Clinical characteristics and determinants of glycaemic control among type 2 diabetes mellitus (T2DM) patients in Fiji

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Research

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Abstract

Background: Glycemic control is the centre in diabetes management. In patients with type 2 diabetes mellitus (T2DM), glycemic control is associated with clinical determinants. The aim of this study was to determine the proportion of poor glycemic control level and its clinical determinants among T2DM patients.

Methods: This retrospective cross-sectional study was conducted on the medical records of T2DM patients attending diabetes clinics at the three selected health centres in Suva, Fiji. Patients who met the following criteria were included in the study: adult T2DM ≥18 years old registered during 2011 to 2016; on treatment for >1year; had >4 clinic visits and; had a recent HbA1c result in 2017. Logistic regression analysis was performed. A *p value of* <0.05 was considered as significant.

Results: There were 200 female (59.2%) and 138 male (40.8%) T2DM patients included in this study with a mean age of 56.5 years (*SD* = ± 9.9). Majority have poorly controlled random blood sugar (RBS), 67.1% and fasting blood sugar (FBS), 63.0%. Two-thirds (65.4%) had co-morbidities. The proportion of poor glycaemic control (HbA1c <7%) was 77.2% with mean HbA1c of 8.6% (± 2.04). RBS, FBS, cholesterol, estimated glomerular filtration rate (eGFR) and diastolic blood pressure (DBP) were significant (p<0.05) determinants of poor glycaemic control.

Conclusions: This study identified clinical determinants of T2DM patients that are highly associated with glycemic control. Health care workers managing T2DM patients should address these clinical determinants in order to achieve glycemic control.

Background

Diabetes is a global health problem reaching pandemic proportions that disables and kills people, striking them at their most productive age [1,2]. The International Diabetes Federation (IDF) estimated that 424.9 million people or 8.8% of people 20 – 79 years are suffering from diabetes globally in 2017 and predicted to rise to 628.6 million in 2045 if the trends continue. Diabetes affects 1 in 11 people where 1 in 2 adults is undiagnosed; and 12% of global health expenditure (USD 727 billion) which corresponds to one for every eight dollars spent on health care [1]. It is the second leading cause of years of life lost to premature deaths and fourth leading cause of years lived with disability [3].

T2DM which constitute about 90% of all diabetes is defined as a chronic medical condition that occurs when the body cannot produce enough insulin or cannot use insulin in adults. A diagnosis of T2DM is made when a fasting blood sugar (FBS) level is > 7.0 mmol/L or HbA1c of > 6.5% [4-7]. The centre of diabetes management is to maintain good glycemic control (HbA1c <7%) in order to prevent or delay onset of complications [6,7]. The United Kingdom Prospective Diabetes Study (UKPDS) has shown that each 1% reduction in mean HbA1c in T2DM patients was associated with reductions in risk of diabetes related deaths by 21%, stroke by 12%, myocardial infarction by 14%, heart failure by 16%, microvascular end point by 37% and amputation from peripheral vascular disease by 40% [8].

The small island states of the Pacific Island Countries and Territories (PICTs) have high prevalence rates of diabetes, where over 70% of T2DM patients have poor glycemic control [9]. This has been attributed to high rates of obesity and changes in lifestyle factors due rapid industrialization and urbanization in the region [9-11].

In Fiji, diabetes has a prevalence rate of 15.6% in 2011which is estimated to rise to 19.3% in 2020 due to rising obesity trends [12,13]. Diabetes is also the number one cause of disease specific mortality, most premature death and health problem causing the most disability in 2005 to 2016 [14]. In 2015, it caused 19.7% of all deaths with a mortality rate of 151.8 per 1,000 population and hospital admission rate of 134.5 per 1,000 admissions due to complications [15].

