

KNOWLEDGE ATTITUDE AND PRACTICES OF PERSONS DIAGNOSED WITH TYPE II DIABETES MELLITUS WITH REGARDS TO NEPHROPATHY AS A COMPLICATION

A Case Study By E Cummings^a, Alam Khan^b, J Singh^c, V Raja^c and A Defreitas^c

^a Faculty of School of Medicine at the University of Guyana

^b Faculty of Health Sciences at the University of Guyana,

^c Faculty at University of Central Lancashire)

Email: emanuelcumplings98@yahoo.com

ABSTRACT

Diabetes mellitus (DM) is the most common disorder of the endocrine glands caused by an inability to produce or use insulin. It is the fourth leading cause of death in the World according to World Health Organization., in Guyana it is among the leading cause of death. (MOH Bulletin)

KEYWORDS:- Diabetes, Dialysis, Kidney Disease, Blood Disease, Arteries, Diabetic Neuropathy

INTRODUCTION

There is an unseen progression of diabetes mellitus with physiological damage that culminates into what is known as a diabetic complication. Most complications of this chronic disease are known to develop without signs or symptoms (until the situation is rendered serious) so that the unaware patient will not take measures to guard against them. While the complications of DM are numerous, one of the most adverse and difficult-to-manage is diabetic nephropathy.

Nephropathy is a form of kidney disease that advances to kidney failure. It is a long-term complication developing in patients who have suffered with diabetes for several years. It predominates amongst type 1 DM patients but to a lesser degree in type 2 diabetics. The glomeruli's function is lost as small arteries in the kidneys harden.

The onset of kidney disease (diabetic neuropathy) and its progression is extremely variable. Initially, diseased small blood vessels in the kidneys cause the leakage of protein in the urine. Later on, the kidneys

lose their ability to cleanse and filter blood. The accumulation of toxic waste products in the blood may require dialysis and subsequently therapy of renal transplantation.

The progression of nephropathy can be significantly slowed by controlling blood pressure and by aggressively treating high blood sugar levels. Angiotensin converting enzyme inhibitors (ACE inhibitors) or angiotensin receptor blockers (ARBs) used in treating high blood pressure may thus benefit kidney disease in diabetic patients (Kumar & Clark, 2002 ; Williams & Pickup, 1998).

Diabetes mellitus is a global adversary affecting greater than 200 million people and claiming the lives of 1.1 million more in 2005. While its predominance is centered chiefly within the developed countries, fatalities are higher among those of the low and middle income countries (over 75%).¹(WHO, November, 2009)

Diabetic nephropathy claims one-third of the medical costs for dialysis- estimated to be over one trillion dollars- within this present decade. Despite its global burden the problem is further worsen by a remarkable lack of awareness among the people bearing the problem. “Diabetic nephropathy has become a worldwide epidemic, accounting for approximately one third of all cases of end-stage renal disease. With increasing prevalence of diabetes particularly in Asia, and a global prevalence of microalbuminuria of 39%, the problem is expected to grow.”²(Worsely et al., 2010)

A general pattern of poor cognizance is abound to those with diabetic kidney disease where few can relate diabetes as a risk factor for kidney disease and still others may not be conscious of their condition/status especially those with minor impairment.

Public education is strongly called upon to enlighten the world’s diabetic family of their ineluctable potential of developing kidney disease and to become mindful of their kidney function status as well as what treatment is available for them.

² Worsely et al.; May 24, 2007; Current Diabetes Reports;Thursday; *Nephropathy: Worldwide epidemic and effects of current treatment on natural history*; (Volume 6, Number 6 / November, 2006 Diabetic); <http://www.springerlink.com/content/>; Retrieved 20/8/2010. There is general consensus that kidney failure will appear in approximately a third of those affected by diabetes mellitus. It is well established within scientific grounds that the disease damages blood vessels within the body with consequential kidney deterioration.

The initiation of kidney degeneration (nephropathy) rarely is marked by symptoms and for this reason repeated testing for its detection is needed. Fortuitously, the lore of diabetes and kidney complication reveals that early signs can be diagnosed by the presence of small amounts of protein in the urine (proteinuria).

“Symptoms related to kidney failure usually occur only in late stages of the disease, when kidney function has diminished to less than 10 to 25 percent of normal capacity. For many years before that point, kidney disease of diabetes exists as a silent process.”⁴(NIH Publication No. 08–4281; *Prevent Diabetes Problems: Keep Your Kidneys Healthy*, 2008)

³National Kidney Foundation; 2007; Diabetes and Chronic kidney Disease; 11-10-0209; <http://www.kidney.org/ATOZ/pdf/diabetes.pdf>; Retrieved 3/8/2010

⁴NIH Publication No. 08-4281; February 2008; *Prevent diabetes problems: Keep your kidneys healthy*; http://diabetes.niddk.nih.gov/dm/pubs/complications_kidneys; Retrieved 17/8/2010

For Guyana, the number of new diabetic cases emerging yearly chips away (at a rate that is disconcerting) another fraction of the healthy population and so fortifies the country's chronic disease impasse. The confrontation of this diabetic predicament commands an exceedingly efficacious management stratagem- a task that hard presses the country's resources and human prowess.

The health sectors' statistical review (2008) of this particular non-communicable disease projects that, in due course, the amount of diabetic individuals would surmount to a fivefold of ten thousand with 56% dominated by the female sex.

Albeit of the convenience available for determining the years before the advent of type 2 DM by measuring blood sugar levels, it is daunting that this specific manifestation of the disease should attest for thousands of the newly diagnosed DM patients in Guyana each year. Inferentially, it is palpable that Guyanese are not taking advantage of early diagnosis or exhibiting judicious decisiveness when it comes to their wellbeing. Thereof, the nation is sorely defeated in their wake to inculcate a promotional way of life tailored to thwart the culturing of diabetes mellitus.

In the perpetual endeavor to create an enterprising diabetic populace it is the arduous road of Guyanese health professionals to fashion through health education and promotion the knowledge attitudes and practices of those afflicted with this metabolic disorder.

OBJECTIVE OF THE STUDY

To evaluate the knowledge attitudes and practice of renal complication in Type 2 Diabetics patients the Peter's Hall Jamat Medical/Diabetic Clinic.

