

## KNOWLEDGE, AWARENESS AND ATTITUDES TOWARDS THE MANAGEMENT OF DIABETES MELLITUS AMONG PATIENTS IN SRI LANKAN SUBURBAN COMMUNITY

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### ABSTRACT

**Introduction:** Due to the sedentary lifestyle and unhealthy eating habits, the prevalence of diabetes is increasing rapidly in urban Sri Lanka than the rural suburbs. Awareness of the disease is pivotal for the prevention and minimization of diabetes-related complications. No information on patient's knowledge is recorded for Sri Lanka, in a country where a comparably high literacy level is recorded. The objective of this study was to evaluate the awareness, knowledge and attitudes regarding their disease among patients with diabetes mellitus in a population of Colombo suburb.

**Method:** This cross-sectional descriptive study was conducted over 6 months enrolling a total of 131 patients with Diabetes mellitus. A self-administered questionnaire with demographic information and information regarding the symptoms, the diagnosis, complications, treatment, prevention and prognosis of the disease was used to collect data. A percentage knowledge score was calculated based on the composite score of each patient and the knowledge level was determined.

**Results:** 76 females (58.01%) and 56 (42.75%) males participated the study. The mean age of the population was 57.56 years and the mean duration of diabetes was 10.57 years. A very small percentage (12.98%) of the patients had formal education on the disease. The mean percentage knowledge score was 37.7% with a minimum of 5.3% and a maximum of 73.7%. The knowledge level of 48.82% of patients was 'poor' while 28.3% showed 'very poor' knowledge. Only 22.88% demonstrated 'good' knowledge and none had 'very good' knowledge. Although the majority of the patients had a 'poor' or 'very poor' knowledge regarding the diagnosis (64.1%) and treatment (88.0%), 54.2% had a 'good' or 'very good' knowledge regarding complications. Only 46.7% patients had 'good' or 'very good' knowledge level on prevention and prognosis of the disease. The study failed to establish statistically significant relationships between knowledge level and gender ( $P = 0.33$ ), literacy level ( $p = 0.445$ ), duration of diabetes ( $P = 0.061$ ) or past participation in diabetes education ( $P = 0.437$ ).

**Conclusion:** Despite having good health care facilities, awareness and knowledge of diabetes mellitus are inadequate among patient of Colombo suburb. Urgent focus and better action plans are needed to create awareness on diabetes mellitus with the aim of a sustainable reduction in diabetes burden in future.

**Keywords:** Diabetes mellitus, awareness, knowledge, attitude, diagnosis, management, complications, prevention, prognosis.

### INTRODUCTION

Diabetes mellitus is a complex metabolic disorder that can adversely affect the normal human physiology. It is one of the commonest non-communicable diseases that has escalated to an epidemic level worldwide. The modern sedentary lifestyle focused on comfort living and unhealthy eating habits have created a striking increase in the

prevalence of non-communicable health issues such as diabetes mellitus, obesity and cardiovascular disease. This is not restricted to developed countries but seen more frequently in developing countries such as Sri Lanka.

In 2011, 366 million people suffered from diabetes and 4.6 million people in the world died due to consequences of high blood sugar (1). The number is expected to reach 552 million by 2030. More than 80% of

diabetes related deaths occur in low and middle-income countries. The World Health Organization projects diabetic deaths to rise by two third by 2030 and the incident of diabetes mellitus in developing countries to increase by 170% by 2025. It has been estimated that 228 million patients in these countries will account for 75 % of the world population of diabetes by 2025 (2). The prevalence of diabetes in Sri Lanka was 10.3 % in 2005 and during the last decade, there has been a

rapid rise in the prevalence of diabetes affecting urban population living in Colombo and suburbs compared to the rural community (3). Improvement of the disease awareness is the key to reduce the disease burden by early diagnosis and appropriate treatment that will minimise disease related complications of these patients (4).

Effective health education is directly influenced by the literacy level of the population (5). Sri Lanka is a country with a high literacy rate of 91.2 %, which is comparable to the literacy level of developed countries (6). Most of literate Sri Lankans are clustered in urban Colombo and its suburbs. Therefore, it can be expected that diabetic patients from these areas to have a better disease awareness. The existing research on awareness and knowledge in developing countries are from countries with low literacy levels (7, 8, 9, 10) and there are no recorded data in the medical literature on the level of awareness of diabetes mellitus for our population. Establishing data on this is a national need to plan public health policies and to identify specific requirements to implement national diabetic control programs. This study was carried out to establish the current level of awareness, knowledge and attitudes on diabetes mellitus in a patient population attending a Colombo suburb hospital in Sri Lanka.

## METHODS

This cross-sectional descriptive study was carried out at Dr Neville Fernando Teaching hospital, Malabe, Sri Lanka, for a period of 6 months from October 2013. The data was collected using a self-administered questionnaire designed in English, which was validated after translating to Sinhalese. The questions included; patient's demography and set up questions on four clinical aspects of diabetes mellitus: 1) diagnosis 2) complications 3) treatment 4) prevention and prognosis.

