correlation exists between employment status and proficiency of self-care practice specific to medication compliance (P = 0.47). Level of self-care knowledge and proficiency of self-care practice with regards to blood glucose monitoring, medication compliance and foot care had no significant relationship to socio-demographic characteristics of age, ethnicity, religion, educational level.

Recommendation

This study has implications for nursing education and nursing practice. Males should be encouraged to access health care services, or services should be extended to target men at alternative locations such as church gatherings. Health education programs tend to focus on imparting self-care knowledge, however more workshops should focus on how to perform self-care skills to increase proficiency of self-care practice to expert level. Self-care knowledge on foot care was mostly on medium level and proficiency of foot care practice was mostly competent. Referring persons diagnosed with Type II Diabetes to a registered podiatrist, or having a registered podiatrist visit the health center on scheduled Chronic Disease Clinic days can result in a higher percentage of persons having high levels of self-care knowledge on foot care and increase the percentage of persons having expert proficiency of self-care regarding foot care.

REFERENCES

"The Ministry of Health - Trinidad and Tobago", 2016. *World Health Day 2016: "Beat Diabetes."* Retrieved 1st November 2016, from http://www.health.gov.tt/news/newsitem.aspx?id=645

Adwan, M., & Najjar, Y. 2017. *The Relationship between Demographic Variables and Diabetes Self-Management in Diabetic Patients in Amman City/Jordan*. Retrieved 1 July 2017, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4776799/

Alligood, M. R. 2010. *Nursing theory: Utilization & application 4th ed*. Maryland Heights, MO:Mosby Elsevier.

Alligood, M. R., & Tomey, A. M. (Eds.). 2010. *Nursing theorists and their work 7th ed.* Maryland Heights, MO: Mosby Elsevier

Almssallem, M. Q. 2014. The Association between the Glycemic Index of Some Traditional Saudi Foods and the Prevalence of Diabetes in Saudi Arabia: A Review Article. *Journal of Diabetes & Metabolism, 5*(11). doi:10.4172/2155-6156.1000452

Austin, M. M. 2011. The two skills set of self-monitoring of blood glucose education: The operative and the interpretive/Diabetes Spectrum – America. Retrieved from www.spectrum.diabetesjournal .org

Baboolal, Y. 2012. *Diabetes in T&T ranked No 2 killer*. Retrieved 31st October, 2016 from http://www.guardian.co.tt/news/2012-03-12/diabetes-tt-ranked-no-2-killer

Bagchi, D., & Sreejayan, N. 2012. *Nutritional and Therapeutic Interventions for Diabetes and Metabolic Syndrome.* Academic Press. Retrieved 7th November, 2016 from https://books.google.tt/books

Ezenwaka C, Olukoga, Onuoha, P, Worrell R, Skinner T, Mayers H, Martin E and Phillip C. 2011. Perceptions of Caribbean type 2 diabetes patients on self-monitoring of

blood glucose. Archives of Physiology and Biochemistry DOI: 10.3109/13813455.2011.625950

Ezenwaka C, Onuoha P, Sandy D, & Israel-Richardson D 2014. Diabetes self-monitoring education in a high-income developing country: survey of the opinions of nurses and dietitians. *International Journal of Diabetes in Developing Countries,* 34: 163:-168. DOI: 10.1007/s13410-013-0174-7

Ezenwaka, C, Onuoha P, & Olukoga, A. 2013. Challenges of self-monitoring of blood glucose in Caribbean type-2 diabetes patients. *International Journal of Diabetes in Developing Countries*, DOI: 10.1007/s13410-013-0117-3

Fujiwara, Y., Kishida, K., Terao, M., Takahara, M., Matsuhisa,M., Funahashi, T., Shimomura, I. & Shimizu, Y. 2011. Beneficial effects of foot care nursing for people with diabetes mellitus: An uncontrolled before and after intervention study. *Journal of Advanced Nursing,* 67(9), 1952-1962. Retrieved 28th November, 2016 from doi:10. 1111/j.365-2648.2011.05640.x.

Gustav, Z. T. 2011. The 32nd Annual Meeting of the European Association for the Study of Diabetes: Macrovascular disease. *Diabetes Care, 20*(7), 1198-1201. Retrieved from doi:10.2337/diacare.20.7.1198

Henry, D. & Onuoha P 2016. Implemeting Diabetes Self-Management Education in St. Lucia: The Community Health Nurses' Perspectives. *IOSR Journal of Nursing and Health Sciences*, Vol. 5, Issue 5, Version 11 (sep-oct. 2016) pp 53-65.