HYPOTHESIS:

There is a deficiency of awareness amongst the diabetic population and consequentially inept knowledge, attitude and practices as it pertains to recognizing, preventing and/or treating renal complications.

MATERIALS AND METHOD:

Study site and population:

The Peter's Hall Jamat was established by the residents of the Peter's Hall village in the 1960,s and approximately ten years later the Medical clinic was established under the practicing physician- the

deceased Dr. MY Bacchus. The clinic to this day is accessible every Sunday to the public with an attendance of over 120 persons approximately per clinical visit. The majority of the persons (63%) are diabetic patients with type 2 predominating are of low economic status and middling educational background.

Sample Population

Patients with type 2 diabetes mellitus of either gender that attended the Diabetic Clinic of the Peter's Hall Jamat were randomly selected for participation in this study. The sample size consisted of a total of one hundred and fifty patients (150). However, patients that suffered from any known mental illness and those that were unwilling to participate were excluded. Age, weight and race were not considered as defining factors for the sample population.

The diagnosis of diabetes was parallel with the established standard of measurement utilized by the Diabetic Center of the Peter's Hall Jamat and the establishment of the patients' diabetic history (of type 2) for five or more years.

Study Design

A pretested questionnaire was administered to the sample population after consent was obtained to test their knowledge, attitudes and practices as it relates to recognizing, preventing and/or treating kidney disease, and diabetes.

Independent variable: (the variable causing the change – Qualitative)

Establishing the fact that patients of the sample population are suffering with DM was based on their clinical history or corroborated by their enrollment into the Medical/Diabetic Clinic at the Peter's Hall Jamat.

Dependent variable: (the variable that changes – Quantitative)

The patients' KAP level: whether there are any mediocrity in the Patients' levels of knowledge, attitudes and practices in relation to renal failure as a complication of type 2 diabetes.

Based on the responses given and organized from the questionnaires, the researchers analyzed and determined the study population's KAP level using points given for correct and incorrect choices- one point was assigned for every right answer given and '0' or no point was awarded for errors.

The mean score obtained for each section and the corresponding standard deviation was computed and then for each fundamental section (the three KAP segments). The points were distributed thus: knowledge received 10 points while attitudes and practices received 5 points each.

RESULTS:

Altogether 150 patients were enrolled in the study. There were 47 (31.33%) males and 103(68.67%) females. The greatest number of patients was in the age group of 51-60 years. Africans (67) and East Indians (43) together accounted for 70% of the sample population. The overall mean (\pm SD) scores of the patients were 8.89 ± 2.32 . Knowledge score was 3.72 ± 1.67 ; attitude $3.00 \pm .113$ and practice 2.17 ± 1.36 , with maximum possible scores for knowledge, attitude and practice patient being 10, 5 and 5 respectively.

Table 1.1: Tabulation of the responses for each domain of the KAP questionnaire

KNOWLEDGE			ATTITUDE			PRACTICES		
Question No.	Correct answer	Incorrect answer	Question No.	Correct answer	Incorrect answer	Question No.	Correct answer	Incorrect answer
1	56	94	1	77	73	1	44	106
2	23	127	2	58	92	2	86	64
3	28	122	3	76	74	3	98	52
4	22	128	4	93	57	4	61	89
5	95	55	5	79	71	5	20	130
			Average:	76.6	73.4	Average:	61.8	88.2
6	113	37						
7	45	105						
8	79	71						
9	66	84						
10	123	27						
Average:	65	85						

Table 1.1 shows the values obtained for the dependent variable i.e. the distribution of points scored for each question for the three main domains (knowledge, attitudes and practices) from the sample of 150 patients tested from the Peter’s Hall Jamat Medical/Diabetic Clinic. The results were tabulated from the questionnaires dispensed at the clinic on two separate clinic days.

The average for the correct and incorrect responses were calculated at the bottom of each column for very domain presented giving a clear indication of the study groups performance on each section.

From the existing data, more than 57% of the patients (~85) answered incorrectly to the questions governing knowledge and practices. Attitudes was the only area tested where the subjects scoring correctly amounted to more than half of the total persons examined with an average of 76.6. in other words 51% of the sample population gave the right responses for every question in the attitudes domain.

Table 1.2: The mean score of the patients

<u>Dependent variables</u>	<u>Total score:</u>	<u>Mean ± SD</u>
Knowledge	10	3.72 ± 1.67
Attitudes	5	3.00 ± 1.13
Practices	5	2.17 ± 1.36
Overall KAP level	20	8.89 ± 2.32

Results derived after the evaluation of the mean KAP level for the population investigated were computed and displayed in **Table 1.2**. The hypothesis stating that there is inept knowledge, attitudes and practices as it pertains to recognizing, preventing and/or treating developing kidney disease is proven true as the KAP level of the population falls within a mediocre range of 6.57 to 11.2.

Table 1.3: Drugs used in therapeutic management of diabetes

<u>Medications used in drug therapy for Diabetes</u>	<u>No. of persons</u>	<u>Percentage of n=150</u>
use of an antihypertensive-drug	97	64.67
Aspirin	136	90.67
Captopril	34	22.67
Aspirin and Captopril	14	9.33

The benefits of certain drugs are nullified by their adverse effects particularly with prolonged therapeutic administration. Aspirin and Captopril are well known for disagreeable outcomes with extensive use such as gastrointestinal hemorrhage and the progression of kidney disease respectively. Table 1.3 demonstrates the overt use of aspirin in comparison to a lesser degree the consumption of Captopril. Yet the risk for developing the antagonistic complications concomitant with diabetes is seemingly doubled for 9% of the population.

