

# Healthcare Providers' Perception of Healthcare System Factors Associated with Poor Glycemic Control among Type 2 Diabetes Patients in Fiji

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Manuscript submitted May 15, 2019; resubmitted June 3, 2019; accepted June 11, 2019

## Abstract

**OBJECTIVE:** This study aims to explore the perceptions and experiences of healthcare providers regarding the role of healthcare system factors on glycemic control among type 2 diabetes (T2D) patients in Fiji in 2018. **METHODS:** Nineteen healthcare providers (physicians and nurses) from three randomly selected urban healthcare centers in Suva, Fiji, were selected through purposive variation sampling to participate in three focus group discussions (FGDs). The participants in this study were healthcare providers working in diabetes clinics, and medical officers and nurse team leaders from the selected healthcare centers. The data were analyzed by means of thematic analysis using Attride-Stirling's thematic network analysis framework. **RESULTS:** The majority of the participants (52.6%) were nurses, most of them female (84.2%), with a mean age of 39 years (SD  $\pm 9.2$ ). A large part of the participants had been working in the diabetes clinics for more than 5 years (52.6%)

and had more than 10 years' experience (52.6%) in their current employment. Five main healthcare system factors that may affect glycemic control were identified during thematic analysis: 1. Healthcare workforce (shortage of staff, high workload). 2. Medicine, consumables, and equipment (regular stock-outs of basic diabetes medicines and consumables, poorly equipped diabetes clinics). 3. Service delivery (lack of effective diabetes service delivery, continuum of care). 4. Healthcare information system (inadequate, not fully functional, unreliable). 5. Infrastructure (lack of supportive diabetes clinic infrastructure and processes). **CONCLUSIONS:** Healthcare system factors influence glycemic control among T2D patients. Understanding these factors is important in order for healthcare providers to deliver an effective and efficient service for diabetes patients in Fiji.

**Keywords:** diabetes • glycemic control • healthcare provider • health system • healthcare system factor • Fiji

## 1. Introduction

Diabetes is a growing global health issue. It affects nearly half a billion people, with almost 80% of cases being found in low- and middle-income countries. Its prevalence rate was 8.8% in 2017, with 1 in 11 people suffering from diabetes [1]. The Western Pacific region, which had a prevalence rate of 9.5% in 2017, is experiencing an increasing trend in diabetes compared to other regions. This has been attributed to a multitude of interrelated factors such as high rates of obesity and gestational diabetes as well as rapid

industrialization and urbanization with ensuing changes in lifestyle factors in this region [2]. In the small Pacific Island Countries and Territories (PICTs), the high diabetes prevalence rate of more than 40% co-occurs with poor glycemic control in over 70% of T2D patients, poor clinical outcomes, and high complication rates [3].

In Fiji, T2D had a prevalence rate of 15.6% in 2011 which is projected to rise to 19.3% in 2020 supported by rising rates of obesity [4, 5]. It was the number one cause of disease-specific mortalities, accounting for 19.7% of all deaths, with a mortality rate of 151.8 per 1,000 persons (i.e. per-

son-years at risk) and a hospital admission rate of 13.45% due to complications [6].

Diabetes is defined as a heterogeneous metabolic disorder characterized by hyperglycemia caused by impairment in insulin secretion, defective insulin action or a combination of both [7, 8]. It has been classified into different categories, with T2D as the most common type, comprising 90-95% of all cases [9, 10]. The cornerstone in managing T2D is to restore blood sugar to a normal level in order to prevent or delay the onset of complications, prevent premature death, reduce mortality, and maintain a good quality of life similar to people without the disease [11]. Hyperglycemia, or high blood sugar levels, if left uncontrolled over the long term, can cause damage to various body organs, leading to the development of disabling and life-threatening complications [12, 13]. On the other hand, if appropriate management of T2D is achieved, these serious complications can be delayed or even prevented [13].

