

A Cross-Sectional Study on Clinical Outcome of the Current Management Practice with Carb-Counting & Insulin Titration, & Health-Related Quality of Life (HRQoL) on a Selected Group of Young Adults with Type 1 Diabetes Attending to Diabetes & Endocrinology Unit at National Hospital Kandy, Sri Lanka

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Abstract

Background:

Clinical outcome and health related quality of life (HRQoL) assessment among young adults living with type 1 diabetes mellitus (T1DM) following structured education on self-management of diabetes in Sri Lankan settings is unknown.

Aims:

To assess the clinical outcomes of current management practice with carbohydrate counting and self-management of insulin according to eating patterns and to assess the health-related quality of life (HRQoL) among young adults living with T1DM aged between 18-25.

Methods:

Thirty young adults aged between 18-25 years with the diagnosis of T1DM, classified according to American Diabetes Association guideline based on the clinical and/or biochemical parameters were recruited in this descriptive cross-sectional study. Basic demographic data, baseline and follow up assessments on HbA1C were recorded. HRQoL assessment was carried out via a self-administered questionnaire (ViDa1) and the results were compared for internal consistency and with the clinical outcomes.

Results:

Among the 12 male and 18 female patients, an improvement in HbA1C by the mean of 1.2% was noted over a mean period of 11.38 months of carbohydrate counting and 9.52 months of the self-management of insulin, though no statistical significance observed ($P=0.698$, 95%CI -0.38-2.8). The internal consistency of ViDa 1 questionnaire for our population was validated through Cronbach's alpha > 0.7 in all four subclasses. There was a positive correlation between self-care and wellbeing ($P<0.05$) as well as wellbeing and concern about illness ($P<0.05$). The means for self-care and concern about illness were higher at 3.77 and 3.80 respectively. Feeling of wellbeing was associated with higher educational level ($P<0.05$).

Conclusion:

Carbohydrate counting and self-management of insulin showed beneficial effects on improving the HbA1C, though there were no statistical significance. Higher educational level had statistically significant association with feeling of wellbeing in patient with T1DM, which could be explained by improvement in self-confidence with better understanding of training. By extending this study in multicentric level with larger sample size might improve the statistical significance in clinical outcome and further follow up study is required to assess the difference in HRQoL with time.

Keywords: Type 1 Diabetes Mellitus (T1DM), Health Related Quality of Life (HRQoL), Diabetic Ketoacidosis (DKA)

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Introduction

Type 1 diabetes mellitus (T1DM) has been traditionally named as a chronic illness of young [1]. It is caused by autoimmune destruction of beta cells of the pancreas which result in absolute insulin deficiency, necessitating insulin treatment for survival [2,3]. Diabetes poses a tremendous global burden on the populations' health related quality of life (HRQoL) and the economy. T1DM leads to higher morbidity and mortality compared to the type 2 diabetes mellitus (T2DM) [2]. Managing T1DM in the ideal setting adds significant costs for monitoring, therapy, or hospitalization as a result of its complications. Studies show that young adults with T1DM presents with various physical, mental, and social challenges, posing a huge burden of lifelong illness [4,5,6]. Psychological distress, behavioural issues and overt psychiatry symptoms are common among T1DM [7]. This in turn produce a negative effect on the treatment adherence and result in suboptimal glycaemic control, which invariably increases the immediate and chronic complications.

The incidence and prevalence of Type 1 Diabetes are increasing globally. Metanalysis of studies between 1980 to 2019 showed that the global incidence of type 1 diabetes was 15 in 100 000 people with a prevalence of 9.5% [8]. In 2021, there were about 8.4 million individuals worldwide diagnosed with type 1 diabetes [9]. The burden of type 1 diabetes is expected to rise rapidly, especially in resource poor countries and it is predicted to be around 13.5 to 17.4 million prevalence which is 60-107% higher than the prevalence in 2021 [9]. From Sri Lankan perspective, there was paucity in data on the incidence and prevalence of diabetes over the past many decades [10]. As a light on this, a national level database program (DYOD-SL) has been started since the year 2021 [11,12]. Along with this, as a step forward towards the ideal management of T1DM, a donation program has been initiated across the country to introduce carbohydrate counting and self-management with multiple daily injections of insulin. In order to achieve a better care for our population, a periodical evaluation of this current management practice is important to identify and improve the deficiencies if any.