Patients diagnosed with diabetes mellitus and attending the medical or

diabetes clinics at Dr Neville Fernando Teaching hospital were enrolled. Patients with gestational diabetes mellitus were excluded. Data was collected over a period of six months with an objective of achieving a minimum sample of 100 patients. At the end of the six months, a total of 131 (n=131) patients were interviewed for the study.

Data was analysed using Statistical Package for Social Sciences (SPSS) version 21. Comparisons of means were done with Student's t- test and comparisons of total percentage scores were done with the Chi-squared test. The level of statistical significance was at  $p < 0.05$ . Patient's demographic data was analysed under age, gender, marital state, duration of diabetes, past participation in health education programmes on diabetes, educational level and employment status. Educational level was graded into categories of no formal education, the primary school only, schooling above 5<sup>th</sup> grade, advanced level, undergraduate education, and postgraduate education.

Answers to the setup questions based on 1) diagnosis, 2) treatment (life style changes and drug), 3) complications, 4) prevention and prognosis were analysed according to the following scoring system.

- a) Each correct answer was given score of 1.
- b) Questions of each assessed component were given a maximum score: diagnosis (12), lifestyle changes (15), drug therapy (10), complications (10) and prevention and prognosis (10). The components were analyzed separately. The final score was calculated by adding up of scores of each component and the maximum achievable score was 57.
- c) A composite score in percentage was determined separately for each component and for the total score by dividing individual scores by the maximum

achievable score.

- d) The knowledge level was rated based on the compo-site score as 0-24.9 very poor, 25- 49.9 poor, 50-74.9 good, 75-100 very good.
- e) The demonstrated knowledge level of patients was further analysed to determine if any significance existed based on gender, educational level, duration of diabetes and previous diabetes education.

## RESULTS

Socio-demographic profile of study population is given in Table 1. 75 females (57.3%) and 56 males (42.7%) participated the study and there was 100% response rate for the questionnaires. The mean age of the study population was 57.56 years (SD +/- 11.92). The highest number of participants were in the age group of 51-60 years. The majority of females were in 61-70 age group. 96.9% of respondents were married while unmarried and non-respondents to the marital state were 1.5 % each. 126 patients (96.2 %) could recall the duration of their illness and the mean duration of diabetes in this population was 10.57 years (SD 8.15). The diagnosis of diabetes was within 10 years of the study in 57.1% of patients. 17 patients (12.98%) acknowledged that they have participated a formal educational program on diabetes, while 46 individuals (35.1%) reported not having such experience. This question was unattended by 68 respondents (51.9%).

The literacy levels of the participants were distributed as grade 10 completion (42%), studied up to advanced level (35.1%), undergraduate education (9.2%) and postgraduate completion (0.8%). This question was not responded by 17 patients (13.0%). Only 28.7% of the study group was employed and the rest of the group were unemployed (48.9%), retired (11.5%) or did not respond (13.0%).

**Table 1: Socio-demographic profile of study population**

Variable		Total: N = 131(%)	Male: 56 (%)	Female: 75(%)
Age group (years)	21 – 30	2 (1.5)	2 (3.6)	0
	31 – 40	9 (6.9)	3 (5.3)	6 (8.0)
	41 – 50	23 (17.6)	8 (14.3)	15 (20.0)
	51 – 60	44 (33.5)	23 (41.1)	21 (28.0)
	61 – 70	37 (28.3)	12 (21.4)	25 (33.34)
	71 – 80	11 (8.4)	7 (12.5)	4 (5.33)
	81 – 90	5 (3.8)	1 (1.8)	4 (5.33)
Marital state	Married	127 (96.9)	55 (98.2)	72 (96.0)
	Unmarried	2 (1.5)	1 (1.8)	1 (1.3)
	Not response	2 (1.5)	0	2 (2.7)
Duration of diabetes mellitus( no of years)	0 – 5	42 (32.06)	18 (32.14)	24 (32.0)
	5 – 10	30 (22.9)	14 (25)	16 (21.33)
	10 – 20	40 (30.53)	15 (26.78)	25 (33.33)
	20 – 30	12 (9.16)	5 (8.92)	7 (9.33)
	30 – 40	2 (1.53)	1 (1.78)	1 (1.33)
	Unknown	5 (3.8)	3 (5.4)	2 (2.7)
Participation in formal diabetic education program in the past	Yes	17 (12.98)	6 (10.7)	11 (14.7)
	No	46 (35.1)	20 (35.7)	26 (34.7)
	No response	68 (51.9)	30 (53.6)	38 (50.7)
Education status (literacy level)	No school attendance	0	0	0
	Primary school only	0	0	0
	Completed grade 10	55 (42.0)	23 (41.1)	32 (42.7)
	Advanced level	46 (35.1)	20 (35.7)	26 (34.7)
	Graduate	12 (9.2)	7 (12.5)	5 (6.7)
	Post graduate	1 (0.8)	0	1 (1.3)
	No response	17 (13.0)	6 (10.7)	11 (14.7)
Employment status	Employed	35 (26.7)	23 (41.1)	12 (16.0)
	Unemployed	64 (48.9)	21 (37.5)	43 (57.3)
	Retired	15 (11.5)	6 (10.7)	9 (12.0)
	No response	17 (13.0)	6 (10.7)	11 (14.7)