Most published studies have indicated that glycemic control is suboptimal in a substantial number of T2D patients across various geographical regions, especially those living in low- and middle-income countries. In the Pacific Island Countries and Territories (PICT), the prevalence of poor glycemic control ranged from 64% in Papua New Guinea, through 72% in Vanuatu, 80% in Nauru, to 83% in the Solomon Islands [3]. The Fiji Non-Communicable Disease (NCD) Steps Survey 2002 found that 32.2% of people aged 25-64 years, previously diagnosed with diabetes and on medication, had poor glycemic control [14]. The poor glycemic control was influenced by a vast number of factors which partly overlap, but can be classified into:

- Patient-related factors
- Factors related to the healthcare team
- Factors resulting from the healthcare system [15]

Healthcare systems play a crucial role in the public health response to the growing problem of poorly controlled T2D and its complications [16, 17]. The World Health Organization (WHO) recommended the following key components of a well-functioning health system which are essential to achieving good health outcomes:

1. Strong policies and leadership.
2. Robust health financing system that facilitates universal health coverage.

#### Abbreviations:

CHREC	College Health Research Ethics Committee
CMNHS	College of Medicine, Nursing and Health Sciences
FGD	focus group discussion
FNHRERC	Fiji National Health Research Ethics and Review Committee
HbA1c	glycosylated hemoglobin
MHMS	Ministry of Health and Medical Services
NCD	non-communicable disease
PATIS	patient information system
PICT	Pacific Island Countries and Territories
T2D	type 2 diabetes
WHO	World Health Organization

3. A competent and high-performing workforce that is responsive to people's needs and expectations through patient-centered care.
4. Access to affordable essential medicines, diagnostics, and health technologies of assured quality.
5. Provision of a comprehensive and integrated range of public health interventions and clinical services.
6. Effective health information systems [18].

Studies have shown that effective intervention in the chronic medical care of T2D patients falls into one of five areas:

1. Use of evidence-based planned care.
2. Reorganization of practice systems and provider roles.
3. Improved patient self-management support.
4. Increased access to expertise.
5. Greater availability of clinical information [9, 19].

In their analysis of non-communicable disease services in Swaziland and Ethiopia using site assessments, chart review, and healthcare worker surveys, Rabkin *et al.* found that the barriers to provision of appropriate T2D care were:

- Lack of guidelines
- Lack of standard operating protocols
- Shortages of drugs and equipment
- Inadequate staffing

They also found that substantial barriers to patients' adherence to care and their retention in care included the cost of medication and laboratory tests, transportation barriers, and limited access to patient education and counseling services [20]. Furthermore, limitations on the time spent man-

aging complex T2D patients, lack of coordination in care, and limited access to secondary resources by primary care physicians were identified as barriers to good glycemic control [21, 22].

Studies on factors that influence glycemic control among T2D patients were mostly quantitative and mainly focused on treatment modalities [23]. A few studies have sought to assess the influence of the healthcare system on glycemic control. However, they have not considered the experience of healthcare providers where many issues remain unexplored.

The aim of this study was to understand the perceptions of healthcare providers of the influence of healthcare system factors on glycemic control in T2D patients attending their diabetes clinics. Understanding these different healthcare system factors will assist the Fiji Ministry of Health and Medical Services (MHMS) in planning and prioritizing with regard to:

- Human workforce allocation, including training and development.
- Ensuring availability and access to supply of essential medicines and appropriate technology.
- Reorganizing diabetes clinic services to ensure that patients with poor glycemic control and at high risk of developing complications are identified and provided with appropriate service.
- Enhancing the healthcare information system to support policy development and implementation, governance and regulation, research, human resource development, health education and training, and service delivery and financing.

### 3. Methods

#### 3.1 Study design and subjects

This study was conducted at three randomly selected primary health centers that provide diabetes clinic services to T2D patients in Suva, Fiji. In order to gain a better understanding of healthcare providers' perceptions of healthcare system factors that influence glycemic control among T2D patients attending their clinics, this study was conducted using an exploratory qualitative study design based on a grounded theory approach through focus group discussions (FGDs). Nineteen healthcare providers (5-7 participants per focus group) were selected by purposive variation sampling using the following inclusion criteria:

1. Either male or female healthcare providers who were working in the diabetes clinic and directly involved in T2D patient management at that time.
2. Medical officer in charge.
3. Nurse team leaders at the selected health centers.