Figure 1.0: Tests performed for the diagnosis of Diabetes Melitus complications

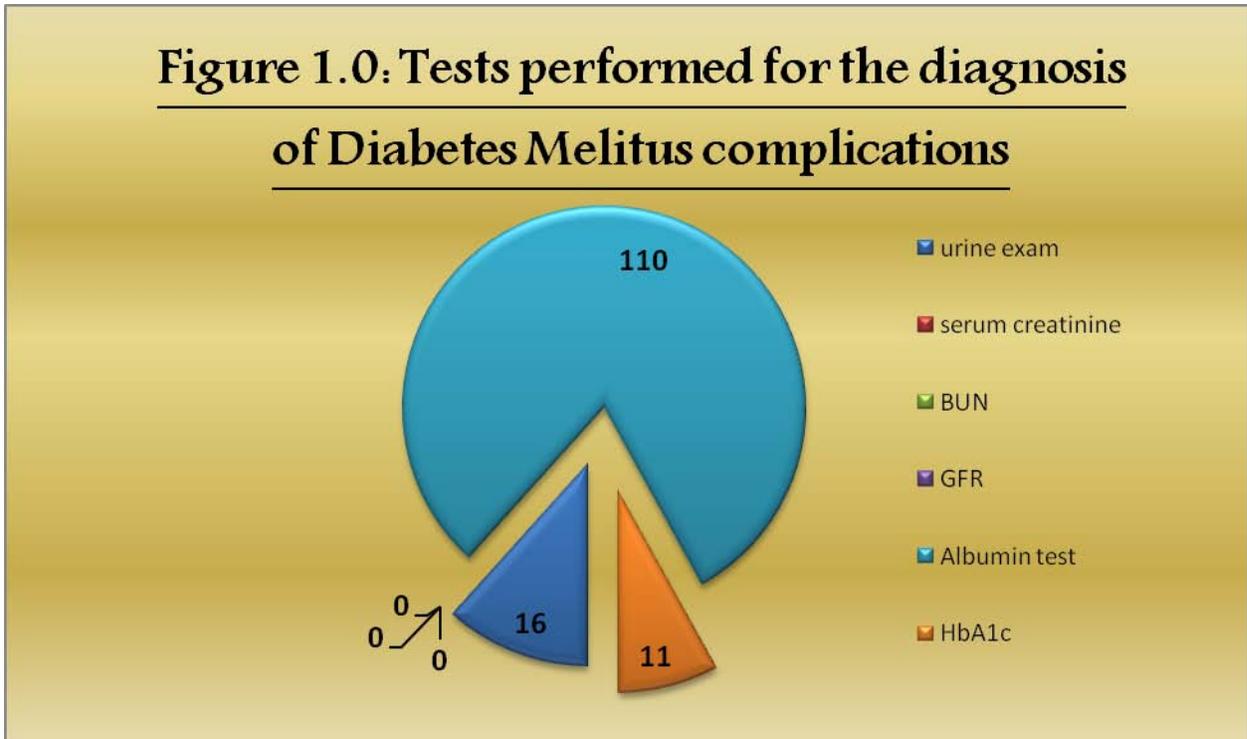


Figure 1.0 represents a pie chart that shows the frequency of diagnostic tests that reveal kidney dysfunction actually done by the patients.

Patients received preliminary tests the least as it pertains to renal evaluation with 73.3% of them having done a urine specimen dipstick test and as such screening for albumin leakage. The data computes that 10.7% of the persons questioned actually had a meticulous diagnostic urinalysis inclusive of microalbumin, urine chemistry and microscopy (urine exam) done.

The sample group in its entirety has never been subjected to a true renal function evaluation (BUN, creatinine, GFR) and so was never actually assessed for the development of diabetic nephropathy. Management of glycaemic control-best done by the glyated hemoglobin test (HbA1c)-was only practiced by an overwhelmingly disappointing few (7.3%).

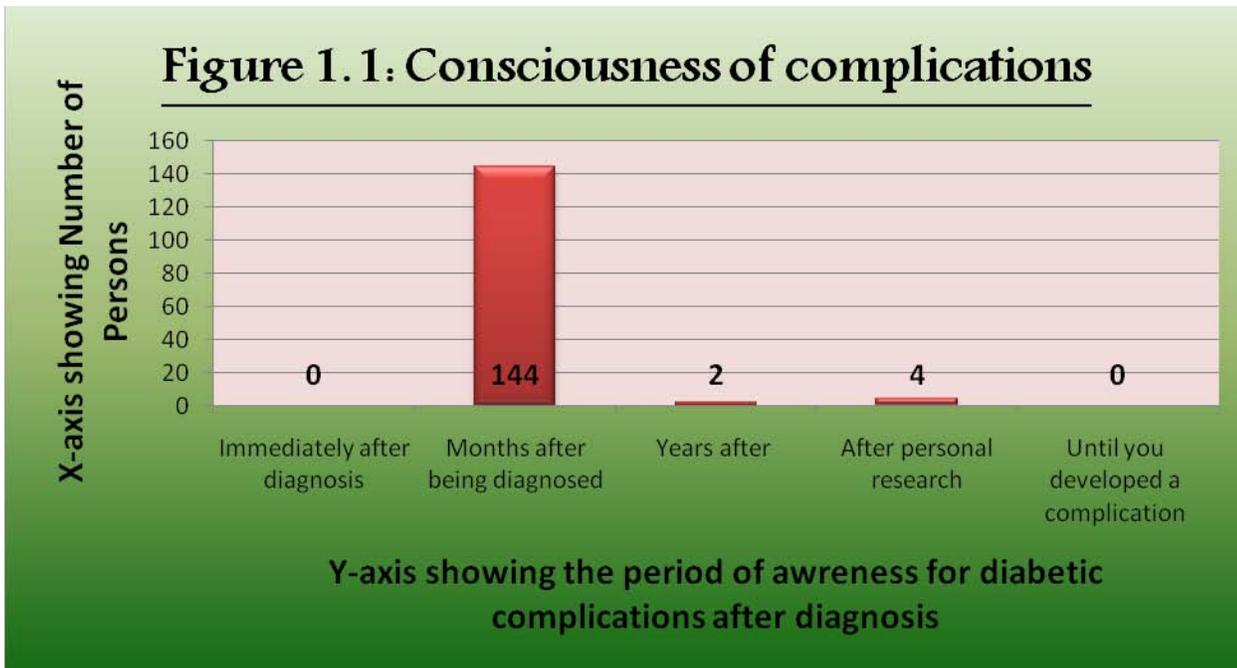


Figure 1.1 above represents a Bar Graph which shows how quickly after diagnosis the diabetics examined for this project were alerted to the pendant peril of further complications. As seen from the graphical portrayal of the results acquired, 96% of the patients were not amiss of this fact; hitherto their KAP level of the subject is disconcerting.