Awareness and knowledge of diagnosis of diabetes mellitus (aetiology, symptoms, risk factors, and diagnosis). (Figure 1):

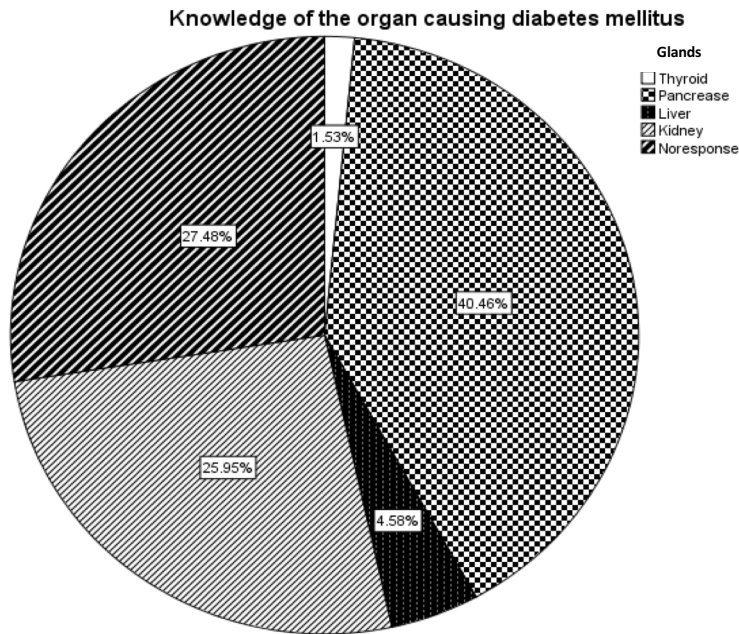


Figure 1A

40.46% patients identified the main organ related to diabetes as the pancreas, while 27.48% failed to respond the question. Among the

incorrect answers, kidney was selected by 25.95% and thyroid by 1.53% (Figure 1A).

Polyuria, non-healing ulcers and weight loss were correctly recognised as presenting symptoms of diabetes by more than 50% of patients. The highest response (77.10%) was on polyuria while responses for non-healing ulcers and weight loss were 68.70% and 53.40% respectively. Incorrect responses of presenting symptoms included chest pain (93.9%) and loss of appetite (90.8%) (Figure 1B).

Patients were asked to identify the factors known to increase the risk of diabetes from a list. The best response was recognition of family history by 61.1% of patients. Obesity was identified by 35.10% while only 22.9% knew hypertension increases diabetes risk. Alcohol consumption and weight loss were falsely believed as risk factors by 77.10% and 84.70% respectively (Figure 1C).

The knowledge of fasting blood sugar in the diagnosis of diabetes was assessed by asking the patient to select the diagnostic value from four different fasting sugar values. Only 54.96% made the correct selection while 28% answered incorrectly and 16.79% failed to respond (Figure 1D).

