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**CAUSES AND CONCERNS IN THE NON-COMPLIANCE OF GLYCAEMIC
CONTROL AMONG DIABETIC NEPHROPATHY PATIENTS**

**NAYAK BS*, SAMUEL G, MAHARAJ RB, GANGABISSOON M, SWARATH S,
MOHOYODEEN T, RAMDASS A AND WINCHESTER S**

The University of the West Indies, Faculty of Medical Sciences, Department of Preclinical
Sciences, Trinidad and Tobago

Corresponding Author: E Mail: shivananda.nayak@sta.uwi.edu; Tel. /Fax: 1-868-662-1873

ABSTRACT

To determine the causes and concerns in the non-compliance of glycaemic control among diabetic nephropathy patients in Trinidad. A cohort study identified 72 patients at the Eric Williams Medical Complex at three clinics – Dialysis Unit, Diabetes and Nephrology. This study relied mainly on questionnaires that were read to the consented subjects and their responses noted. Along with the questionnaire medical record files were obtained from the Medical Records Department to supplement some of the data. Males accounted for the majority of subjects in the study with 51.4%. Out of 72 patients east Indian ethnicity (Indo-Trinidadian) were 59.7%, African (Afro- Trinidadian) were 22.2% and mixed were 18.1% belonging to age groups of 55-69 years. Majority of them were having diabetes for more than 10 years and 36.1 % were having diabetes for more than 21 years. Of 72 participants, 25% were non compliant with the use of a home glucose meter. A surprising, 50% of subjects were not compliant and not surprisingly 47.20% of subjects did not adhere to any meal plan. Noteworthy, being only 4.20% of subjects were not taking their hypertensive medication regularly or at all. The concerns of non-compliance were addressed in follow up questions. When asked concerning the home blood glucose meter, 38.90% were recorded to have expensive as being a reason for not acquiring the device. While another 38.90% either had a device but it was spoilt. While 16.70% did not bother to get one since the health care services test their blood when they do come in. Meal plans

follow up question revealed 41.20% of non-compliant subjects responded with the food being unappealing and 52.90% stating that either the dietician did not give them a meal plan or “they eat as they feel like it”. With a gross mean of 63.52 being compliant and 26.66 being non-compliant for the parameters we investigated. We recognise there might be other factors at play concerning the progression of this lifestyle disease.

The population investigated seems to be compliant for the most case, while the non-compliant subjects tended to have socioeconomic reasons for not being compliant.

Keywords: Non-Compliance, Glycaemic Control, Nephropathy

INTRODUCTION

The 21st century has graced our country of Trinidad and Tobago, with a disease that traverses many generations called Diabetes Mellitus. Diabetes Mellitus a condition that exist in two types, type 1 and type 2. Type 2 (DM2) is characterised by insulin resistance, which in chronic and uncontrolled cases, also leads to depletion of the beta cells due to overproduction of insulin. The common causes of DM2 in Trinidad are obesity and sedentary life.

Placing special focus on DM 2, the goal of management of such patients is glycaemic control. Glycaemic control refers to the values of glucose in one’s blood, with lower values being the goal in DM 2 patients. Research shows there is a high correlation of microvascular complications, nephropathy and other long term effects due to the presence of hyperglycaemia. To obtain a better indication of one’s glycaemic control, the periodic observation of the HbA1C levels

in the blood could be used. This usually produces a more accurate measure of the patient’s glycaemia control and individuals with levels below 6.5% are said to have “good glycaemic control.” The implications of “good glycaemic control” benefits the patient overall with, better quality of life, reduce complications and a decrease in medical costs.

Non-compliant patients with uncontrolled DM experience certain complications such as nephropathy which the kidney is compromised from prolonged thickening of the blood due to excessive glucose and the increase of pressure as to mobilise the thicken blood. There is a direct correlation of uncontrolled diabetes mellitus to nephropathy, being that, and prolonged hyperglycaemia increase nephropathy in patients. Compliance is described as the patient’s adherence to the regimen and recommendations prescribed by medical professionals. This, however, is an

issue since compliance is subjective and it depends on the patient's willingness to take the treatment as prescribed. Research has shown that in most cases patients fail to comply. In an article outlining the importance of complying with medication, concerning patients taking anti-hypertensive drug therapy for diabetic nephropathy, it was stated that if a patient was taking the prescribed therapy for up to 80% it was considered non-compliance. This was then compared with patients who took a placebo and results showed that they had similar deterioration of their kidneys [1]. These results therefore emphasize the importance of compliance in the role of progression of diseases. Additionally, studies have shown non-compliance even at 80% of the time being compliant is as almost the same as if the person was not taking the prescribed medication at all [1].