The Structured Education Program for Diabetes (StEP-D) is one of the major milestones in achieving the target of ideal management to reach a near normal life in patients living with T1DM. Through this, the carbohydrate counting, and self-adjustment of insulin doses are encouraged. The major barrier to establish this in the public sector was the lack of provision of glucometers/ strips to facilitate frequent blood glucose monitoring and insulin delivery devices to facilitate multiple dose insulin regimens. However, the island wide donations through the Life For A Child (LFAC) program initiated in 2022 paved the way to change the management practices from conventional fixed dose regimens to more standard multiple dose insulin regimens with insulin titration.

Frequent manual check-ups on blood glucose levels and self-managing the insulin requirement according to the number of carbohydrates taken for that particular meal is still a preliminary stage when compared to the ideal management practice with continuous glucose monitoring and insulin pumps [13,14]. Though, this kind of self-management practice has improved the clinical and psychological aspects in varying degree, studies have detected potential limitations and obstacles to reach the optimum. [15]. Margaret et al. have described that the optimum management of T1DM by the mean of self-management of glycaemia facilitated by newer technologies, adequate resources and knowledge show better quality of life [15]. In our set up, evaluating the outcome of such change in the management practice was aimed to explore the actual results and aid us to detect the challenges and hindering factors to achieve the expected results if any discrepancies. This would further facilitate the ideal management with continuous glucose monitoring and insulin pump therapy, which are yet to be developed in Sri Lanka.

Secondly, assessment of health-related quality of life (HRQoL) had been sparsely reported among T1DM patients. Marta Murillo et al. have described no major difference in HRQoL among children and adolescents when compared to general population with slight reduction in physical wellbeing [5]. However, we do not have our own data on HRQoL among T1DM patients, though there are few studies taken up in T2DM patients [16]. Therefore, this study was also conducted in view of gaining the knowledge on HRQoL among young adults with T1DM in our own setting. Following the introduction of self-management of diabetes, it is expected to achieve an improvement in clinical and psychological aspects among a challenging age group of population, and further periodical assessment is deemed necessary.

Methods

We conducted a cross sectional descriptive study in Diabetes and Endocrinology unit at National Hospital Kandy. A selected group of young adults aged between 18-25 years with the diagnosis of T1DM, classified according to American Diabetes Association guideline based on the clinical and/or biochemical parameters were recruited. We screened all the patients who had been registered in the database for Young Onset Diabetes in Sri Lanka (DYOD-SL) at Kandy regional centre up to 31st of December 2023. We included the participants who are aged between 18-25 years, been registered in the Database for Young Onset Diabetes in Sri Lanka (DYOD-SL) at Kandy regional centre, being treated with multiple daily injections of insulin with self-titration at least more than 3 months and who have literacy in English and Sinhalese languages (As Tamil Version of the questionnaire has not been validated still). We excluded patients who are on any other insulin regimes apart from multiple daily injection, who do not perform carb counting according to clinic routine records, or who have interruptions in the treatment continuity for at least

last 3 months, patients with dilemma on the diagnostic classification, and participants who do not respond or withdraw from the study at any point. Accordingly, we recruited all the patients who fulfilled our inclusion and exclusion criteria to our study.

Data were collected through an interviewer administered questionnaire to gather the basic demographic details and clinical parameters as well as a self-administered questionnaire to assess the HRQoL (ViDa1). Clinical data was obtained from the DYOD-SL database (kandy regional centre) and clinic records. The ViDa1 English questionnaire and the validated Sinhala version was used to obtain data on quality of life.

Out of the 104 patients screened from the DYOD-SL database, 52 patients diagnosed with T1DM by the means of clinical or biochemical characteristics. Out of those 52 patients, a total of 30 patients fulfilled our inclusion and exclusion criteria and were recruited to the study.

The ethical clearance was obtained from the Ethics review Committee of National Hospital Kandy. Informed written consent was obtained from the patients who were recruited in the study. Privacy and confidentiality of the patients were maintained during the study.