#### 3.2 Study procedure

All necessary ethical approvals were obtained from the College Health Research and Ethics Committee (CHREC) of the Fiji National University's College of Medicine, Nursing and Health Sciences (CMNHS), and the Fiji National Health Research and Ethics Review Committee (FNHRERC) before commencing the study. All participants were fully informed about the details of the study, including its benefits and risks, before obtaining their written consent. After written consent to participate in the study had been obtained, the participants were asked to complete a demographic characteristics form that collected sociodemographic information. Each FGD had five to seven participants and lasted for one hour. The FGDs were recorded using a digital audio recorder. To ensure confidentiality, the participants were addressed according to codes given to them.

The research questions for this study were based on the researcher's experience as a medical practitioner who is frustrated about the high prevalence rate of poor glycemic control among T2D patients in Fiji despite the fact that knowledge of how to achieve glycemic control and a wide range of therapeutic options are available. The research questions that this study tried to answer were:

1. What are the expectations of healthcare providers regarding glycemic control among T2D patients?
2. How can a healthcare provider contribute to glycemic control among T2D patients?
3. What are the healthcare system factors that contribute to poor glycemic control?
4. How do these healthcare system factors support or establish barriers to glycemic control?

Although the researcher has prior knowledge and experience of T2D, he has no concept of the knowledge and practice of the individual participant. To avoid personal bias caused by the influence of the researcher on study participants, an

**Table 1.** Focus group discussion (FGD) questions

Type of question	Specific question
Starting question	As a healthcare provider working in a diabetes clinic, what does glycemic control in type 2 diabetes mean to you?
Exploratory questions	<ul style="list-style-type: none"> <li>- How can you contribute to glycemic control in type 2 diabetes patients attending your healthcare center?</li> <li>- What healthcare system factors influence glycemic control among type 2 diabetes patients attending your clinic?</li> <li>- How do these healthcare system factors establish barriers to glycemic control?</li> <li>- Apart from healthcare system factors, are there any other factors that may establish barriers to good glycemic control?</li> </ul>
Final question	Are there any other factors associated with glycemic control among type 2 diabetes which are not covered in the above questions?

independent researcher carried out the FGDs to allow the participants to reflect their honest perceptions and experiences.

### 3.3 Data collection tool

The FGDs used six semi-structured open-ended questions with prompts. These questions were categorized as engagement, exploration, and exit questions which were developed from the research questions of this study (**Table 1**). Prior to the study, the questions were tested with healthcare providers from a diabetes clinic that was not chosen for this study.

### 3.4 Data analysis

The qualitative data that were collected from the FGDs conducted during the period August 1 to August 30, 2017 were transcribed by the researcher from the digital audio recorder using handwritten notes, copied to the electronic Microsoft Word 2010 format, and sent to the research assistant for verification. The verified transcripts were then migrated into Microsoft Excel spreadsheets and dissected into significant keywords and phrases. These keywords and phrases were then manually coded. Data coding and sorting were performed until theoretical saturation was reached. Sorting of the coded data was carried out in Microsoft Excel using the Bree and Gallagher method [24]. The sorted data were thematically analyzed using Attride-Stirling's thematic network analysis framework [25] and grouped into global, basic, and

organizing themes. These themes formed the structure of the results portion. Quotes from participants were used to illustrate responses related to the relevant themes.

## 4. Results

### 4.1 Participants

The participants from the selected settings were distributed as follows:

- Lami Health Centre (4)
- Valelevu Health Centre (7)
- Suva Diabetes Centre (8)

The majority of the participants were nurses (52.6%). The age of the participants ranged from 28 to 58 years ( $SD = \pm 9.2$ ,  $m = 39$ ), with the majority of them in the 30-39 years age group. More than half of the participants were of indigenous Fijian ethnicity (52.6%). The participants' profile is shown in **Table 2**.

### 4.2 Themes

Five main themes corresponding to healthcare system factors influencing glycemic control among diabetes patients were identified during data analysis.

**Theme 1. Health workforce.** Eleven participants (11/19) identified the following health workforce factors that impact on glycemic control among T2D patients attending diabetes clinics:

- Shortage of staff
- High staff workload
- Low staff-to-population ratio
- High staff turnover
- Lack of staff training in diabetes management

Description of participant 6b, female, medical officer in charge:

*"When the system is flowing well ... and then, all of a sudden, we get a new staff. That's what breaks down the system that not only affects us, the staff here, but definitely affects patient care as well. Folders are missing, we cannot get new folders, and the patients have good rapport with the staff nurse; she knows them well and if a new staff comes and*

*does not behave like the old one, the patients lose their trust and don't want to come anymore."*

High workload was identified by the majority of participants as the main limiting factor for the time spent on patients to educate them about diabetes and the importance of controlling their blood sugar.