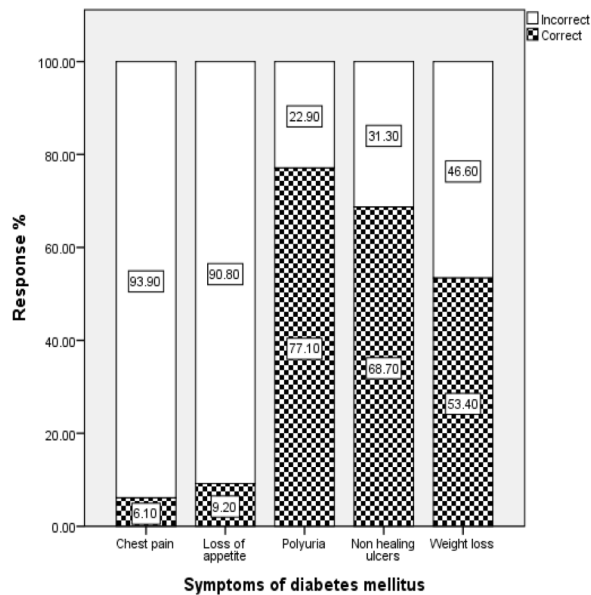


Figure 1B

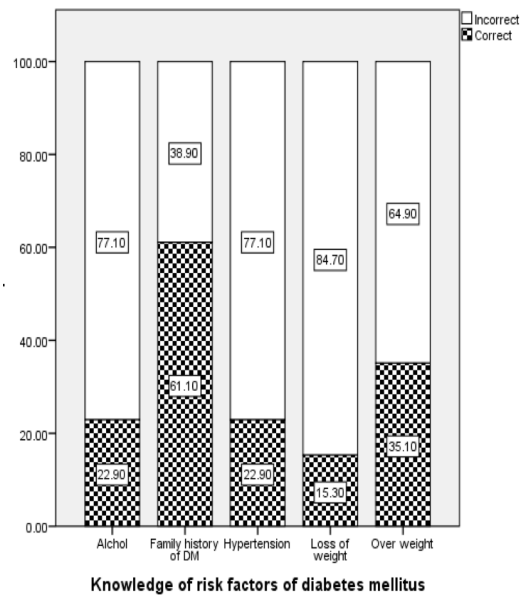


Figure 1C

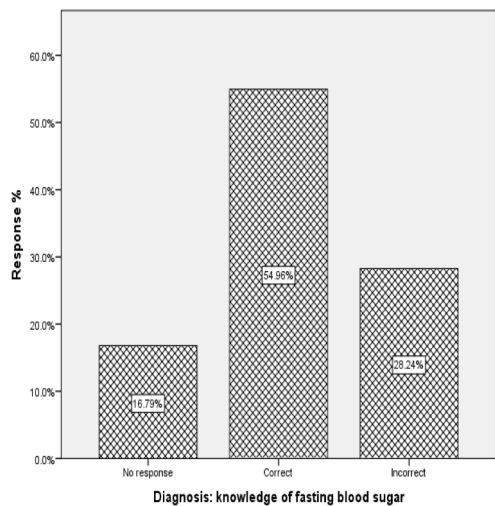


Figure 1D

**Awareness and knowledge of management of diabetes mellitus (diabetic diet, lifestyle changes and pharmacological treatment: Figure 2):**

Awareness of healthy diabetic diet was assessed by asking study participants to select food items that could be freely taken by a diabetic

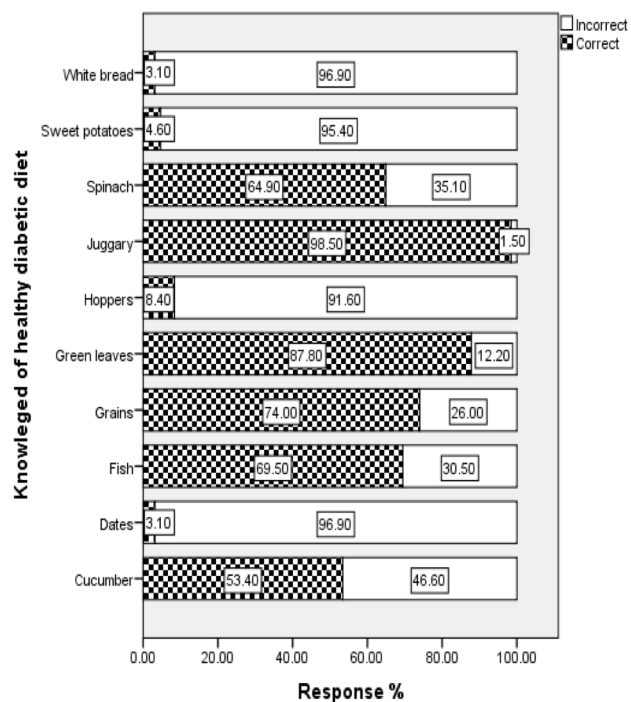


Figure 2A: Diabetic diet

patient from a given food list. Avoidance of jaggery (a concentrated sugary product) was recognised by 98.5% of respondents. However, a significant number (96.90%) failed to identify that dates should be avoided. More than 50% showed awareness that green leaves (87.8%), grains (74.0%), fish (69.5%), spinach (64.90%) and cucumber (53.4%) were healthy. The respondents were not familiar with healthy main meals and more than 90% of them considered white bread (96.90%), sweet potatoes (95.40%) and hoppers (91.60%) could be consumed without restrictions.

Lifestyle modifications for blood sugar control (Figure 2B): Awareness of lifestyle changes for better blood sugar control was assessed on five different practices. Sugar added tea was identified as unhealthy by 82.40%. Sugary carbonated drinks and excess alcohol consumption were recognised as unhealthy by 79.4% and 61.8% respectively. Snack in between meals was incorrectly considered as unhealthy