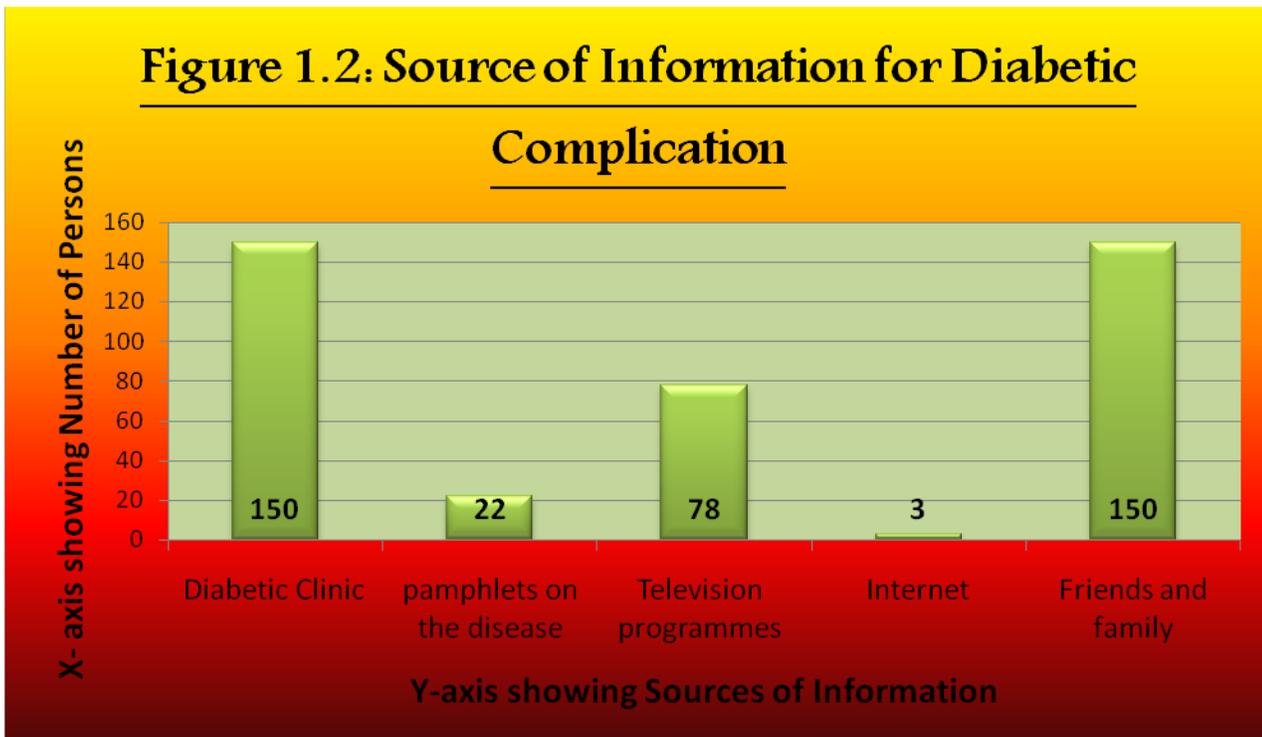
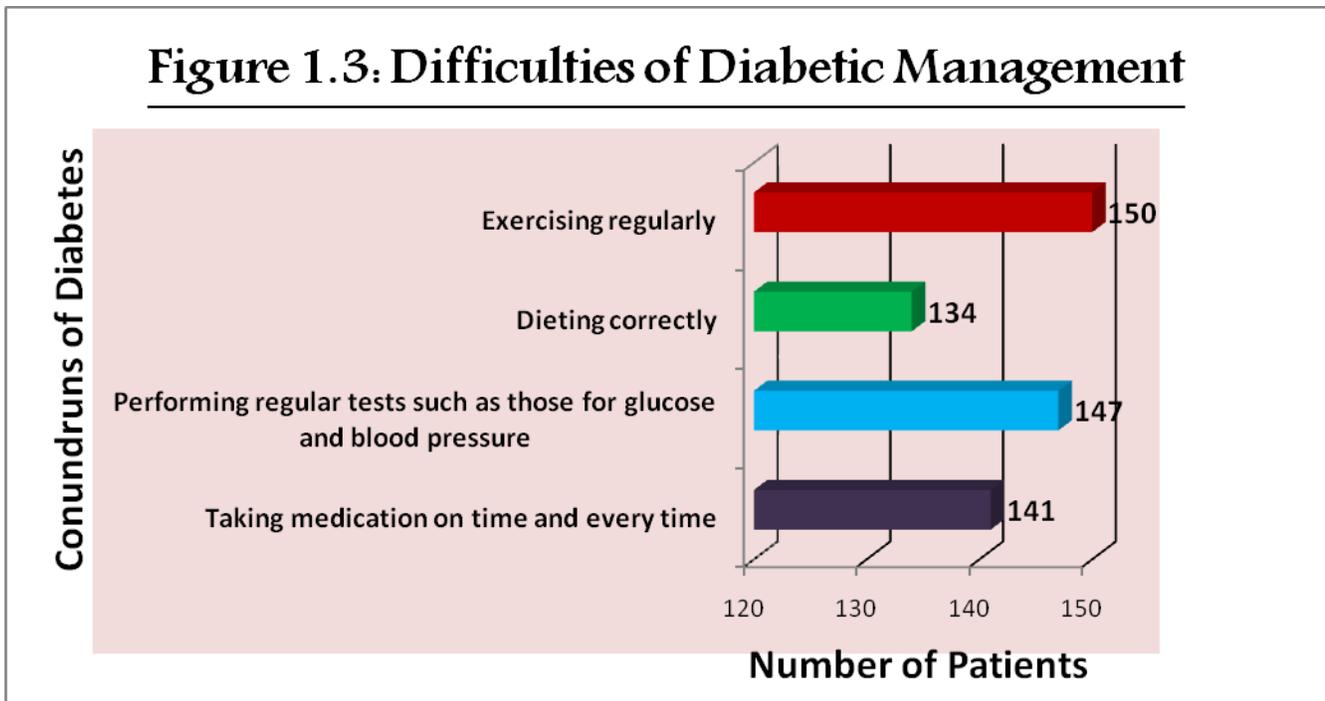


Figure 1.2 is diagrammatical interpretation of the statistics tallied for the various sources of information exploited by the participants of the project to feed their consciousness of its overhanging renal impediments.