Many research studies, both quantitative and qualitative, have been conducted to determine the various factors associated with glycemic control among T2DM patients. These factors have been classified into patient-related factors, factors related to the health care team and health system factors. Among the patient-related factors associated with glycaemic control include socio-demographic characteristics such as age, gender, ethnicity and educational background; clinical characteristics; associated medical condition; treatment and treatment adherence; self-management practices and diabetes clinic attendance [16,17]. Research studies show that patient clinical characteristics are highly associated with glycaemic control. These include duration of diabetes, body mass index (BMI), blood pressure, random blood sugar (RBS), fasting blood sugar (FBS), total cholesterol, triglyceride, renal functions as measured by estimated glomerular filtration rate (eGFR) and the presence of associated medical conditions or co-morbidities [18-24].

There have been no current published and peer reviewed studies conducted in Fiji to determine the clinical determinants of T2DM and their association with glycaemic control. Hence, the aim of this retrospective study was to determine the proportion of poor glycaemic control level among adult T2DM adult patients attending clinics at the three selected Suva health centres in 2011 - 2016, the clinical characteristics and determinants that are associated with it.

The findings of this study will be beneficial to the Fiji Ministry of Health and Medical services by providing information on the current proportion of poor glycaemic control among T2DM patients that will assist in planning and prioritizing its resources to ensure that those patients with poor glycaemic control are identified and appropriate services provided.

Methods

This cross-sectional research study was conducted using a five-year retrospective medical records audit of randomly selected T2DM patients attending diabetes clinics at three selected urban health centres in Suva, Fiji between the period August 1, 2011 and August 1, 2016.. The three selected health centres were Lami Health Centre, Suva Diabetes Centre and Valelevu Health Centre with a total of 992, 563, and 518 registered T2DM patients during this period. The following inclusion criteria were used in this study: adult T2DM 18 years old and over; on diabetes treatment for more than one year; has been attending clinic for

4 or more occasions and; had a recent HbA1 test result in 2017. Those that did not meet the above inclusion criteria, Type 1 diabetes patients and those with incomplete records were excluded from this study.

A sample size of 354 was calculated using a proportionate sampling method: 5% margin of error and 95% confidence interval (CI) using 32.2% proportion of poor glycaemic control [25] and adjusted by a factor of 10% for incomplete medical records. A systematic random sampling method was used to select T2DM patient records where every third (3^{rd}) folder were chosen from the diabetes register of the selected health centres. Three hundred thirty-eight (338) records met the inclusion criteria out of the 354 calculated samples with a response rate of 95%.

Glycemic control was the dependent variable in this study. HbA1c $\geq$ 7% defines poor glycemic control, while HbA1c <7% constitute good glycemic control [4-7]. The patient's most recent HbA1c test result in 2017 was used as a measure of glycemic control [26,27]. Duration of diabetes, BMI, RBS, FBS, systolic blood pressure (SBP), diastolic blood pressure (DBP), cholesterol, triglyceride, eGFR and co-morbidities were the independent variables used in this study.

Data analysis used International Business Machine (IBM) Statistical Package for Social Sciences (SPSS) version 22.0 software. Descriptive statistics were used to describe the data using mean, standard deviation, frequency and percentage as well as to determine the glycemic control level among T2DM patients. Logistic regression analyses were performed to assess the effect of patient's clinical characteristics on glycemic control. P values <.05 were considered significant. Further analysis was done using forward logistic regression to test the likelihood ratio (chi square difference), starting with the constant-only model and adding variables one at a time. All the factors that were significant were ultimately introduced in the final model where statistical variables with $p < 0.05$ were accepted.

Results

Data were collated from 338 T2DM patient's clinical records out of 354 that were considered eligible for this study. Sixteen records were excluded due to incomplete information. The T2DM patients in this study were composed of 200 females (59.2%) and 138 males (40.8%). The mean age was 56.5 years (*SD* = $\pm$ 9.9) and ranged from 30 – 82 years. Fig. 1 shows patient selection flowchart.

Glycemic control of T2DM participants

The proportion of poor glycemic control (HbA1c $\geq$ 7.0%) in this study was 77.2% while only 22.8% achieved good glycemic targets (HbA1c < 7.0%). The mean HbA1c was 8.6% (*SD* = $\pm$ 2.4) with a range of 5.0% - 16.6%.