Participant 4a, male, medical officer in charge, reported:

*"With the workload, if the number of patients is small, you will spend quality time with the patients. You will be able to build rapport and gain their trust. So, knowledge and treatment will be given to patients and will be fully understood and adhered to by the patients, which will help in controlling their blood sugar."*

The majority of participants also identified the following health workforce characteristics critical to achieving glycemic control among the T2D patients:

1. Healthcare provider's attitude described as showing empathy to patients' needs and establishing rapport.
2. Healthcare provider's knowledge such as having undergone diabetes management training and being familiar with the different diabetes management guidelines and protocols.
3. Healthcare provider's skills in conducting motivational interviews, communicating knowledge to the patients, and effectuating behavioral changes.

**Theme 2. Medicines, consumables, and medical equipment.** The majority of participants (11/19) identified the lack of clinic resources as a contributing factor to poor glycemic control among T2D patients. These resources include essential medicine stock-outs regarding consumables such as glucometer strips, lancets, insulin syringes, and needles as well as functioning medical equipment.

Participant 19c, female, nurse, reported:

*"Well, I believe, a factor related to the healthcare system in the diabetes clinic is the lack of resources. Examples are the shortage of insulin and syringes, like the couch in the foot clinic, there are only two couches. It's really time-consuming when we are working."*

**Table 2.** Focus group discussion (FGD) participant's profile

Characteristic (n = 19)	n (%)
<i>Professional cadre</i>	
Medical officer	6 (31.6)
Nurse practitioner	1 (5.3)
Nurse	10 (52.6)
Dietician	2 (10.5)
<i>Age</i>	
<30 years old	3 (15.8)
30-39 years old	8 (42.1)
40-49 years old	6 (31.6)
≥50 years old	2 (10.5)
<i>Gender</i>	
Female	16 (84.2)
Male	3 (15.8)
<i>Ethnicity</i>	
I-Taukei (indigenous Fijian)	10 (52.6)
Fijian of Indian descent	5 (26.3)
Fijian of other descent	4 (21.1)
<i>Length of service</i>	
<5 years	2 (10.5)
5-9 years	7 (36.9)
>10 years	10 (52.6)
<i>Length of time working at diabetes clinic</i>	
<1 year	5 (26.3)
1-5 years	4 (21.1)
>5 years	10 (52.6)

Participants also reported that patients on insulin were given free medications, but not free syringes and needles. Glucometers and consumables were also not provided to enable patients to monitor their own blood glucose.

Participant 12c, male, medical officer, reported:

*"Unfortunately, with the insulin, they are not giving the syringes to inject. So, on the one hand, they are giving insulin, but they are not giving the injection (syringes and needles). We require glucose-testing machines; whenever they have access to cheaper glucose-testing machines and consumables, they will be able to check their diabetes better. Unfortunately, in Fiji, we are not giving it for free, and it's quite expensive. So, that's another problem, the blood-testing consumables."*

**Theme 3. Service delivery.** In terms of diabetes service delivery, 10 participants (10/19) identified the following factors that may support T2D patients in achieving good glycemic control:

- Offering group therapy in the clinic.
- Having an established diabetes peer support group in the community.

- Having a fully equipped foot care clinic.
- Community outreach and home visits being regularly conducted by community health-care nurses.
- Providing on-site blood testing or blood collection facility.
- Providing regular diabetes specialist team outreach to primary care facilities.
- Providing diabetes education and counseling services.

Most healthcare providers reported that glycemic control in T2D patients can be improved by continuous care and community healthcare service delivery through community outreach and home-based care programs. The participants also identified the need for community-based diabetes support services such as community peer support groups and community healthcare worker services.