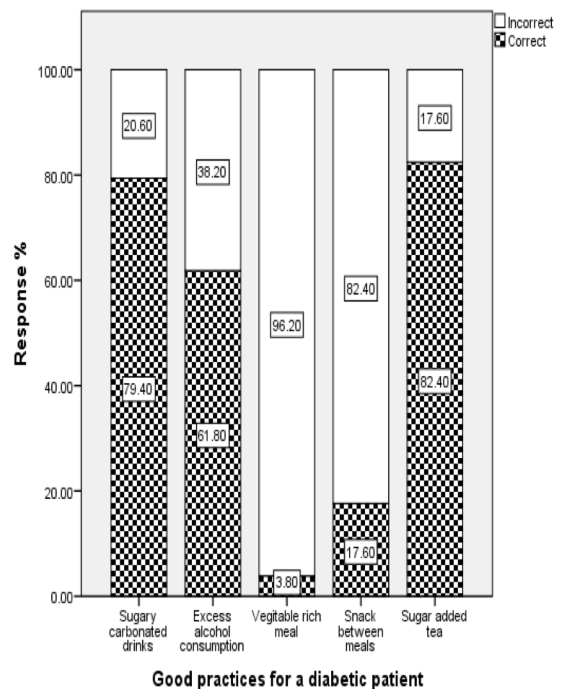


Figure 2B: Lifestyle modifications for blood sugar control

by 82.4%. 96.2% of respondents failed to recognise consumption of extra vegetables as healthy.

Pharmacological treatment of diabetes (Figure 2C and 2D): Dizziness was recognised as a symptom of hypoglycaemia by 42.7% and this was the best knowledge reported on oral drug use. Only 31.3% knew that some oral medications can enhance the insulin level in the body. The weight reducing benefit of metformin was only known to 11.5%. More 42.7% and this was the best knowledge reported on oral drug use. More than 90% had false beliefs that oral drugs damage the pancreas (90.8%) and increase appetite (93.9%).

The best response regarding insulin was for its storage requirements and 45.80% were aware that refrigerator facility was not compulsory to keep insulin at home. The overall awareness of insulin was poor and 94.70% considered insulin was used only in the treatment of type 1 diabetes mellitus. Insulin was falsely considered as a risk for infections



Figure 2C and 2D Pharmacological treatment of diabetes.

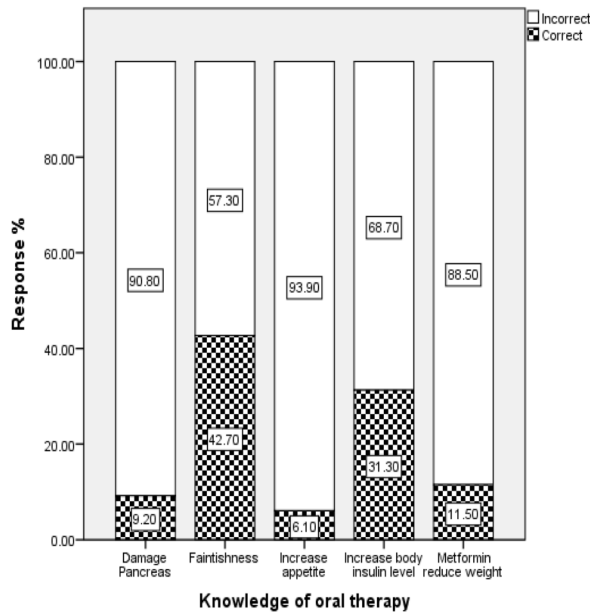


Figure 2C

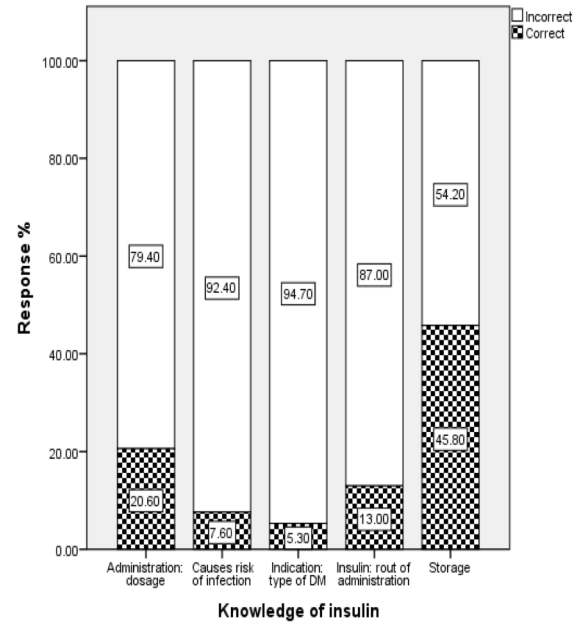


Figure 2D

By 92.40%. Administration of insulin was incorrectly recognized as oral by 87% while only 20.60% knew insulin is measured in units.

A list of specified organ dysfunctions and disease conditions were used to assess general awareness of complications of diabetes. The highest awareness was of chronic ulcers

(79.40%) followed by peripheral neuropathy (73.3%) and renal failure (65.6%). Recognition of ischaemic heart disease and cataract as complications was 56.5% and 53.4% respectively. Established complications such as stroke (35.9%), erectile dysfunction (28.2%) and subfertility (16.0%) were less known to the participants.