Trinidad and Tobago, endowed with many natural resources seems to be plagued with a chronic medical condition, giving this nation the highest ranking in having the highest number of persons affected with diabetes in the Western Hemisphere. With a population of (1,294, 494), the number of individuals dying with this condition is astoundingly high (14%) ranking 2nd to Diseases of the heart (24.9 %) [2]. Complications of diabetes mellitus are the second most leading cause of

death in Trinidad and Tobago, with cardiovascular disease being the greatest. According to the Ministry of Health of Trinidad and Tobago annual statistical report 2003 and 2004 disease of the heart ranked number one while diabetes ranked number two causes of death [2].

An increasing medical issue, diabetes mellitus although chronic, can be managed successfully. With the advent of drugs that control glucose levels in the blood, a new issue arises, compliance. Non-compliance indicates that the patient would have uncontrolled diabetes mellitus. Hence the common accompaniment of nephropathy with uncontrolled diabetes has been the cause for discussion. This project sets out to investigate the direct correlation between the causes and concern of non-compliance of glycaemic control, and patient complicated with nephropathy.

MATERIALS AND METHODS

This cohort study was designed to determine the causes and concerns in the non-compliance of glycaemia control among diabetic patients complicated with nephropathy in Trinidad.

A cohort study identified 72 patients at the Eric Williams Medical Complex at three clinics – Dialysis Unit, Diabetes and Nephrology. This study relied mainly on

questionnaires and medical records. Adults having DM2 with nephropathy were only selected. Non diabetic nephropathic patients, persons with any infections, subjects with drug or chemical causing nephropathy were excluded from the study (**Table 1**).

The medical files of patients in the diabetic and nephrology clinic were investigated to determine suitable candidates for the study. This was done along with random questioning of patients present at the clinics. Age, sex, location, the duration of their diabetic condition, duration of their nephropathy, the name of the clinic(s) they attend, how often they visit the clinic(s), the type of medication they are on, lipid profile, HbA_{1c}, blood glucose levels, waist to hip ratio and measurements of height and weight which were used to calculate the body mass index (BMI).

The data was compiled using a statistical program SPSS and results analyzed according to the research standards. The statistical data obtained would lead us towards either the study should be descriptive or inferential.

RESULTS

Males accounted for the majority of subjects in the study with 51.4%. Out of 72, east Indian ethnicity (Indo-Trinidadian) were 59.7%, African (Afro- Trinidadian) were 22.2% and the remaining were mixed (18.1%)

belonging to age groups of 55-69 years. Majority of them were having diabetes for more than 10 years and 36.1 % were having diabetes for more than 21 years. Of 72 participants, 25% were non compliant with the use of a home glucose meter. A surprising, 50% of subjects were not compliant and not surprisingly 47.20% of subjects did not adhere to any meal plan. Noteworthy, being only 4.20% of subjects were not taking their anti-hypertensive medication regularly.

The concerns of non-compliance were addressed in follow up questions. When asked concerning the home blood glucose meter, 38.90% were recorded to have expensive as being a reason for not acquiring the device. While another 38.90% either had a device but it was spoilt. While 16.70% did not bother to get one since the health care services test their blood when they do come in. Meal plans follow up question revealed 41.20% of non-compliant subjects responded with the food being unappealing and 52.90% stating that either the dietician did not give them a meal plan or “they eat as they feel like it”. With a gross mean of 63.52 being compliant and 26.66 being non-compliant for the parameters we investigated. We recognise there might be other factors at play concerning the progression of this lifestyle disease.

DISCUSSION

The cost related to management of lifestyle diseases has ascended to the top of the health “food chain. “Consequently, a lot of the funding set aside for medical health sectors has been absorbed for this purpose [3]. Diabetes type 2 is one such example. It takes a particular interest due to the surrounding complications, the well known ones being heart disease and kidney disease. These complications are more than likely to arise if ones diabetes not under control.

One of the main characteristics of any lifestyle disease or condition, in which treatment is required, is compliance.

Another article from Clinical Journal of the American Society of Nephrology [4] investigated the correlation of people with chronic kidney disease and diabetes. In particular, they focused on persons who had diabetes but were unaware of their condition and so were not taking any treatment. These results thus, represented the most extreme cases of non-compliant patients. Results showed a high prevalence of chronic kidney disease with those who had undiagnosed diabetes and pre-diabetes [4].

It was noted that there was an inverse relationship between non-compliance and glycemic control [5]. Therefore, the more compliant a patient is, the better the glycemic

control, leading to better management of diabetes mellitus type 2. This, consequently, staves off the development or progression of any further complication, namely, kidney disease.