Clinical characteristics of T2DM participants

More than half (61.5%) of the T2DM patients had the disease for less than 5 years with majority of them were overweight (42.9%) and obese (38.8%). Most of T2DM patients have poorly controlled RBS (67.1%), FBS (63.0%) and total blood cholesterol (44.1%). About two-thirds (65.4%) of the T2DM patients have co-morbidities “Table 1”.

Association of T2DM clinical characteristics on glycemic control

Bivariate analysis was conducted on each of the T2DM patient’s clinical characteristics separately to look for any significant association with poor glycemic control. Bivariate analysis showed that there were significantly higher chances of poor glycemic control among T2DM patients with fairly and poorly controlled RBS, poorly controlled FBS and poorly controlled cholesterol compared to good control of these clinical determinants. Those with fairly and poorly controlled eGFR have significantly lesser chances of having poor glycemic control. These determinants were significant at $p < .05$ “Table 2”.

Logistic regression analysis

Logistics regression analysis was done on T2DM clinical characteristics to eliminate confounding effect as there are more than one independent variables. RBS, FBS, DBP, cholesterol and eGFR were significant factors that influenced poor glycaemic control “Table 3”.

Further analysis used stepwise logistic regression where all variables with $p > .05$ were excluded. Variables with $p < .05$ were accepted in the final model. RBS, FBS, Cholesterol, eGFR and DBP variables remained in the final model “Table 4”.

The final logistic regression model was statistically significant, indicating that the clinical determinants as a set reliably distinguished between poor and good glycemic control ($X^2 = 127.15$, $p < .001$, $df = 19$). The model explained 47.6% (Nagelkerke R^2) of the variance in those with poor glycemic control and correctly classified 84.6% of the cases. The chances of T2DM patients with fairly controlled RBS were 9 times and those with poorly controlled RBS were 7 times more likely to have poor glycaemic control compared to those with normal RBS. T2DM patients with poorly controlled FBS and cholesterol were 10 and 4 times, respectively, more chances of having poor glycemic that those with good control of these clinical determinants. However, T2DM patients with poorly controlled DBP, fairly and poorly controlled eGFR had 68%, 80% and 67% less chances of having poor glycaemic control than those with good control, respectively “Table 4”.The predicted probability was 87.8% (Receiver operating characteristics (ROC) curve).

Discussion

This study sought to identify the clinical characteristics and determinants of glycemic control among T2DM patients attending clinics at the three selected health centres in Suva, Fiji in 2011 – 2016 using a 5-year retrospective folder audit. The results of this study showed a mean HbA1c of 8.6% ($SD = \pm 2.04$) which was higher compared to the result of the study conducted by Brian et al among 1,131 T2DM

patients in Fiji as part of the HbA1c data collected during the Fiji Eye Health Survey 2009 (mean HbA1c = 6.5%, *SD* = ± 1.3) [28]. The proportion of poor glycaemic control (HbA1c ≥ 7%) in this study was 77.2% which is similar to the results of the previous studies done in Fiji in 2014 by Kumar et al [29] and those conducted in low and middle income countries [29-32]. Despite stringent glycemic control to prevent complications, generally over 60% of T2DM patients do not achieve the recommended glycemic targets (HbA1c < 7%) [33].