Statistical Analysis

All data were tested for normality via Shapiro-Wilk test. The variables were normally distributed, and we used descriptive statistics by assessing the mean with standard deviation and a paired t-test to compare the variables. The level of significance was considered as P value of <0.05. HRQoL analysis was done through reliability statistics and Cronbach's alpha was calculated for each subscale of the ViDa1 questionnaire to assess the validity of the scales. Spearman's correlation was applied to analyse the correlation between each subscale and ANOVAs was applied to compare ViDa1 score with clinical parameters. A Bonferroni Post Hoc test correction was done to control the type 1 error.

Results

Population characteristics

Among the study population, 12 patients were males and 18 were females (40% and 60%). The mean age was 21.5 years. 36.7% of our study population was educated up to ordinary levels and 26.7% patients were either doing or completed their undergraduate studies. The mean duration of diabetes among our population was 95.5 months ($\pm$ SD 74.7). The mean duration of self-treatment of insulin was 9.5 months ($\pm$ SD 4.8) (Tables 1 & 2).

Clinical outcomes

The mean HbA1C level recorded prior to introducing carb counting and self-management was 11.4% ($\pm$ SD 3.3) which has come down to a mean of 10.2% ($\pm$ SD 2.1) after the introduction of structured education on self-adjustment of insulin, though it did not show a statistically significance (P=0.129 and 95% CI -0.38 to 2.80). Only 4 patients

(13.3%) reported admissions with diabetic keto acidosis. However, 19 patients (73.3%) have experienced hypoglycaemia within the last one year, in which 8 patients (30%) have experienced a severe hypoglycaemia. Of note, 11 patients (36.7%) experience ongoing hypoglycaemia, which is meant by hypoglycaemia within the last week of study recruitment (Table 1).

HRQoL assessment and Validation of ViDa1 questionnaire in study population

Reliability statistics were applied via performing Cronbach's alpha to evaluate the internal consistency of the subclasses of ViDa1 questionnaire. It showed Chronbach's alpha of 0.86 for the interference with life (question numbers 1-12), 0.84 for the Self-care (question numbers 13-23), 0.76 for wellbeing (question numbers 24-29) and 0.71 for concern about the illness (question numbers 30-34). As all the subscales had coefficients >0.70, the validity of the questionnaire for our sample population was adequate (Table 3).

Analysis of the individual questions in the four scales, the subscale regarding interference in life showed a highest mean (3.5 ± 1.4 ; towards agreeing the statement) for 'having diabetes has changed my life'. Regarding self-care, the highest mean (4.3 ± 0.9) was observed for 'my training in quantifying carbohydrates allows flexibility in my diet' and the lowest mean (2.6 ± 0.9) was detected for 'I find it hard to do the daily controls blood glucose'. These statistical findings prove that there are beneficial outcomes from our current management practice. However, still the flexibility of the current management practice with multiple daily injections and capillary blood glucose monitoring are inadequate in improving the patients' worry about their illness in terms of hypoglycaemia (the highest mean of 4.2 ± 0.8).

The total scale descriptive analysis showed that the patients gave a neutral answer for the subscales regarding interference in life and wellbeing category, though agreed on the statements in self-care and worry about the illness. There was a statistically significant positive correlation observed between the subscales of self-care and wellbeing as well as wellbeing and worry about the illness (P<0.05). It indicated that as one subscale increases, the other subscale also tends to increase.

Correlation between population characteristics and HRQoL

There was statistically significant correlation between the highest mean in wellbeing and higher educational level (P<0.05). Similarly, high mean value in self-care and worry about the illness also were associated with higher educational level, though the values did not show statistical significance. A Multiple regression was run to predict the individual scale from other scales. Interference with Life, Wellbeing and Concern about the illness statistically significantly predicted Selfcare scale (p<0.05). Interference with Life, Selfcare and Concern about the illness statistically significantly predicted

Table 1: Basic demographic details and complications related to diabetes or treatment