Heo, S., Moser, D., Lennie, T., Riegel, B., & Chung, M. 2008. Gender differences in and factors related to self-care behaviors: A cross-sectional, correlational study of patients with heart failure. *International Journal of Nursing Studies*, *45*(12), 1807-1815. http://dx.doi.org/10.1016/ j.ijnurstu.2008.05.008.

Holder, A. 2015. *36,000 living with diabetes in TT*. Retrieved 31st October, 2016 from http://www.newsday.co.tt/news/0, 211649.html

Johnson, P., Ghildayal, N., Rockwood, T., & Everson-Rose, S. 2014. Differences in Diabetes Self-care Activities by Race/Ethnicity and Insulin Use. *The Diabetes Educator*, *40*(6), 767-777. http://dx.doi.org/10.1177/01457217145 52501

Kenreigh, S. 2011. Special Article: Diabetes: What Americans Don't Know Can Kill Them. *Diabetes Technology & Therapeutics, 2*(1), 3-4. Retrieved from doi: 10.1089/ 152091500316674

Kheir, N., Greer, W., Yousif, A., Geed, H. A., & Okkah, R. A. 2011. Knowledge, attitude and practice of Qatari patients with type 2 diabetes mellitus. *International Journal of Pharmacy Practice,* Retrieved from doi: 10.1111/j.2042-7174.2011.00118.x

Knapp, S., Manroa, P., & Doshi, K. 2016. *Self-monitoring of blood glucose: Advice for providers and patients*. Retreived 2nd November 2016, from DOI: 10.3949/ccjm. 83a.14147

Levels of Cognitive Learning. 2017. *Indiana.edu*. Retrieved 2nd July 2017, from http://www.indiana.edu/~idtheory/ methods/m1d.html

Mukeshimana, M., Hakizimana, G., Mwali, C., Umuhoza, C., Uwambajimana, J., & Asingizwe, D. 2015. The knowledge and practice of self-care management among patients attending a diabetes clinic in Kigali, Rwanda. *Rwanda Journal Series F: Medicine and Health Sciences.* Vol. 2 No. 1, 2015 Retrieved 1st July 2017 from http://dx.doi.org/ 10.4314/rj.v2i1.3F

Nwankwo, C; Ezenwaka C; Onuoha P; & Agbakoba N. 2015. Implementing diabetes self-management education in Nigerian population: perceptions of practice nurses and dietitians. *Archives of Physiology and Biochemistry*, DOI: 10.3109/13813455.2015.1031140

Omar, M. S., & Lia San, K. 2014. Diabetes knowledge and medication adherence among geriatric patient with Type 2 Diabetes mellitus. *International Journal of Pharmacy and Pharmaceutical Sciences*. Vol 6, Issue 3

Onuoha P. & Ezenwaka C 2014. Diabetes Patients need support to practice self-monitoring of blood glucose levels. *Asian Journal of Science and Technology*, Vol. 5, Issue 12, pp. 789-792.

Onuoha, P, Israel-Richardson D, Caesar L; Ezenwaka C, Moriyama, M 2014. Do Practice Nurses in the Caribbean have the knowledge of Principles of and Concepts of Diabetes Self-Management Education? Nursing and Care. Vol 3, 192. Doi: 104172/2167-1168.1000192

Patricia Benner's From Novice to Expert. 2017. *Currentnursing.com*. Retrieved 2nd July 2017, from http://currentnursing.com/nursing_theory/patricia_benner_f rom_novice_to_expert.html

Pidduck, A. 2016. *Reducing the burden of diabetes.* Retrieved 1st November 2016, from http://www.newsday.co.tt/ features/0,226221.html

Polit, D. F., Beck, C. T. 2010. *Essentials of Nursing Research 7th Edition Appraising Evidence for Nursing Practice*. Philadelphia, PA: Lippincott Williams & Wilkins.

Regional Health Authorities. Port-of Spain, Trinidad and Tobago: Ministry of Health, Government of the Republic of Trinidad and Tobago, 2013. Retrieved November 15, 2016 from: www.health.gov.tt/sitepages/default. asp?id=6.