Using logistic regression analysis, this study found that RBS, FBS, cholesterol, eGFR and DBP as significant determinants of poor glycemic control. The chances of T2DM patients with fairly controlled RBS were 9 times and those with poorly controlled RBS were 7 times more likely to have poor glycaemic control compared to those with normal RBS. This is similar to the results of the studies conducted by Kazmi et al on 106 randomly selected T2DM patients and by Rasmussen et al on 78 T2DM patients where they found a significant linear positive correlation between RBS and HbA1c level, $p < .01$ and $< .001$, respectively [34,35]. Also, another study conducted by Sacks among 300 T2DM patients found a good correlation between HbA1c and average blood random blood glucose levels and suggested to derive a regression equation that permits conversion of HbA1c results into estimated average random blood glucose values [36]. This significant association of RBS with glycaemic control highlights the importance of this simple and cost-effective test which can be used by patients in self-blood sugar monitoring and by primary care diabetes clinics in targeted HbA1c testing. However, Rohlfing et al on their study on defining the relationship between plasma glucose and HbA1c: analysis of glucose profiles and HbA1c in the diabetes control and complications trial (DCCT) suggest with caution that short term RBS can fluctuate markedly which may result in significant discrepancies when attempting to estimate HbA1c [37].

This study also found that T2DM patients with poorly controlled FBS were 10 times more chances of having poor glycaemic control than those with good FBS control. This is similar to the studies conducted by Mahato et al among 294 T2DM patients in Nepal [38]. However, some studies show that FBS provides a short-term picture of glycaemic control and only moderately correlates with hyperglycemia and poorly predicts and may underestimate HbA1c at higher glucose levels [37, 39]. It is necessary to have a clear understanding of the relationship between RBS and HbA1c as well as FBS and HbA1c for both T2DM patients and their health care providers which may be used in adjusting management interventions based on regular RBS and FBS monitoring with the expectation of achieving glycaemic control rather than relying solely on HbA1c testing especially in resource-constrained settings like Fiji where HbA1c testing is not always available.

Total cholesterol in this study was found to be significantly correlated with poor glycaemic control where T2DM patients with poorly controlled cholesterol level were 4 times higher chances of having poor glycemic control compared to those with good control. This is similar to the findings of other studies that higher total cholesterol concentration is an independent predictor of poor glycaemic control [38,40]. T2DM is characterized by hyperglycemia, insulin deficiency and insulin resistance which contribute to the abnormal lipid profile or dyslipidemia [41]. Dyslipidemia is a very important factor in T2DM patients since

controlling it may not only indirectly result to better glycaemic control but may also result to reduced cardiovascular events.

This study found that T2DM patients with fairly and poorly controlled eGFR had 80% and 67% less chances, respectively, of having poor glycaemic control than those with good control [42]. The reason for this is unclear but could be related to the use of insulin as the main treatment regimen in patients with reduced renal function due to increased insulin resistance and abnormalities in glucose metabolism [43]. Studies however, found that low eGFR is an independent factor with poor glycemic control white other studies found no significant association with eGFR and glycemic control [44]. Diastolic pressure has negative correlation with poor glycaemic control in this study where those T2DM patients with poorly controlled DPB have 68% less chances of having poor glycemic control. There is no definite reason for this but some studies found that patients receiving antihypertensive treatment, regardless of whether BP was controlled or not, were more likely to have optimal HbA1c control compared with participants without hypertension [45,46]. Most studies however found a strong positive association with DBP where tight blood pressure control reduces risk of diabetes complications ($p<.001$) [47, 48].

This study has its limitations. It only considered patient's clinical characteristics associated with poor glycaemic control. Other factors such as the T2DM patient's socio-demographic and treatment characteristics need to be considered to shed more light on other important predictors and determinants of poor glycemic control.

Conclusions

The results of this study showed a high proportion of T2DM patients with poor glycemic control (77.2%). The chances of T2DM patients with fairly controlled RBS were 9 times and those with poorly controlled RBS were 7 times more likely to have poor glycemic control compared to those with normal RBS. T2DM patients with poorly controlled FBS and cholesterol were 10 and 4 times, respectively, more chances of having poor glycemic that those with good control of these clinical determinants. However, T2DM patients with poorly controlled DBP, fairly and poorly controlled eGFR had 68%, 80% and 67% less chances of having poor glycemic control than those with good control, respectively.

This study recommends that health care workers managing T2DM patients should address their clinical determinants in order to achieve glycemic control. Due to its positive correlation with glycemic control, regular RBS testing is recommended to monitor glycemic control with targeted HbA1c testing in resource-limited settings where HbA1c testing is not always available. Further studies are needed to determine the clinical determinants of poor glycemic control among T2DM patients.