The clinic itself besides their extant social network (friends and family), was credited (100% assured) for providing its patients with awareness of renal failure and other complications. The internet while a good source of information, was least accessed (by a meagerly 2%), possibly due to the predominant aged population and their alienation from technology. Therein, televised programmes (52%) was the other popular medium through which the population gain knowledge of the debilitating defects associated with longevity of this metabolic syndrome.



Self-care for a chronic illness such as diabetes mellitus can be exasperating and impracticable especially with the many undertakings of a day-to-day life. Obesity common among those suffering with type 2 diabetes is incapacitating by itself along with inadequate energy generate form the inherent mal-absorption of glucose concurrent with the disease.

Figure 1.3 corroborates these inferences as over 88% of the population reported having challenges with each aspect of therapeutic management scrutinized for the purposes of this study.

Drug therapy, exercise, dieting and pressure and glycaemic management are all critical to the prevention of the disease’s progression to complications. The current statistics exhibits the populations struggle to

maintain good management which was rationally and explicitly internalized in the results accrued for their practices (Table 1.1).

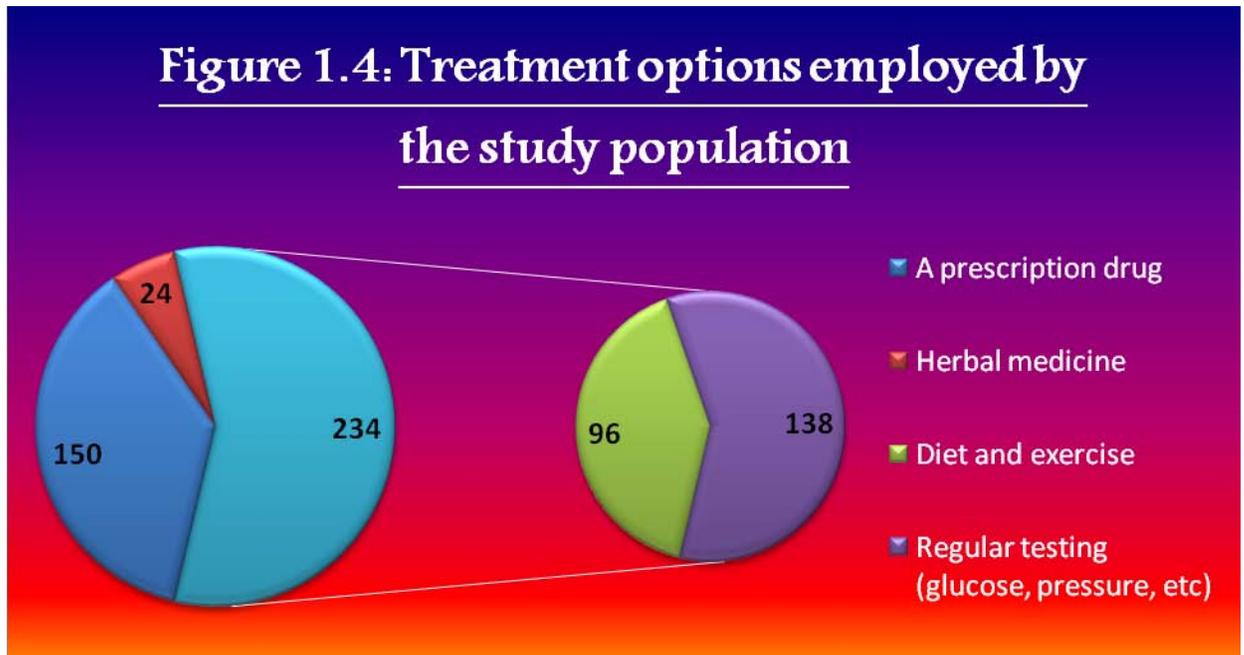


Figure 1.4 is representative of the statistics gathered for the medical and non-medical remedial measures conduit to the sample group.

A prescription drug constitutes the therapeutic regimen for all of the participants of this study closely followed by diet and exercise and regular testing which together was employed by more than 60% of the population each.

Local concoctions derived from herbs with acclaimed medicinal properties were used by 16% of the sample group to treat blood pressure, glucose control and abnormal foot swelling (among other aspects of the syndrome) associated with this chronic carbohydrate dysfunction of normal metabolism.

DISCUSSION

The statistical data shows the KAP level of the study group on average to be 44.95% (Table 1.2) of the total score (maximum 20 points) awarded for the three domain. This is relatively lacking and suggests that the community requires a more efficient process of enhancing awareness to tailor their daily proclivities towards healthier lifestyles.

Only two persons of the entire sample examined were diagnosed for approximately five years. Hence, 98.6% of the population was suffering with this metabolic disease for more than half a decade and conscious

of its additional burdens. Yet, monitoring of blood glucose is done by majority of the patients when they are “not feeling well” (61.3%) as opposed to every day (17.3%). Testing blood pressure received even more tragic results as clinical visits are the most opportune times when the investigated individuals (74% of the sample) monitor their pressure. This surmounts to once or twice a month depending on how many times the clinic is frequented which in turn maybe dependent on the wellness of the said patient.

The aforementioned tendencies are no novelties as proven by another study conducted in Kolkota, India. “Attitude toward regular exercise and dietary modification in diabetics was found to be favorable in the majority; however, while compliance to dietary modification was reported to be high (82.8%) it was not the case with regular exercise (32.8%) possibly due to lack of time. The study found that monitoring of blood glucose at home was very low due to lack of awareness and cost factors but prescription compliance was very high (95.3%).”⁹(PK Kamdar, Nishit Shah, et al.; 2009)

⁹PK Kamdar, Nishit Shah, et al. “Assessing the knowledge, attitudes and practice of type 2 diabetes among patients of Saurashtra region, Gujarat” **Year** : 2009 / **Volume** : 29 / **Issue** : 3 / **Page** : 118-122; <http://www.ijddc.com/article.asp>; retrieved 14-9-10

Several pathophysiologic mechanisms contribute to the genesis and development of renal failure in the patient with diabetes. One major contributing factor found in recent studies shows that hypertension and insulin resistance influence the maintenance of an elevated risk for kidney damage. The etiology of this lies in the fact that blood pressure and glucose control are momentous to delay and possible prevention of nephropathy. This common pathophysiologic manifestation of renal failure in diabetes deems these two non-communicable diseases a global epidemic.