Repenning, K., & Taylor, S. (Eds). 2011. Self- Care Science, Nursing Theory, and Evidenced- Based practice. NY: Springer Publisher.

Rodrigues, C., Luchetti, F., Santos, A., Texiera, C., Gonela, J., & Zanetti, M. 2012. Relationship between knowledge, attitude, education and duration of disease in individuals with diabetes mellitus. *Acta Paulista de Enfermagem*. 25(2), 284-290. Retrieved 1st July 2017 from https://dx.doi.org/10.1590/S0103-21002012000200020

Rossaneis, M., Haddad, M., Mathias, T., & Marcon, S. 2016. Differences in foot self-care and lifestyle between men and women with diabetes mellitus. *Revista Latino-Americana De Enfermagem*, *24*(0). http://dx.doi.org/10.1590/1518-8345.1203.2761

Sajith, M., Pankaj, M., Pawar, A., Modi, A., & Sumariya, R. 2014. Medication Adherence to Antidiabetic Theray in Patients with Type 2 Diabetes Mellitus. *International Journal of pharmacy and Pharmaceutical Sciences.* Vol 6, Suppl 2, p. 564-570

Saleh, F., Mumu, S. J., Ara, F., Begum, H. A., & Ali, L. 2012. Knowledge and self-care practices regarding diabetics among newly diagnosed type 2 diabetics in Bangladesh: a cross sectional study. *BMC Public Health.* Retrieved from www.bmcpublichealth.biomedcentral.com

Seid, A., & Tsige, Y. 2015. Knowledge, Practice, and Barriers of Foot Care among Diabetic Patients Attending Felege Hiwot Referal Hospital, Bahir Dar, Northwest Ethiopia. Advances in Nursing. Retrieved 19th October, 2016 from http://dx.doi.org/10.1155/2015/934623

Sharma, T., Kalra, J., Dhasmaa, D. C., & Basera, H. 2014. Poor adherence to treatment: A major challenge in diabetes. *Journal, Indian Academy of Clinical Medicine.* 15(1):26-9

Soederberg Miller, L. 2009. Age differences in the effects of domain knowledge on reading efficiency. *Psychology and Aging*, *24*(1), 63-74. http://dx.doi.org/10.1037/a0014586

Sweileh, W. M., Zyoud, S. H., Nab'a, R. J. A., Deleq, M. I., Enaia, M. I., Nassar, S. M., & Al-Jabi, S. W. 2014. Influence of patients' disease knowledge and beliefs about medicines on medication adherence: findings from a cross-sectional survey among patients with type 2 diabetes mellitus in Palestine. *BMC Public Health.* Retrieved from doi: 10.1186/1471-2458-14-94

Taylor, R. 2014. Diabetes. *Nursing Standard, 29*(3), 61-61. Retrieved from doi:10.7748/ns.29.3.61.s48

Tunceli, K., Bradley, C., Nerenz, D., Williams, L., Pladevall, M., & Lafata, J. 2005. The Impact of Diabetes on Employment and Work Productivity. *Diabetes Care Journals*. 28(11), 2662-2667. Retrieved 1st July 2017 from https://doi.org/10.2337/diacare.28.11.2662

Waghachavare, V., Gore, A., Chavan, V., Dhobale, R., Dhumale, G., & Chavan, G. 2015. Knowledge about diabetes and relationship between compliance to the management among the diabetic patients from Rural Area of Sangli District, Maharashtra, India. *Journal of Family Medicine and Primary Care*, *4*(3), 439. http://dx.doi.org/10.4103/2249-4863.161349

Watkins, Y., Quinn, L., Ruggiero, L., Quinn, M., & Choi, Y. 2013. Spiritual and Religious Beliefs and Practices and Social Support's Relationship to Diabetes Self-Care Activities in African Americans. *The Diabetes Educator*, *39*(2), 231-239. http://dx.doi.org/10.1177/0145721713475843

Webb, Y. 2013. *Minister: Private centres denying patients' dialysis.* Retrieved 19th November, 2016 from http://www.guardian.co.tt/news/

Wu, S. V., Tung, H., Liang, S., Lee, M., & Yu, N. 2014. Difference in the perceptions of self-care, health education barriers and educational needs between diabetes patients and nurses. *Contemporary Nurse,* 46(2).

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