Variable	Characteristics	Frequency	Percentage
Sex	Male	12	40%
	Female	18	60%
Age (Years)	18-25	30	
Education	Grade 1-5	0	
	Grade 6-10	2	6.7%
	O/L	11	36.7%
	A/L	9	30%
	Graduate	8	26.7%
Foot Ulcer	Yes	1	3.3%
	No	29	96.7%
Maculopathy	Yes	1	3.3%
	No	29	96.7%
PDR (Laser Eye Injection)	Yes	1	3.3%
	No	29	96.7%
Admissions with DKA	Yes	4	13.3%
	No	26	86.7%
Last episode of Hypoglycaemia	Within last week	11	36.7%
	Within last month	5	16.7%
	Within last year	2	6.7%
	One year ago	3	10%
	No Episodes	9	30%
Last Episode of Severe Hypoglycaemia	Within last week	3	10%
	Within last month	5	16.7%
	Within last year	1	3.3%
	One year ago	3	10%
	No Episodes	18	60%
Number of Severe Hypoglycaemia within last year	1 Episode	3	
	4 Episode	1	
	6 Episodes	1	
	10 Episode	1	
	12 Episode	1	
	20 Episode	2	

Table 2: Duration of T1DM, treatment and comparison of HbA1C, renal functions, urine albumin creatinine ratio

Variable	Mean	Standard deviation (SD)
Mean age	21.5	2.49
Duration of Diabetes(Months)	95.46	74.71
Duration of Carb counting (Months)	11.38	3.93
Duration of Basal Bolus Insulin Regime implementation(Months)	9.52	4.78
Baseline HbA1C (Prior to introduction of current management)	11.13	3.37
HbA1C – after introduction	10.15	2.11
Baseline Serum Creatinine	59.97	19.96
Serum Creatinine – After current management	53.28	21.30
Baseline Albumin Creatinine ratio	63.88	127.37
Albumin Creatinine ratio- After current management	25.62	50.39

Table 3: Reliability Statistics of subscales

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
Interference with life scale	.846	.841	12
Selfcare scale	.832	.845	11
Wellbeing Scale	.706	.705	5
Concern About Illness Scale	.833	.845	5

Wellbeing scale ($p < 0.05$). Interference with Life, Selfcare and Wellbeing statistically significantly predicted Concern about the illness scale ($p < 0.05$). There was no statistical difference noted between HRQoL and gender, although wellbeing, self-care and concern about the illness scores were higher in males than females. Interference in life was highly reported among females.

Discussion

T1DM is a chronic illness requiring complex therapeutic measures with lifetime insulin treatment. Due to its complexity and lifelong dependency on medical treatment, patients living with diabetes may have significant impact on clinical outcome as well as the psychological wellbeing. Indeed, it is one of the few chronic endocrinological conditions where a near normal life can be achieved with evolving therapeutic advancements and technology in the management. However, as a developing country, Sri Lanka faces various challenges in delivering the optimum management due to limited resources, accessibility, and knowledge gap coupled with psycho-social stigma of having diabetes [2, 17]. Therefore, we still have a lag in catching up with the so called 'ideal care'. Atapattu et al. in 2012, portrayed the suggestions to overcome the challenges in managing the T1DM mainly among paediatric age group [17].

As a part of improving the management of T1DM, we aimed to explore the clinical outcomes of the current management practice which involves carbohydrate counting and self-management of multiple daily injections of insulin and to describe the HRQoL.

In the light of that, we described the basic demographic data, difference in HbA1C prior to and after starting self-management of insulin, baseline data on frequencies and severity of hypoglycaemias and diabetic keto acidosis (DKA). In addition, the psychological aspects and the HRQoL related to the disease burden and the management practices among the cohort of patients living with T1DM were assessed with the help of ViDa1 questionnaire. It is carried out through a set of 34 questions grouped into four subscales namely interference in the life, self-care, wellbeing, and concern about the illness.

According to our single centre study, there was a mean HbA1C reduction of 1.21% following the introduction of carb counting and self-adjustment of insulin when compared to the HbA1C prior to introduction of this current practice, however, there was no statistical significance noted. The study duration may have to be extended further with a higher sample number to improve the significance of this result. Moreover, introducing the structured education program for T1DM at patient level will help to improve the HbA1C outcome further. The occurrence and frequency of hypoglycaemia was still observed following the successful introduction of self-management in 11/30 patients, in whom 3

patients had at least one severe hypoglycaemia episode within the last one week from the study date. This shows an inadequacy of our current management practice with routine four-point glucose check with finger pricks and multiple daily doses of insulin. Further, this implies the importance of introducing a better management facility such as short acting insulin analogs instead of using the current short acting human insulin, self-administering glucagon injections, Continuous Glucose Monitoring (CGM) devices with hypo-alarms and insulin pumps. Therefore, in view of achieving a better glycaemic control without getting hypoglycaemia, we reiterate the importance of introducing short acting insulin analogs, continuous glucose monitoring and insulin pumps among selected individuals who have hypoglycaemic unawareness and brittle diabetes [18-20].