Indubitably, it is of solemn importance that the community’s understanding of diabetes and diabetes nephropathy surpass the sentient echelons of just being cognizant of it. Their feelings and preconceived ideas must influence compliance to treatment and motivate effective disease management. Poor knowledge and attitudes will be demonstrated through poor actions. As apparent from the data acquired, the averaged score attained for the knowledge aspect of the study was 37.2% of the maximum 10 points accessible.

The disease’s pathogenesis is least understood by the patients wherein the purpose of insulin is a preponderant unknown in the sample group. The causation is also unacquainted to the target population as 145 of 150 failed to tick the option that suggested a combination of all other factors listed. There is also strong correspondence amongst the greater part of the group (70.6% of the answers) that with the right medications, exercise and diet diabetes can be cured. Another void in the responders’ knowledge is their enormous concern that uncontrolled diabetes is annexed to heart disease alone while the kidneys and eyes are of unwarranted interest. Overall, the average score obtained for the knowledge domain of this KAP study was 3.72 (± 1.67). Finding that the average score did not exceed even 50% of the maximum points (i.e.10) awarded for this domain is a veracity of the deficient information needed for these patients to make lifestyle changes and enhance self-care or even seek better treatment.

The palpable severity in lack of knowledge thereof is incontestably reflected in the community’s practice.

Acquiring education and effective disease management is momentous as the treatment of this metabolic disease is predominantly effectuated on an individual basis. Knowing what to eat for instance influences the diabetics’ nutrition, blood glucose control and inexorably the rate at which diabetic complications may

develop. Yet, it is below par that persons of the sample population admittedly indicated the use of high glycaemic indexed foods such as white bread, fried foods, and large amounts of salt, among others. The problem is further solemnized by the eating routine practiced by the respondents. For the majority (58%), several snacks a day was the most popular pattern adapted by the diabetics investigated. Consequently, correct dieting becomes difficult to maintain with unplanned meals, late night eating (14%) or eating when time is available (16.6%).

Exercising everyday is another keystone for efficacious diabetic therapy. Once or twice a week is not adequate for therapeutic management as it is customary for 105 of the patients interrogated. More than 50% of the remainder does not. Regular exercise should not be performed only when time is available (as indicated by 20 individuals of the sample). It should be a daily routine for successful diabetic control.

Persons with diabetes attending the Peter's Hall Jamat Clinic rely heavily on medications for their sickness; even the obscure avenue of herbal medicine is sought by some (12.6%). The average score statistically computed for the practice domain was 2.26 (± 1.39). Here again the study sample failed to achieve half of the total score attainable (maximum five points).

On a positive note, the attitudes of the community toward this distressing metabolic syndrome were found to be within acceptable ranges. With an average score above the 50% threshold (i.e. 3.00 ± 1.33), most of the question posed were answered correctly.

The attendants of the Jamat's clinic suffering with type 2 diabetes well perceive the pendant risk they face of heart disease, stroke and pathologic injury to small vessels of the body. They are unanimously chary of LDL cholesterol and saturated fats and mindful of why exercise is necessitated. Though, they did not grasp the mechanism by which physical work out and keeping fit benefits their disease state. A striking correspondence arrested by 42.6% of the sample group is that exercise only improves oxygen flow. In addition, the reduction of insulin resistance and regulation of blood pressure were disassociated from the benefits to be accrued from exercising

No one viewed the use of coke, bacon fat and baked beans as significant enough to contribute to the nephrotic complication of diabetes. Despite their misgivings, everyone (100%) was receptive to the reality that a combination of all aspects of therapeutic management is de rigueur to the prevention of complications maturation and the amelioration of the disease itself. The option –all of the above-identifying exercise, diet, monitoring blood pressure and glucose and adhering to medication regimen as treatment measures was chosen unanimously.

Nevertheless, having the right attitude by itself is insufficient to answer the call for the lifestyle changes pertinent for individuals to delay or even avert altogether the need for dialysis, amputations, by-pass surgery- the entire gamut of medical intercessions that can be circumvented with good overall diabetic control. Knowledge and practices should also be engineered towards healthy lifestyles both at the grass root and health care levels. This finding is in close agreement with the aforementioned cross-sectional KAP study conducted in Kolkata, India. "Diabetic patients rely mostly on drugs and dietary modification for disease control while neglecting other lifestyle modification. Promotion of healthy lifestyle modifications and self-care should be incorporated as part of diabetes education in all treatment facilities." ¹⁰(PK Kamdar, Nishit Shah, et al.; 2009)

Although diabetes is a pervasive disease within the country, critical epidemiological data statistically quantifying the problem is absent and so there is no actual scale available to give measure to the magnitude of control needed for the disease and its related complications.

¹⁰PK Kamdar, Nishit Shah, et al. "Assessing the knowledge, attitudes and practice of type 2 diabetes among patients of Saurashtra region, Gujarat" **Year** : 2009 / **Volume** : 29 / **Issue** : 3 / **Page** : 118-122; <http://www.ijddc.com/article.asp>; retrieved 14-9-10

The aforementioned studies in correlation with the findings of this one objectively portray the situation as it pertains to the outer world. However, perpetuate representation of the disease's prevalence, mortalities, morbidities and progressive treatment mediated by continuous surveys and research is momentous to evaluate our critical capacity of management and determining how much further there is to go. The derivation of strategies, apportioning of resources and identification of new clinical patterns critically relies on contemporaneous information-the collection of which requires urgent relevance by the health sector.