74.8% were aware of the importance of regular physical activity in the prevention of diabetes. However, their awareness of hyperglycaemia risk with sedentary lifestyle and occupations with minimum physical exertion was poor. Only 26.0% considered sedentary lifestyle has an impact on blood sugar control while 32.8% accepted that some

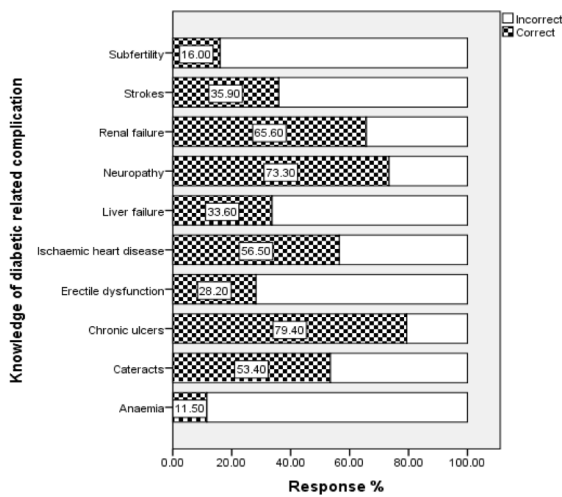


Figure 3A: Awareness and knowledge of diabetes-related complications.

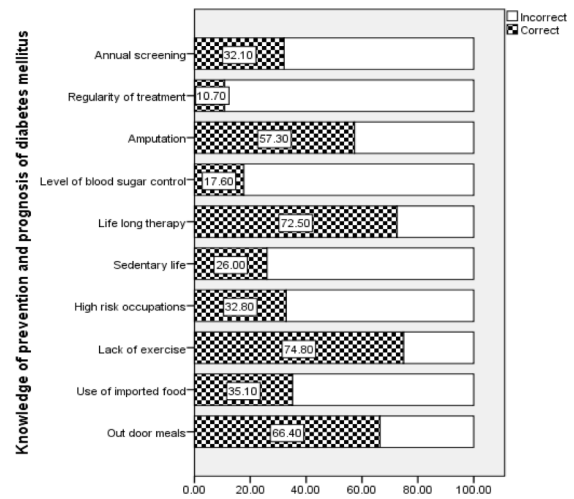


Figure 3B: Awareness and knowledge of prevention and prognosis of diabetes mellitus.

occupations have a greater risk. 66.4% were aware that fast-food/take-away meals may worsen the blood sugar control. Data also revealed that 64.9% incorrectly believed that consumption of imported food increases the risks of diabetes.

The necessity of life-long therapy for diabetes was identified by 72.5% while 57.7% identified the relationship

of poor glycaemic control and risk of limb amputations. The importance of annual screening to monitor disease progression was only identified by 32.1%. 82.4% believed that diabetes-related complications will occur despite good glycaemic control and 89.3% believed intermittent drug treatment was adequate to control diabetes satisfactorily.

The total scores indicated that 64.1%

of the population has 'very poor' or 'poor' level of knowledge on symptoms and diagnosis of diabetes mellitus. Only 32.6 % had 'good' knowledge while only 3.10 % were 'very good' (Figure 4A). The overall level of knowledge on diabetic treatment (non-pharmacological and pharmacological) was significantly low. 93.3 % scored less than 50% and showed 'very poor' (29.1%) and 'poor' (64.2 %) knowledge (Figure 4B).

Figure 4: Knowledge levels of diabetes mellitus based on diagnosis, treatment, complications, prevention and prognosis.