The set of 34 questions in the ViDa1 questionnaire was used to assess the HRQoL among our young patients living with T1DM. The validity of the questionnaire was adequate in all four subscales as the Cronbach's alpha was > 0.70 . Males had a higher mean value for self-care, wellbeing and worry about the illness while females had higher mean value for interference in life due to diabetes, expressing the higher mean value as favouring the answer towards agreement with the statement. Higher educational levels were associated with better self-care with statistical significance, that proves the fact that the better understanding and practicing the carbohydrate counting and self-management of insulin, in turn will provide a better self-satisfaction and confidence.

The comparison among individual questions revealed that the fear of hypoglycaemia according to ViDa 1 scale is still existing as the clinical outcome proved persistent hypoglycaemia, even after the introduction of carbohydrate counting and self-management. There are plenty of systematic reviews and randomised controlled trials exhibiting the beneficial effects of carbohydrate counting and management of diabetes adjusted to eating patterns [21-24]. Furthermore, similar structured education program like Dose Adjustment For Normal Eating (DAFNE), which is in practice in the UK for long time have assessed the QoL and HbA1C difference a decade ago, proved significant beneficial outcomes on both HbA1C improvement and QoL [25, 26].

We identified a few limitations on this study such as limited number of patients who fulfilled the recruitment criteria, short mean duration after introduction of carbohydrate counting and self-management practice and lack of baseline HRQoL data for comparison. Follow up analysis and comparison are required to identify any further changes in the clinical and psychological outcomes. In the meantime, we aim to extend this study in multicentre levels among a larger population over a longer duration to gather more information from Sri Lankan perspective in the future and we believe that will express the actual outcome of the current practice and facilitate establishing the ideal management and care.

Conclusion

Carbohydrate counting and self-management of insulin treatment may have beneficial effects achieving an HbA1C reduction in young adults with T1DM over a short duration, however, further follow up studies required for confirmation. The HRQoL assessment proves the need for focusing on hypoglycaemia prevention with better way of treatment modalities including short acting analog insulins, glucagon injections for majority and advanced technological devices such as CGMs and insulin pumps in selected individuals. Furthermore, it was evident that educational level of the patients determines the ability of benefit from the current practice. Further standardization in reporting with higher number of sample population over a longer duration is needed to find the correlation between HbA1C reduction and HRQoL outcome.

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Annexure 01: Original ViDa1 Questionnaire
(in English). Version 1. Last updated 19.1.2022

ViDa1 Questionnaire

Please mark with an X your level of agreement with each of the statements below, which refer to your opinion concerning your health-related quality of life. It is very important to answer all the questions and not leave anything in blank. Remember that there are no good or bad answers; what is important is to know your opinion. Thank you.

- 1 = totally disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = fully agree