Declarations

Ethics approval and consent to participate

Ethics approval were obtained from the Fiji National University College Health Research Ethics Committee (CHREC) and the Fiji National Health Research Ethics and Review Committee (FNHRECRC). Written approvals were also obtained from the medical officers' in-charge of the selected health facilities as well as from the Permanent Secretary for Health and Medical Services to collect data from the patient's folders before commencing the study. T2DM patient's folders were de-identified before accessing data to ensure confidentiality. The patient's informed consent to access their medical records were waived by the FNHRERC as per Fiji's medical records policy.

Consent for publication

Not applicable.

Availability of data and materials

All authors declare that data and any supporting material regarding this manuscript are available and can be requested at any time.

Competing Interest

The authors declare they have no competing interest.

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Author Contributions: Research proposal was written by P.R. and was guided by other authors. The data was collected and analysed by AR and revised by other authors. All authors were involved in the final version of the manuscript. All authors have read and agreed to the published version of the manuscript.

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Tables

Table 1. Clinical characteristics of T2DM patients attending clinics in three selected health centres in Suva, Fiji in 2011 – 2016

Variable (n = 338)	Glycaemic Level		
	Good (HbA1C < 7%) n (%)	Poor (HbA1C ≥ 7% n (%)	Total n (%)
Duration of Diabetes			
<5 years	48 (14.2)	160 (14.3)	208 (61.5)
5 – 10 years	22 (6.5)	80 (23.7)	102 (30.2)
>10 years	7 (2.1)	21 (6.2)	28 (8.3)
[a]BMI (kg/m^2)			
Underweight (<18)	0	0	0
Normal (18 – 24.9)	12 (3.5)	50 (14.8)	62 (18.3)
Overweight (25 – 29.9)	32 (9.5)	113 (33.4)	145 (42.9)
Obese (>30)	33 (9.8)	98 (29.0)	131 (38.8)
[b]SBP (mmHg)			
Good control (<130)	28 (8.3)	108 (32.0)	136 (40.2)
Fair control (130-139)	17 (5.0)	53 (15.7)	70 (20.7)
Poor control (≥140)	32 (9.5)	100 (29.6)	132 (39.1)
[c]DBP (mmHg)			
Good control (<80)	40 (11.8)	140 (41.4)	180 (53.3)
Fair control (80-89)	22 (6.5)	89 (26.3)	111 (32.8)
Poor control (≥90mmHg)	15 (4.4)	32 (9.5)	47 (13.9)
[d]RBS (mmol/L)			
Good control (4-8)	35 (10.4)	25 (7.4)	60 (17.8)
Fair control (8.1-10)	7 (2.1)	44 (13.0)	51 (15.1)
Poor control (>10)	35 (10.4)	192 (56.8)	227 (67.5)
[e]FBS (mmol/L)			
Good control (4-6)	37 (11.0)	38 (11.2)	75 (22.2)
Fair control (6.1-7)	22 (6.5)	28 (8.3)	50 (14.8)
Poor control (>7)	18 (5.3)	195 (57.7)	213 (63.0)
Cholesterol (mmol/L)			
Good control (≤4.0)	24 (7.1)	52 (15.4)	76 (22.5)
Fair control (4.1-5.0)	26 (7.7)	87 (25.7)	113 (33.4)
Poor control (>5.0)	27 (8.0)	122 (36.1)	149 (44.1)
Triglyceride (mmol/L)			
Good control (<1.5)	29 (8.6)	69 (20.4)	98 (29.0)
Fair control (1.5-2.0)	29 (8.6)	106 (31.4)	135 (39.9)
Poor control (>2.0mmol/L)	19 (5.6)	86 (25.4)	105 (31.1)
[f]eGFR (ml/min/1.73m^2)			
Good control (≥90)	12 (3.6)	93 (27.5)	105 (31.1)
Fair control (60 - <90)	48 (14.2)	115(34.0)	163 (48.2)
Poor control (<60)	17 (5.0)	53 (15.7)	70 (20.7)
Associated medical condition			
No	28 (8.3)	89 (26.3)	117 (34.6)
Yes	49 (14.7)	172 (50.9)	221 (65.4)