In rectifying the expeditious growth of renal complication among diabetics, assiduous management must be pursued. Changes administered in numerous areas, including the management of hyperglycemia in diabetes, nutrition, and treatment have proven to aid in the adjournment of ESRD. Maintaining a blood pressure at or below 130/80 mmHg is another instrument of complications prophylaxis that is strongly advocated. Systematic examination of patients based on symptomology- e.g. unintentional weight gain from fluid build up, fatigue, swelling of legs etc-can be effective in screening for the development of renal failure and needs to be pragmatically implemented in clinics and other health institutions.

Managing hyperglycemia can be a problem for many people with diabetes. It is advised that early intervention with metformin in combination with lifestyle changes to improve glycemic control. This is concurrent with the revised recommendations strategized from recently included information of a Consensus Statement published by the ADA and the European Association for the Study of Diabetes (EASD). It also urges early initiation of insulin for those who present with weight loss and more severe symptoms. (**'Prevention, Detection, Evaluation and Treatment of High Blood Pressure in Diabetics'** Archives of Internal Medicine, 1997)

¹¹- The Report of the Joint National Committee on **'Prevention, Detection, Evaluation and Treatment of High Blood Pressure in Diabetics'** Archives of Internal Medicine, 1997, 157: 2413-2446.

Although the principles of management in the diabetic patient prescribe the use of drug administration, the prolonged use of certain drugs adds to the abhorring diabetic end-organ complications. The use of an antihypertensive drug was documented for 64.6% of the study sample, with captopril specifically consumed by 22.6% of the entire sample size. It was not amiss that the popular pain reliever Aspirin was utilized by 90.7% in the group's drug therapy. Both captopril and aspirin were being taken by 14 (9.33%) of the persons participating in the study. It is a medical lore that aspirin in itself (even in lower doses) when used in progressive therapy can effectuate intracranial and gastrointestinal bleeding. Hemorrhagic stroke is likely to be directly linked to the intracranial bleeding induced by aspirin therapy. It is also known that the protracted use of anti-hypertensive medication and even the anti-diabetic drug metformin can contribute to renal damage.

In isolation, there is an imperative requisite for public health and clinical strategies to prevent diabetes in unaffected persons as well as to prevent or reduce the burden of complications among those who are affected. Among the measures that should be adopted to stem the flood of diabetes in the Caribbean region are lifestyle interventions to promote better nutrition and to increase exercise; patient education, particularly about the central role of diabetes self-management; and the multidisciplinary team approach in the provision of care.

CONCLUSION

It was projected that the KAP level of the diabetic population attending the Diabetic Clinic of the Peter's Hall Jamat are at a substandard level. Based on the findings using the statistical calculations of chi-square on the data obtained it was deduced that the observed values deviated from the expected with quantitative statistical significance to prove the hypothesis. The X^2 resulted in a value of 6.8 thus exceeding the tabulated χ^2 value (10.828 for $p = 0.001$). It can be safe therefore to say that there is significance of the inadequate KAP regarding nephropathy and its relation to type 2 diabetes. The corresponding p-value derived was 0.0091 (less than the threshold p-value in used i.e. 0.05) suggesting that ~99% probability exists that the same results will be found in another population with random sampling.

The observed values for the knowledge and practice domain when evaluated were of significant deviation from the expected. For n-1 degree of freedom and probability of 0.001, the X^2 value-61.4- for the Knowledge domain exceeded the critical value (χ^2) of 10.828. It induces that the knowledge of the sample population was indeed grim confirming the hypothesis. The chance of this being an adequate representation of the wider population is significantly high given a p-value of > 0.0001 calculated for this domain.

The p-value obtained for the practice domain was 0.0226 which strongly corresponds to the abortive diabetic management being conducted by the investigated individuals. The p-value goes hand in hand with the calculated X^2 -5.2- (derived from the data obtained) exceeding the Chi-square (χ^2) value of 3.841 for n-1 degree of freedom and a probability of 0.05. It is only through stringent care management that glycaemic control and ultimate improved life standards can be achieved. High blood pressure is intense stimulus for the development of renal failure yet regular blood pressure evaluation is one of the more critical areas of failure observed. This coupled with irregular and insufficient exercising devastates the delicate glycaemic control of a diabetic.

For the attitudes domain, the statistical values computed show a prominent departure from the expected proving with a Chi-square value of 6.8 (for $p=0.05$) and p-value of 0.0091 that the mind-set of the diabetic patients is revolutionarily assenting. It confirms that the way of thinking is geared towards alleviation of their medical problem (as is of any person with a health issue). Conversely, the beneficence of therapy is not attainable with just the appropriate attitudes, but must go hand in hand with the pragmatic rationales cultured by knowledge and enforced by practices.

With education the misconceived myths of diabetes and unacquainted facts can be clarified while with motivation the prowess of self-care can be amplified. It is recommended that health education and promotion with focal stress on understanding this debilitating disease and mastering its care be extended to the population through the medium of televised broadcasts and the support of both governmental and non-

governmental organizations. Physicians and other health care workers at the primary levels should be alerted of the substandard knowledge, attitudes and practices possessed by the people of Guyana. They should provide to the best of their abilities the enrichment of behavioral modifications that necessitates health care refinement of our jaded but precious diabetic population.

RECOMMENDATIONS

1. Physicians tending diabetic patients should be more pro-active towards health education with emphasis on diabetic complications.
2. Information should be made available through pamphlets, educational programmes and advertisements of the pathogenesis of the diseases and the ineluctable routes to its devastating complications.
3. Clinical visits can be an opportunity for health care workers to enquire about health practices especially when diagnostics tests shows a patient's health parameters are not within normal ranges. The need to motivate and imbue the necessity for self-care management requires tenacity on the part of the health professionals.
4. The dangers of unremittingly using certain medications should be made cognizant to those with chronic diseases like diabetes. The means to relieve those with lifetime illnesses of their dependence on drug therapy should be aggressively pursued.
5. The population without diabetes but prone for its development should be made aware of the disease through family counseling of those in whom the ailment is already extant. Lifestyle changes induced at an early stage geared towards healthy choices is pertinent to the delay of the onset of inherent and environmental diseases like diabetes.
6. Health education programmes regarding diabetes and its prevention should target the younger generation through educational channels likes schools, religious centres, workshops, youth groups, etc.
7. The diabetic populace should be made cognizant of new medical advancements available to increase efficiency of disease management like the use of the HbA1c test.
8. The deficiency of studies evaluating the KAP of varying demographics and linking causative factors for the conflagrating diabetogenic environment must be given immediate attention.
9. Poverty, smoking, and obesity are a few of the contributory elements of diabetes which also requires the need for medical intervention from the level of political policies governing the health system to the grass root health care being proffered.
10. Continual testing should be made mandatory by clinics which should monitor clinical parameters-particularly those associated with complications development-through regular follow up.