1 Having diabetes complicates my social relationships (friends, companions, couple, etc.)	1	2	3	4	5
2 Having diabetes makes me feel different	1	2	3	4	5
3 Having to administer insulin is a daily problem for me	1	2	3	4	5
4 Having diabetes limits my social life and leisure time (eating out, celebrations, travel, etc.)	1	2	3	4	5
5 Having diabetes has changed my life	1	2	3	4	5
6 Having diabetes complicates my family relationships	1	2	3	4	5
7 I feel limited in my professional life because of diabetes	1	2	3	4	5
8 I have some complications/s of diabetes that limit me physically and therefore worsen my quality of life	1	2	3	4	5
9 Daily life with diabetes causes me added stress	1	2	3	4	5
10 I am worried about others knowing that I have diabetes	1	2	3	4	5
11 Having diabetes limits my sex life	1	2	3	4	5
12 I can lead a normal life with diabetes	1	2	3	4	5
13 I feel satisfied with my daily involvement in the self-care of my diabetes	1	2	3	4	5
14 My training/knowledge of diabetes helps me to ensure good control	1	2	3	4	5
15 My training in quantifying carbohydrates allows flexibility in my diet	1	2	3	4	5
16 I feel satisfied with how I deal with my diabetes	1	2	3	4	5
17 I feel motivated with the self-care of my diabetes	1	2	3	4	5
18 I adjust the insulin dose to my diet in order to ensure good control	1	2	3	4	5
19 I feel satisfied with my drug treatment, because it helps control my diabetes	1	2	3	4	5
20 I feel satisfied with my current blood glucose (glycosylated hemoglobin) control	1	2	3	4	5
21 The management of diabetes is normally integrated into my daily life	1	2	3	4	5
22 I consider that I have flexibility and freedom in my diet despite having diabetes	1	2	3	4	5
23 I find it hard to do the daily controls (blood glucose)	1	2	3	4	5
24 I rest well and my sleep at night is good	1	2	3	4	5
25 I feel well physically	1	2	3	4	5
26 I feel well psychologically	1	2	3	4	5
27 I have other illnesses as a consequence of diabetes that worsen my quality of life	1	2	3	4	5
28 I feel satisfied with the time I spend doing physical activity	1	2	3	4	5
29 I consider my quality of life in general to be good	1	2	3	4	5
30 I am afraid of hypoglycaemia (drops in sugar level)	1	2	3	4	5
31 I often feel concerned about hypoglycaemia	1	2	3	4	5
32 I feel concerned when I have high blood glucose	1	2	3	4	5
33 I often feel concerned about future complications of diabetes	1	2	3	4	5
34 I often feel concerned about having to enter hospital because of poor diabetes control	1	2	3	4	5

Interference with life: (1---12), self-care (13---23), wellbeing (24---29) and concern about the illness (30---34). The scores corresponding to each subscale are added for correction. Items 12, 23 and 27 are inverted for correct interpretation. Copyright© 2017 Dácil Ahrarado-Martel. ULPGC.

Annexure 02: Original ViDa1 Questionnaire
(in Sinhala). Version 1. Last updated 19.1.2022

පළමුවන වර්ගයේ දියවැඩියා රෝගීන් සඳහා යොදාගත සම්බන්ධ ජීවිතයේ ගුණාත්මකභාවය මිළිබද ප්‍රශ්නාවලිය

බලන්නේ ජීවිතයේ ගුණාත්මකභාවය මිළිබද පහත කරුණු කීවට බලා සිටිමි කැමැත්ත ගැලපෙන පමිදි රවුමකරන්න. සිම සියල්ලටම මිළිබදු ලැබිය යුතුය. මනක කවරා හත්තා, මෙහිදි කිසිවක් හොඳ හෝ තරස මිළිබදු ගලන වැරදිකරණය නොකෙරේ. අපට අමතර වන්නේ බලමි අවංක අදහසයි.