[a]BMI – Body Mass Index

[b]RBS – Random Blood Sugar

[c]FBS – Fasting Blood Sugar

[d]SBP – Systolic Blood Pressure

[e]DBP – Diastolic Blood Pressure

[f]eGFR – estimated Glomerular Filtration Rate

Table 2. Bivariate analysis of participant's clinical characteristics associated with glycaemic control

Clinical Characteristics	ß	Crude OR [95% CI]	*p* value
Duration of diabetes in years			
<5 years	0	1	
5 – 10 years	0.09	1.09 [0.62, 1.93]	.765
> 10 years	-0.11	0.90 [0.36, 2.25]	.821
[a]BMI (kg/m^2)			
Normal (18-24.9)	0	1	-
Overweight (25-29.9)	-0.17	0.85 [0.40, 1.78]	.662
Obese ($\geq$ 30)	-0.34	0.71 [0.34, 1.50]	.372
[b]SBP (mmHg)			
Good control (<130)	0	1	-
Fair control (130 – 139)	-0.21	0.81 [0.41, 1.61]	.543
Poor control ($\geq$ 140)	-0.21	0.81 [0.46, 1.44]	.473
[c]DBP (mmHg)			
Good control (<80)	0	1	-
Fair control (80 – 90)	0.15	1.16 [0.64, 2.07]	.627
Poor control (>90)	-0.50	1.64 [0.30, 1.24]	.170
[d]RBS (mmol/L)			
Good control (4 – 8)	0	1	-
Fair control (8.1 – 10)	2.18	8.80 [3.41, 22.72]	***.001**
Poor control (>10)	2.04	7.68 [4.10, 14.38]	***.001**
[e]FBS (mmol/L)			
Good control (4 – 6)	0	1	-
Fair control (6.1 – 7)	0.21	1.24 [0.60, 2.54]	.559
Poor control (>7)	2.36	10.55 [5.44, 20.45]	***.001**
Cholesterol (mmol/L)			
Good control (<4.0)	0	1	-
Fair control (4.0 – 5.0)	0.44	1.54 [0.80, 2.97]	.192
Poor control (>5.0)	0.77	2.09 [1.10, 3.95]	***.024**
Triglyceride (mmol/L)			
Good control (<1.5)	0	1	-
Fair control (1.5 – 2.0)	0.43	1.54 [0.85, 2.79]	.159
Poor control (>2.0)	0.64	1.90 [0.98, 3.68]	.056
[f]eGFR (ml/min/1.73m2)			
Good control (> 90)	0	1	-
Fair control (60 – 89)	-1.17	0.31 [0.16, 0.62]	*.001
Poor control (< 60)	-0.91	0.40 [0.18, 0.91]	*.028
Associated medical condition			
No	0	1	-
Yes	0.10	1.10 [0.65, 1.88]	0.714

* Significant p <.05.

[a]BMI – Body Mass Index

[b]RBS – Random Blood Sugar

[c]FBS – Fasting Blood Sugar

[d]SBP – Systolic Blood Pressure

[e]DBP – Diastolic Blood Pressure

[f]eGFR – estimated Glomerular Filtration Rate

Table 3. Logistic regression of clinical characteristics on glycaemic Control.