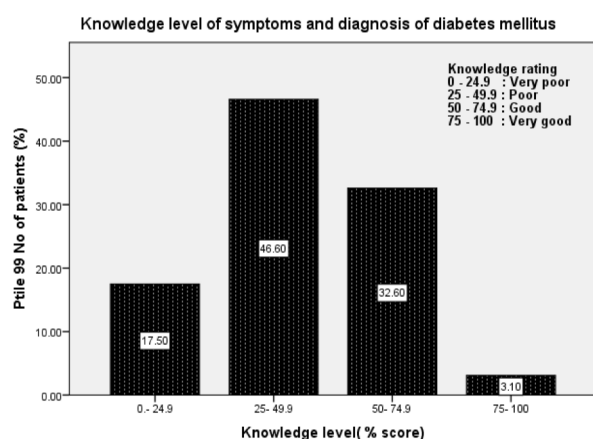


Figure 4A

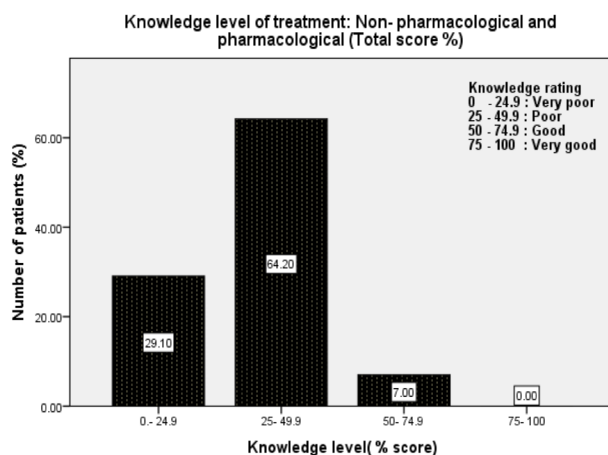


Figure 4B

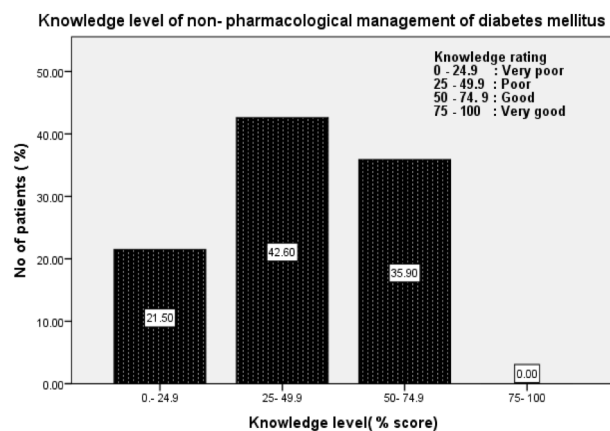


Figure 4C

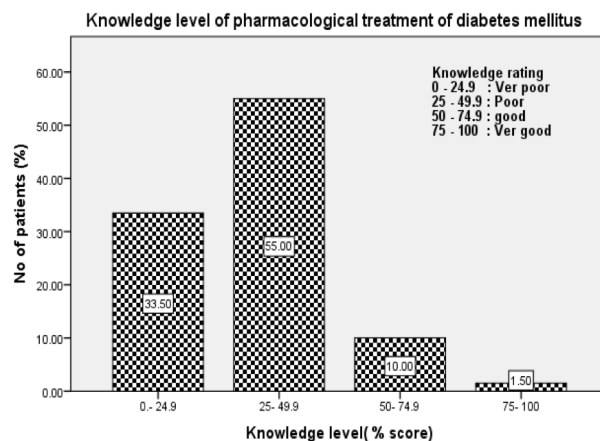


Figure 4D

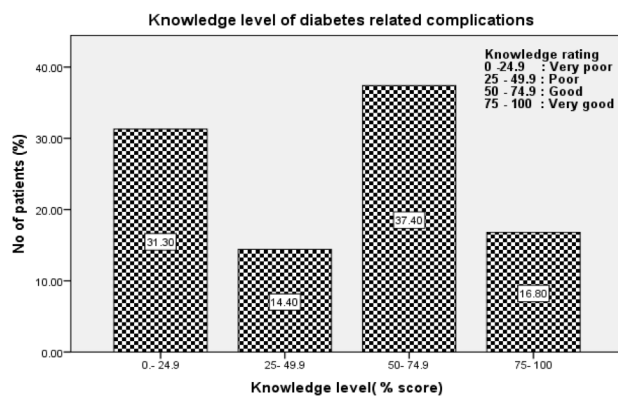


Figure 4E

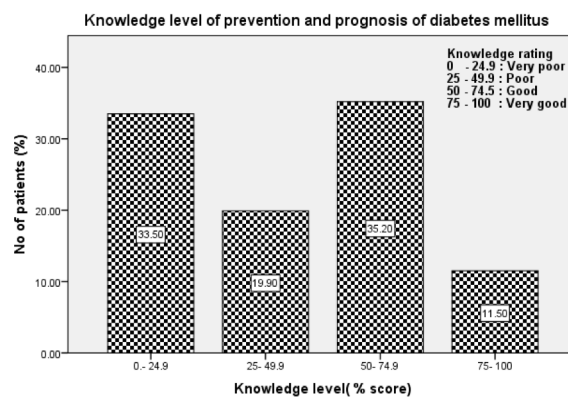


Figure 4F

The knowledge scores of non-pharmacological management were less than 50% among 64.1%; 21.5% (very poor) and 42.6% (poor). 35.9% showed 'good' knowledge and none were 'very good' (Figure 4C). Total of 88.5% had 'very poor' (33.50%) and 'poor' (55%) knowledge on pharmacological management. 10% had 'good' knowledge while 'very good' knowledge was recorded by 2 respondents (1.5%) (Figure 4D). The knowledge of diabetes-related complications showed a better trend compared to other assessed areas, having a total of 54.2% in 'good' (37.4%) and 'very good' (16.8%) knowledge. However, a significant number of participants still recorded 'very poor' (31.3%) and 'poor' (14.4%) knowledge (Figure 4E). The knowledge on prevention and prognosis of diabetes showed that 33.5% had 'very poor' and 19% 'poor' ratings. Total of 46.7% were rated either as good (35.2%) or very good (11.5%) (Figure 4F).