Participant 10b, female, nurse team leader, public healthcare, reported:

*"Diabetes Fiji has a diabetes peer group project currently being piloted in our squatter settlements. In this project, diabetes patients, including their caregivers, are trained in diabetes care, including taking blood pressure and blood sugar, and diabetes education. Diabetes Fiji provides the devices and consumables. This diabetes peer support project is really working as it has empowered the T2D patients to look after their own health. Most of the patients have well-controlled blood pressure and blood sugar. And they really help each other, reminding people about their appointments to clinics or their diet. They inform Diabetes Fiji to come in, and it is working. The only problem probably is the networking between the community and us. The support is not always there due to staff turnover."*

**Theme 4. Healthcare information.** Ineffective healthcare information was reported by nine participants (9/19) to be a barrier to effective diabetes care. One of the factors was shortage of recorders for retrieval and file folders. Nurses were performing the recorder's job rather than concentrating on their nursing duties and spending more time with the patient conducting health education sessions.

Participant 12c, male, medical officer, reported:

*"In fact, at the moment, our nurses are doing it (looking after the folders). They spend less time with patients and more time looking for the folders."*

*I believe our nurses will be more useful in doing patient education than trying to get the folders and files."*

They also identified a lack of functional and reliable information technology such as the electronic patient information system (PATIS) where healthcare providers are supposed to trace patient's records, especially those of their blood investigation reports and current medications they are taking. Also, there is a one-way referral system without feedback from the referred facility to the referring facility in terms of patient status and management plan. There was a lack of patient monitoring and tracking systems to ensure continuity of patient healthcare.

**Theme 5. Diabetes clinic infrastructure and processes.**

Fourteen participants (14/19) identified that diabetes clinic environment, infrastructure, and clinic processes were factors that also influence glycemic control. The factors relating to the clinic setting included a lack of space and patient-friendliness, especially for elderly patients and those with disabilities and special needs. The participants also mentioned that, although they encouraged their patients to walk, the majority of patients were prevented from doing so by the absence of footpaths with good lighting and secure places to walk at night.

Participant 15c, female, medical officer in-charge, reported:

*"If you are telling patients to walk in the evening for their physical activity, you have to have footpaths, you have to have good lighting, making sure that people are safe to walk in the night. Also, you should have structures that are wheelchair-friendly and all that."*

According to the majority of participants, many T2D patients failed to attend clinic appointments and ran out of medications, causing poorly controlled blood sugar. They believed that these problems were related to the strict clinic appointment scheduling system. Once patients had missed a clinic appointment, they are given a much later clinic date and told to queue at the already overcrowded general outpatient department for consultation and replenishment of their medication. There was also poor coordination and networking with other healthcare providers and community healthcare workers regarding follow-up care.

Some participants reported that having a laboratory testing facility and an electronic laboratory information system on site would positively influence glycemic control among T2D patients.

Participant 6b, female, medical officer in-charge, reported:

*"It's not a direct relationship, but I think, it's one of the factors that affect glycemic control, namely having a computerized patient information system and laboratory information system. If we would have this here, all patients would get their laboratory tests done, and would get their results in time, and they feel happy that they know their kidney function and what their cholesterol is like. This motivates patients to be compliant to medication plans and clinic appointments. And similarly, the HbA1c as well, with the blood results, the patient will know whether they have glycemic control or not."*

## 5. Discussion

Effective provision of high-quality care to patients with chronic disease such as T2D to improve their health status depends on a well-organized healthcare system that provides:

1. Effective leadership in securing resources and facilitating access to healthcare.
2. Self-management support through patient empowerment.
3. Evidence-based care and interventions.
4. Supportive coordinating care processes.
5. Robust healthcare information system.
6. Sustainability of care by using community-based resources and public health policy [26].

In this study, healthcare providers identified the following healthcare system factors that were barriers to effective diabetes care according to the best standards in practice:

- Shortage of healthcare workforce and high workload of healthcare providers (patients/healthcare worker ratio).
- Medicine and consumables being out of stock and poorly equipped diabetes clinics.
- Lack of effective diabetes service delivery and continuity of care.
- Inadequate, not fully functional, and unreliable healthcare information systems.
- Lack of a supportive diabetes clinic infrastructure and clinical processes.

In this study, we identified the following factors that promoted poor glycemic control among T2D patients:

- Large workload of patients per staff member.
- Limitations on time spent on individual patients.
- High turnover of staff working in the diabetic clinic.