1=කිසිවක් නොහැටිමි

2=එකඟ නොවෙමි

3=එකඟවන්නේ හෝ නොවන්නේ නැත

4=මනක වෙමි

5=සම්පූර්ණයෙන්ම එකඟ වෙමි

1. දියවැඩියාව නිසා මගේ සමස්ත සම්බන්ධතා ගැටලු සහගත වී ඇත (උදා. මිතුරන්, සහයෝ, සහකරුවන්)	1	2	3	4	5
2. දියවැඩියා තත්ත්වය නිසා අනික් අයට වඩා මම වෙනස් බව මට හැඟේ	1	2	3	4	5
3. දිනපතා ඉන්සියුලින් වීදීමට සිදු වීම මට කරදරයකි	1	2	3	4	5
4. දියවැඩියාව නිසා මගේ වෘත්තීයමය සහ අනෙකුත් කාර්යයන්ට සහභාගී වී ඇත (උදා. වැඩ, සැමරුම්, ගමන්විමර්, වටිනිකු ඇඳුම් ආදිය)	1	2	3	4	5
5. දියවැඩියාව නිසා මගේ ජීවිතය වෙනස් වී ඇත	1	2	3	4	5
6. දියවැඩියාව නිසා මගේ පවුල් සම්බන්ධතා ගැටලු සහගත වී ඇත	1	2	3	4	5
7. මගේ වෘත්තීය ජීවිතය දියවැඩියාව නිසා සිම වී ඇති බව හැඟේ	1	2	3	4	5
8. දියවැඩියා අසුරු ආබාධ නිසා මගේ හැටිපිට ක්‍රියාකාරකම් සිම වීමෙන් මගේ සාමාන්‍ය ජීවිත රටාවට බලපෑම වී ඇත.	1	2	3	4	5
9. දියවැඩියාව මගේ ජීවිතයට ජීවිතයට අමතර මානසික අපහසුතා සහගත වී ඇත	1	2	3	4	5
10. මගේ දියවැඩියා තත්ත්වය ගැන අනික් අය දැන ගනිමි යැයි මට හිසක් ඇත	1	2	3	4	5
11. දියවැඩියාව නිසා මගේ වෘත්තීය ජීවිතයට බලපෑමක් ඇති බව කිසිවක්	1	2	3	4	5
12. මට දියවැඩියාව නිසා සාමාන්‍ය ජීවිතයක් හැකි නැත	1	2	3	4	5
13. දිනපතා මම මගේ දියවැඩියා තත්ත්වය සලකා තරඟාත්තා ආකාරය මිළිබද හැසිරීමට පත්වෙමි	1	2	3	4	5
14. දියවැඩියාව මිළිබදව මගේ සුභාසනය සහ දැනුම, හොඳ සිති සලකාසන් පවත්වාගැනීමට මට උදව් වී ඇත	1	2	3	4	5
15. කාමරයකදී ප්‍රමාණය ගණනය කිරීමට සුදුසු ඇති බැවින් මට වීඩියෝ ආකාර වගර් හැඟීම කිරීමට හැකියාව ඇත	1	2	3	4	5
16. දියවැඩියා තත්ත්වය සලකා කිරීමට මම යොදා ගන්නා ක්‍රම මිළිබද මම සැතීමට පත් වෙමි	1	2	3	4	5
17. මගේ දියවැඩියා තත්ත්වය සලකා කිරීම සඳහා මම උනන්දු වෙමි	1	2	3	4	5
18. මාගේ සිති මටම හොඳින් සලකා මම මගේ ආකාරයටම අනුමත ඉන්සියුලින් මාත්‍රාව වෙනස් කළ හැකිවෙමි	1	2	3	4	5
19. දියවැඩියා තත්ත්වය සලකා මම ලබාගන්නා වෛද්‍ය මිළිබද මම සැතීමට පත් වෙමි	1	2	3	4	5
20. දැනට පවතින මගේ රුධිර සීනි මටම (HbA1c) ගැන මම සැතීමට පත්වෙමි	1	2	3	4	5
21. දියවැඩියාව සලකා මගේ වෛද්‍ය ජීවිතයේ කොටසක් වෙමට පත් වී ඇත	1	2	3	4	5
22. දියවැඩියාව නිසා මගේ ආකාරයටම ජීවිතයේ සැකිලි මට අසාදන	1	2	3	4	5
23. දිනපතා සිති මටම සලකා කිරීමට මට අසාදන	1	2	3	4	5
24. සාමාන්‍යයෙන් මට හොඳින් ජීවිතය හැසිරීමට, ජීවිතයට හොඳින් නිදා හැසිරීමට හැකිය	1	2	3	4	5
25. මට හොඳ කාලයක් සිටිය යුතුය	1	2	3	4	5
26. මට හොඳ මානසික සුවයක් ඇත	1	2	3	4	5
27. දියවැඩියාව නිසා මගේ ජීවිතයේ සහභාගීත්වයට බාධා ඇතිවී ඇත.	1	2	3	4	5
28. මම සාමාන්‍ය වශයෙන් කිසිම සඳහා වැය කරන කාලය මිළිබදව සැතීමට පත්වෙමි	1	2	3	4	5
29. මාගේ ජීවිතය සහගත මටම සැතීමට පත්වෙමි	1	2	3	4	5
30. මටම සිති අදහස් මිළිබද මට සිතක් ඇත	1	2	3	4	5
31. සිති මටම අදහස් අදහස් මිළිබද මම නිසා සැතීමට පත්වෙමි	1	2	3	4	5
32. සිති මටම වැඩි වීමට අදහස් මිළිබද මම නිසා සැතීමට පත්වෙමි	1	2	3	4	5
33. දියවැඩියාව නිසා කොටසක් ඇති සැතීමට පත්වෙමි	1	2	3	4	5
34. සිති සලකා හොඳ නැති වීමට හෝ මට ඇති අදහස් මිළිබද මම නිසා සැතීමට පත්වෙමි	1	2	3	4	5