The mean percentage score on awareness and knowledge of diabetes mellitus was 37.7% with a minimum score of 5.3% and a maximum score of 73.7%. The level of knowledge of the majority (48.82%) was poor while further 28.3% showed very poor knowledge. Only 22.88% demonstrated a 'good' knowledge and none was 'very good'.

Comparison of composite scores of males and females showed that there was no statistically significant relationship ( $p = 0.33$ ) and both males and females scored equally on knowledge assessment. Similarly, there was no statistically significant relationship between knowledge level and educational levels ( $P = 0.445$ ). Participants of all four educational levels, namely, the primary school only, school above grade five, advanced level and graduate education had the same level of knowledge on diabetes mellitus. Neither the duration of diabetes ( $p = 0.061$ ) nor previous participation in diabetes education ( $p = 0.437$ ) demonstrated statistically significant relationships with the level of knowledge among the participants.

## DISCUSSION

Patients' knowledge and awareness of diabetes determine the successful management of the disease (1, 2) and their commitment to self-management determine the outcome of their disease. This is significantly influenced by correct information they receive from healthcare providers and other information sources such as media, health bulletins and the internet. The process is also influenced by the accuracy of the information they receive, literacy level

of a population, established mis-believes in the community and the level of effective communication by the health care provider (11). In spite of having a good literacy level, the majority of the patients in our study had a 'poor' or 'very poor' knowledge regarding diagnosis, treatment, prevention and prognosis of diabetes. However, majority showed 'good' or 'very good' knowledge level for complications. The study also failed to establish statistically significant relationships between the level of understanding they have regarding their disease and the gender, literacy level, duration of diabetes or past participation in diabetes education.

10% of the current Sri Lankan population is diagnosed as having diabetes and it has been predicted to rise rapidly. Despite having a good literacy level, the general awareness and knowledge of the participants regarding their disease was 'poor' or 'very poor', which is a matter of concern. This study has been conducted in a Colombo suburb where healthcare facilities are of a higher standard and freely available for the diabetic patients. The results of this study represent a cross section of the diabetes population of the Western province of Sri Lanka and highlights accessibility, effectiveness and outcomes of the currently available public health education facilities for diabetic



**Table 2: Knowledge levels of diabetes mellitus and relationships**

Total score (%)			
N	Valid	131	
	Missing	0	
Mean	37.7065		
Median	40.4000		
Std. Deviation	16.11217		
Range	68.40		
Minimum	5.30		
Maximum	73.70		
Knowledge level based on composite scores			
Composite score	Knowledge level	No of patients (n= 131)	Percentage (%)
0 - 24.9	Very poor	37	28.3
25 - 49.9	Poor	64	48.82
50 - 74.9	Good	30	22.88
75 - 100	Very good	0	0
Statistically tested relationship (Confidence level 95%)			P – value
Knowledge level and gender			0.33
Knowledge level and level of education( literacy level)			0.445
Knowledge level and duration of diabetes mellitus			0.061
Knowledge level and previous participation in diabetes education			0.437

patients in this area. The results of this study show only the tip of the iceberg and could reflect one of the best scenarios. If the levels of knowledge regarding their disease is that poor among patients with diabetes in Colombo suburb where health care facilities are more effective and easily accessible, the disease awareness of patients in other parts of the country with lesser amount of resources is of greater concern.

The study results indicated that the awareness and knowledge level of diabetes in this population was not affected by gender, educational level, duration of diabetes and previous formal education on diabetes. It seems that repetition of the same

information is needed to establish better awareness among patients and there is a need for regular public health education programs with island wide coverage that could educate the public on basic facts such as diagnosis, treatment, prevention and prognosis of diabetes mellitus.

There are few limitations noted in this study. The questionnaire with close-ended questions to assess knowledge would have affected the final results of the study as respondents had the choice of guessing and answer. However, using this type of questionnaire is the most feasible method of collecting data for a population-based study carried out in a busy clinic setting. Certain areas

assessed in the study could have carried more questions in the questionnaire to gather additional information to establish further relationships of the knowledge level of the study population. Information to establish the type of diabetes, past exposure to a dietician or a physical trainer, current treatment modalities and the complications patient had developed could have been established by further questions. This study was carried out in a private hospital setting that may render a patient selection bias. However, it is noteworthy that the study population in this study is from an open public follow-up clinic run without financial benefits.

## CONCLUSIONS AND RECOMMENDATIONS

Awareness and knowledge of diabetes mellitus are poor among patient of Colombo suburbs, a region with country's highest diabetes prevalence and good health care facilities. The current health education programs should be modified and free accessibility to these programs should be ensured to the patients and public. Further research covering the entire country is needed to assess the exact situation of the country and to find better ways to improve the awareness and knowledge regarding their disease among patients with diabetes.

## ACKNOWLEDGEMENTS

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