Clinical Characteristics	ß	Adjusted OR [95% CI]	*p* value
Duration of diabetes in years			
<5 years	0	1	-
5 – 10 years	0.32	1.37 [0.64, 2.97]	.421
> 10 years	-0.36	0.70 [0.22, 2.25]	.546
[a]BMI (kg/m^2)			
Normal (18-24.9)	0	1	-
Overweight (25-29.9)	-0.51	0.60 [0.22, 1.66]	.326
Obese (≥ 30)	-0.46	0.63 [0.23, 1.75]	.376
[b]RBS (mmol/L)			
Good control (4 – 8)	0	1	-
Fair control (8.1 – 10)	2.41	11.11 [3.45, 35.73]	*.001
Poor control (>10)	2.07	7.91 [3.58, 17.47]	*.001
[c]FBS (mmol/L)			
Good control (4 – 6)	0	1	-
Fair control (6.1 – 7)	0.31	1.37 [0.57, 3.30]	.488
Poor control (>7)	2.38	10.75 [4.85, 23.81]	*.001
[d]SBP (mmHg)			
Good control (<130)	0	1	-
Fair control (130 – 39)	0.13	1.14 [0.47, 2.80]	.769
Poor control (≥ 140)	0.08	1.08 [0.45, 2.60]	.858
[e]DBP (mmHg)			
Good control (<80)	0	1	-
Fair control (80 – 90)	-0.04	0.96 [0.43, 2.14]	.919
Poor control (>90)	-1.17	0.31 [0.11, 0.89]	*.030
Cholesterol (mmol/L)			
Good control (<4.0)	0	1	-
Fair control (4.0 – 5.0)	0.76	2.14 [0.91, 5.06]	.082
Poor control (>5.0)	1.33	3.77 [1.60, 8.90]	*.002
Triglyceride (mmol/L)			
Good control (<1.5)	0	1	-
Fair control (1.5 – 2.0)	0.37	1.45 [0.66, 3.19]	.359
Poor control (>2.0)	0.55	1.74 [0.74, 4.04]	.202
[f]eGFR (ml/min/1.73m^2)			
Good control (≥ 90)	0	1	-
Fair control (60 – 89)	-1.65	0.19 [0.08, 0.48]	*.001
Poor control (< 60)	-1.19	0.31 [0.11, 0.87]	*.027
Associated medical condition			
No	0	1	-
Yes	0.19	0.82 [0.22, 3.16]	.777

* Significant $p < .05$

[a]BMI – Body Mass Index

[b]RBS – Random Blood Sugar

[c]FBS – Fasting Blood Sugar

[d]SBP – Systolic Blood Pressure

[e]DBP – Diastolic Blood Pressure

[f]eGFR – estimated Glomerular Filtration Rate

Table 4. Final model of factors significantly associated with glycaemic control among T2DM patients attending clinics at Suva Health Centres, Fiji in 2011 - 2016

Independent variables	β	Adjusted OR [95% CI]	*p* value
[a]**RBS (mmol/L)**			
Good control (4 – 8)	0	1	-
Fair control (8.1 – 10)	2.28	9.76 [3.11, 3.60]	*.001
Poor control (>10)	1.96	7.13 [3.31, 15.35]	*.001
[b]**FBS (mmol/L)**			
Good control (4 – 6)	0	1	
Fair control (6.1 – 7)	0.19	1.21 [0.52, 2.82]	.659
Poor control (>7)	2.33	10.28 [4.74, 22.31]	*.001
Cholesterol (mmol/L)			
Good control (<4.0)	0	1	1
Fair control (4.0 – 5.0)	0.76	2.14 [0.92, 4.99]	.078
Poor control (>5.0)	1.38	3.98 [1.70, 9.17]	*.001
[c]**eGFR (ml/min/1.73m^2)**			
Good control (> 90)	0	1	
Fair control (60 – 89)	-1.60	0.20 [0.09, 0.48]	*.001
Poor control (< 60)	-1.11	0.33 [0.12, 0.91]	*.032
[d]**DBP**			
Good control (<80)	0	1	-
Fair control (80 – 90)	0.01	1.01 [0.48, 2.13]	.973
Poor control (>90)	-1.13	0.32 [0.13, 0.82]	*.017