REFERENCES

- 1) Anon, article date: 01 Mar 2010 - 6:00 PST; Think Globally, Act Locally To Reduce Burden Of Diabetic Kidney Disease, Diabetes; Urology / Nephrology; <http://www.medicalnewstoday.com/articles/180714.php>; Retrieved 22/8/2010).
- 2) Atkins RC, Zimmet P.; Diabetic kidney disease: Act now or pay later. Saudi J Kidney Dis Transpl 2010;21:217-21; <http://www.sjkdt.org/article.asp>; Retrieved 19/8/10.
- 3) Belle TR, Fraser HS, Adomakoh SA, Walrond ER; April 2002; Economic cost of managing diabetes mellitus in Barbados [conference presentation]; Caribbean Health Research Council, 47th Annual Council and Scientific Meetings, Georgetown, Guyana; <http://revista.paho.org>; Retrieved 20/8/2010
- 4) Burt VL, Whelton P, Roccella EJ, et al. (March 1995). "Prevalence of diabetics, Results from the Third National Health and Nutrition Examination Survey, 1988-1991". <http://hyper.ahajournals.org> Retrieved 2010-08-04.
- 5) Butt Saud, Hall Phillip, Saul Nurko; Diabetic Nephropathy; <http://www.clevelandcliniced.com/medicalpubs/diseasemanagement/nephrology/diabetic-nephropathy/>; Retrieved 18/8/2010
- 6) Correa-Rotter et al.; (Kidney International (2005) 68, S69–S75; doi:10.1111/j.1523-1755.2005.09813.x); Early detection and prevention of diabetic nephropathy: A challenge calling for mandatory action for Mexico and the developing world; <http://www.nature.com/ki/journal/v68/n98s/full/4496442a.html>; Retrieved 22/8/10
- 7) Upadhyay Dinesh K, et al.; November 26, 2007; Knowledge, Attitude and Practice about Diabetes among Diabetes Patients in Western Nepal; http://www.rmj.org.pk/rmj_jan_jun_2008/original_articles/dm_attitude/pdf.pdf; Retrieved 29/8/10
- 8) EHE Newsletter, Volume 9, Number 5, March 3, 2009, Kidney disease; <http://www.eheintl.com/newsletter.jsp>; Retrieved 8/26/2010
- 9) GINA; July 18, 2008; Diabetes registry established - will allow for easy patient follow, <http://www.gina.gov.gy/archive/daily/b080718.html>, Retrieved 22/8/2010
- 10) Gordon Serena; Tuesday, Dec. 29 (HealthDay News); Diabetics Less Prone Now to End-Stage Kidney Disease; <http://www.medicinenet.com/script/main/art.asp>; Retrieved 22/8/10
- 11) Gower Timothy; How Diabetes Affects the Kidneys; <http://health.howstuffworks.com/how-diabetes-affects-the-kidneys1.htm>; Retrieved 9/23/10

- 12) Holly Kramer, MD1 and Mark E. Molitch, MD2; Screening for Kidney Disease in Adults With Diabetes; <http://care.diabetesjournals.org>; Retrieved 8/22/10
- 13) Ian H. de Boer and Michael W. Steffes; March 14, 2007; Glomerular Filtration Rate and Albuminuria: Twin Manifestations of Nephropathy in Diabetes; *J Am Soc Nephrol* 18: 1036-1037, 2007; Last Reviewed: February 27, 2009; http://nkdep.nih.gov/patients/kidney_disease_testing.htm; Retrieved 8/22/10
- 14) Jamal Soraya, Monday, March 8th; Protect Your Kidneys- Control diabetes; <http://malaysia.news.yahoo.com/bnm/20100308/tap-kidney-with-pix-5cdd12e.html>; Retrieved 3/18/10
- 15) Janet Worsley, Norwood and Charles B. Inlander; Diabetic Complications; The Factors Behind Complications of Diabetes; Excerpt from: Understanding Diabetes; http://www.diabetesinfocenter.org/View.aspx?url=diabetic_complications; Retrieved 8/18/10.
- 16) Kumar PJ & Clark M (2002). *Clinical Medicine*. Pub: Saunders (London), pp. 1069-1121.
- 17) Pagana, Kathleen Deska. 1998; *Mosby's Manual of Diagnostic and Laboratory Tests*. St. Louis: Mosby, Inc.; <http://medical-dictionary.thefreedictionary.com/Creatinine+Test>; Retrieved 3/25/10
- 18) Perneger Thomas V. , MD, PhD et al.; (Ann Intern Med December 15, 1994 vol. 121 no. 12 912-918); End-Stage Renal Disease Attributable to Diabetes Mellitus; <http://www.annals.org/content/121/12/912.full>; Retrieved 9/22/10
- 20) Tetsutani Tamiko 1993; 64:69-74 (DOI: 10.1159/000187281); *Nephron*; Early Detection of Diabetic Nephropathy and Criteria for the Initiation of Therapy; Published online: December 12, 2008; <http://content.karger.com/ProdukteDB/produkte.asp>; Retrieved 8/22/10
- 21) WHO; November 2009; Diabetes (Fact sheet N°312); <http://www.who.int/mediacentre/factsheets/fs312/en>; Retrieved 8/20/2010
- 22) Worsely et al.; May 24, 2007; Current Diabetes Reports; Thursday; Nephropathy: Worldwide epidemic and effects of current treatment on natural history; (Volume 6, Number 6 / November, 2006 Diabetic); <http://www.springerlink.com/content/>; Retrieved 8/20/2010
- 23) Williams, G & Pickup, JC (1998) diagnosis and classification of diabetes mellitus. In: *Handbook of Diabetes*. Pub: Blackwell Science, Oxford ,pp1-2.