These findings are similar to those established by LeBlanc *et al.* in their survey of 252 US primary care physicians where they identified that lack of time for treating complex patients served as a barrier to good glycemic control [27]. Our findings are also confirmed by Abdulhadi *et al.* in their study on doctors' and nurses' views of patient care for T2D in primary healthcare in Oman [28]. In their qualitative study on the barriers and facilitators of structured diabetes care in general practice, O'Connor *et al.* reported that primary care physicians felt that they lacked the time and other resources necessary for effective management and care of their T2D patients [21]. Large patient workload usually leads to healthcare providers rushing to clear the crowd, resulting in limited time being spent on each patient. This was one of the reasons why patients waited longer for clinic appointments, which may lead to poor patient follow-up, poor glycemic control, and diabetes complications.

It is important to note that, in this study, the majority of participants also felt that healthcare provider characteristics impacted the quality of patient care and eventually glycemic control. They believed that healthcare provider's attitudes towards healthcare, as well as their competence in diabetes management, good skills in conducting motivational interviews, and effectuating behavioral change directly influenced patient's glycemic control. This is in contrast to the findings of most studies that healthcare provider characteristics have minimal direct impact on T2D patient's glycemic control [29, 30].

Also, in this study, the lack of regular stocks of medicines and diabetes consumables, as well as poorly equipped diabetes clinics, lack of on-site laboratory testing facilities, and poor health information systems were further contributing factors to poor glycemic control. This is similar to the findings of the qualitative study on the perceptions of diabetes care provision among healthcare providers in rural Tanzania by Mwangome *et al.* [31]. They found that lack of equipment, supplies, and

medication for diabetes diagnosis, treatment, and monitoring served as barrier to effective diabetes management and care. T2D patients require a regular supply of medicines to control blood sugar level, blood pressure, lipids, and other parameters; they also need equipment and consumables to monitor regularly their blood sugar levels at home or at the diabetes clinics. Furthermore, an effective and robust healthcare information system may be beneficial to both T2D patients and their healthcare providers because it may increase the efficiency and quality of diabetes care through improved continuous care, increased patient engagement and self-efficacy, increased patient adherence to medications and lifestyle changes, and improved patient self-monitoring [32].

In our study, healthcare providers also identified the need to reorient healthcare services to make them more accessible to patients by providing more diabetes-related services in the clinic and community. Improving community referral systems, community outreach, and home-based care programs ensures continuity of effective care for T2D patients. Findings from other studies support these recommendations [33]. The participants also identified that diabetes clinic environment, infrastructure, and clinic processes influence glycemic control. T2D patients miss clinic appointments because of limited access for patients with disability, overcrowded waiting areas, rigid appointment schedules, and lack of patient support services. This in turn affects patients' adherence to medication and compliance with diabetes management plans, which is supported by findings from other studies [34].

## 6. Limitations of the study

This study has a few limitations. It was limited to healthcare providers working in urban regions. Selection of participants in rural regions and in remote areas may show different results. Furthermore, the study was limited to the exploration of healthcare providers' perceptions in determining

the different healthcare system factors that influence glycemic control; patients' perspectives were not explored.

## 7. Conclusion

In conclusion, we found that glycemic control among T2D patients attending diabetes clinics was influenced by healthcare system factors, as reported by healthcare providers. These healthcare system factors include:

- Shortage and high workload of trained healthcare providers.
- Limited access to essential medicines, consumables, and medical equipment.
- Inadequate delivery of services that maintain continuity of care both in the clinics and community where the patient lives.
- Lack of an effective and robust healthcare information system.
- Diabetes clinics which were not very supportive in terms of infrastructure and clinic processes.

This study also found that healthcare providers' attitudes, knowledge, and skills directly impact glycemic control. More research is needed, especially on T2D patients' perspectives on healthcare system factors that facilitate or serve as barriers to good glycemic control since healthcare providers and T2D patients may have different levels of understanding of what is necessary for an effective diabetes management and care.

**Acknowledgments:** The authors would like to thank the following people for their contribution to this study: staff participants from the three healthcare centers included in this study for their participation in the focus group discussions, Dr. Donald Wilson for his technical advice, and Mrs. Sabiha Khan for her advisory input and encouragement.

**Disclosures:** The authors report no conflict of interests.

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