From the various compliance factors we identified, we were able to assess the non-compliance of those factors based of a response of “no” to whether they own, adhere or comply with any of the factors the study outlined. As shown in **Table 2** and **Figure 1& 2** which summarises the various non-compliant figures for the factors which our study identified. Some of the factors we derived from looking at the responses to the concerns were that some of the issues were sometimes circumstantial. For example looking at **Table 2**, in the case of exercise, 50% of the subjects were compliant and 50 % were not. Out of the 50% many stated that due to the debilitating state (or progression of the disease) they were too “ill” to exercise. While the rest indicated some form of pain with exercising some were not having their limb (due to amputation). By our limited criteria, these patients were non-compliant. However, if provision was made for specialized physiotherapy for their particular case, then maybe that value would be much lower. The researchers stated that “Age, race, and insulin use were significant predictors of

HbA1c levels”, where HbA1c is used to determine the glycaemic control of an individual [6]. **Kasier et al** demonstrated that “More frequent self-monitoring of blood glucose levels was associated with clinically and statistically better glycaemic control regardless of diabetes type or therapy [7]. Demonstrated that “More frequent self-monitoring of blood glucose levels was associated with clinically and statistically better glycaemic control regardless of diabetes type or therapy”. Therefore the importance of such a device for diabetic patients should not be an option but rather mandatory. This further supports the purpose behind our study. Glycaemic control is important for proper management of a patient with diabetes mellitus. This goes to stand that daily

evaluation of ones glycaemic levels or frequent evaluation is actually beneficial to the patient in living a “regular” life span but in short term to help stave off the effects of complications from uncontrolled diabetes mellitus [8, 9].

On another note, nephropathy, which usually results from uncontrolled diabetes but not limited to such life style disease, was looked at by the *Adv Perit Dial* and they had inconclusive results due to other complications [10]. However, greater care and compliance to all the issues we identified are necessary in order to prevent or slow down progression of nephropathy, as well as if a patient does have nephropathy compliance is mandatory, if they want to extend their life due to all the issues dialysis commands.

Table 1: Subjects Participating in the Study

Demographic Summary		
Variables	n	%
Age (years)		
>55	10	13.9
55-65	29	40.3
>65	33	45.8
Ethnicity		
Indo-Trinidadian	45	59.7
Afro-Trinidadian	16	22.2
Mixed	13	18.1
Length of diagnosed w/ Diabetes (years)		
<1	1	1.4
1-10	23	31.9
11-20	22	30.6
>21	26	36.1

Table 2: Compliance vs Non-compliance

Compliance vs Non-compliance		
Variable	Compliant	Non-compliant
Glucometer	75%	25%
Physician visit	93.10%	6.90%
Exercise	50%	50%
Meal plan	52.80%	47.20%
Medication for HTN	91.70%	4.20%

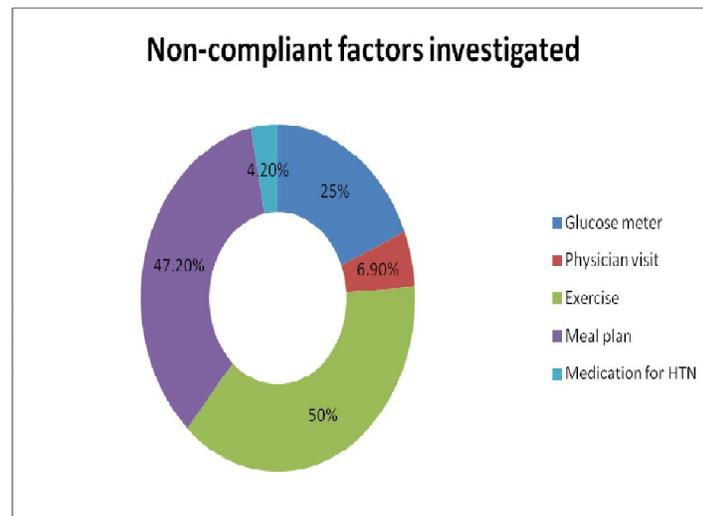


Figure 1: Doughnut Graph Showing Non-Compliant Factors that Were Investigated. (Factors Together do not Sum to 100% Rather Each Segment is Out of its Own 100%)

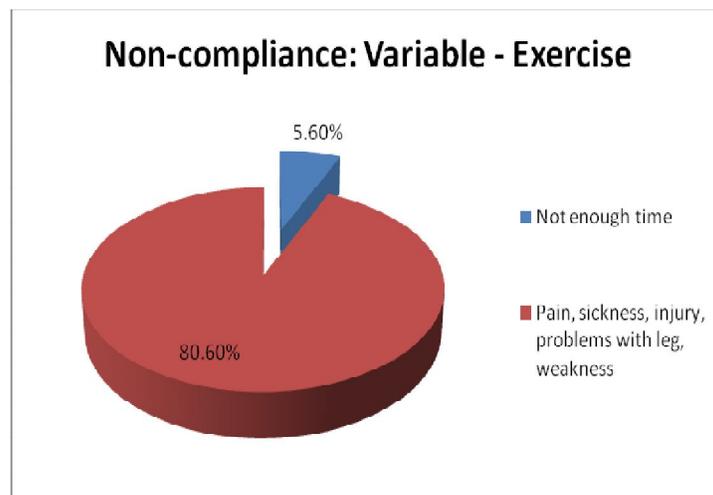


Figure 2: Non-compliance – Pie Chart Illustrating one of the Variables Investigated Exercise

CONCLUSION

Proper management and patient compliance have been shown to improve and lessen the complications associated. This will ultimately improve the quality of lives of those affected and have a positive effect on society.

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