* Significant $p < .05$

[a]RBS – Random Blood Sugar

[b]FBS – Fasting Blood Sugar

[c]eGFR- estimated Glomerular Filtration Rate

[d]DBP – Diastolic Blood Pressure

Figures

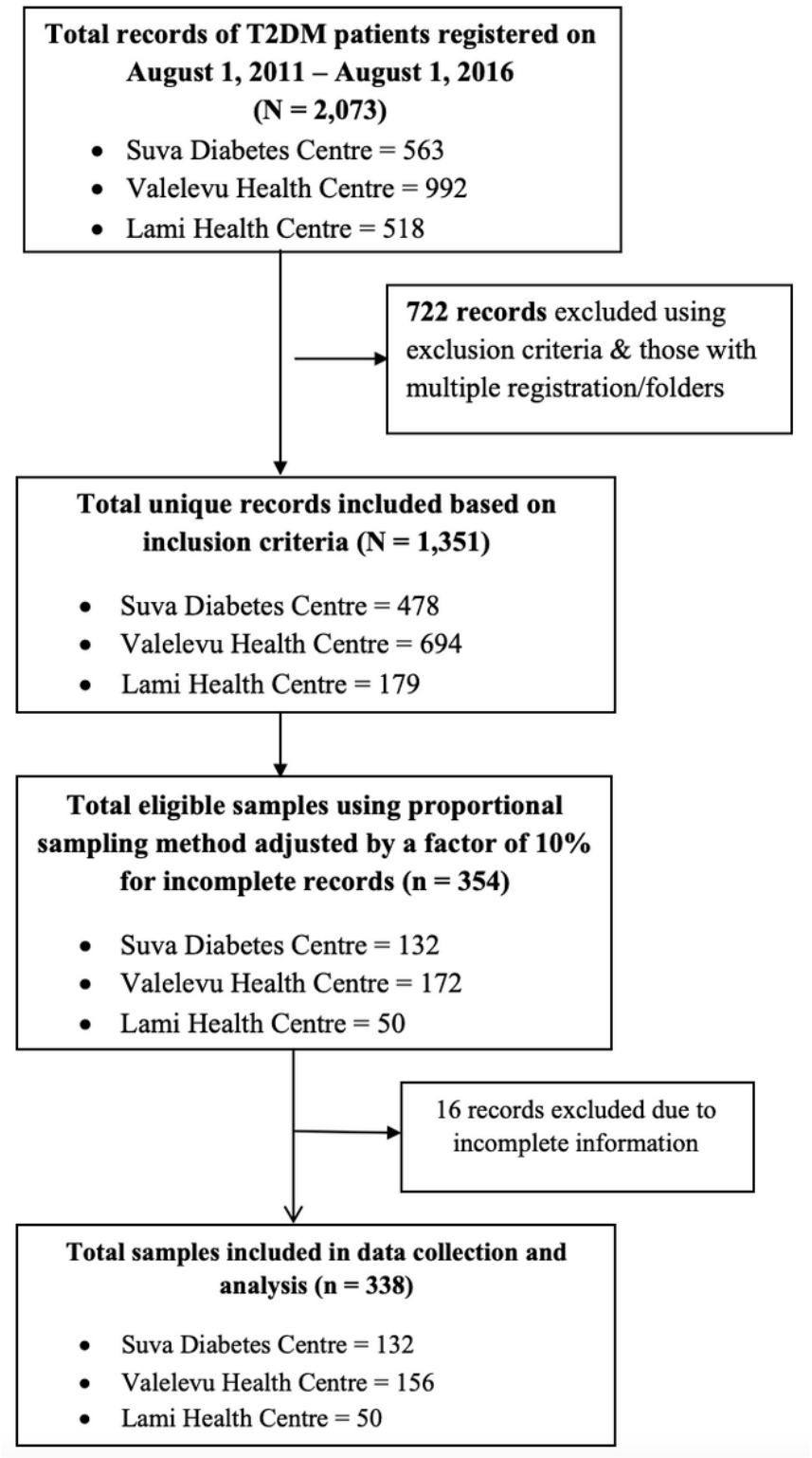

Figure 1

Patient selection flow chart