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RESEARCH ARTICLE

# Knowledge of Self-management Activities among Patients Living with Diabetes in Sekhukhune, Limpopo Province of South Africa

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**Abstract:**

***Background:***

Self-management activities include diet, avoiding foods high in fat, and increasing exercise. Knowledge may prompt patients with diabetes to take appropriate self-management activities for adherence to treatment, whilst lack of knowledge is associated with poor practices and complications. This study was aimed at exploring knowledge regarding self-managements activities among patients in Sekhukhune district, Limpopo province.

***Methods:***

Qualitative method and phenomenological exploratory descriptive design were used to collect data from 19 patients with 12 months or more living with diabetes in Elias Motswaledi municipality, Limpopo province. Purposive sampling was used to select participants. One-on-one interviews were conducted using voice recorders and field notes for non-verbal cues were observed. Unstructured interview guide with principal question which enabled probing was used. Data were analysed using 8 Steps of Tesch's inductive, descriptive, and open coding technique. Trustworthiness was ensured.

***Results:***

Findings shows that participants knew that adherence to diabetic diet, and importance of stress management, regular intake of medication, and physical activity. Moreover, they indicated that costs of food affect adherence, whilst inconsistent availability of medications at health facilities, including transportation costs for collection of medication, impact medication usage.

***Conclusion:***

Patients living with diabetes are knowledgeable of self-management activities, which include healthy eating, medication use, engaging in physical activity and the importance of managing stress. Intervention to improve adherence should include further empowerment of patients through strengthened diabetes self-management education coupled with behavioural changes. The emphases to improve self-management activities should be that all these activities are implemented together for better outcomes.

**Keywords:** Self-management activities, Patients living with diabetes, Knowledge, Improvement, Adherence, Diabetic diet.

| Article History | Received: March 10, 2023 | Revised: June 24, 2023 | Accepted: June 30, 2023 |
|---|---|---|---|

## 1. INTRODUCTION

Diabetes mellitus (DM) is a public health problem with increasing incidences and prevalence. Diabetes prevalence has increased quickly in South Africa, where it has nearly tripled from 4.5% in 2010 to 12.7% in 2019 [1]. Type 2 diabetes has been identified as one of the most prevalent types of diabetes and the mortality rate among these patients is also increasing [2]. In the Sekhukhune district of South Africa, it was reported that 241 patients with diabetes were admitted in hospitals between April 2016 and April 2017, of which 41 of them died [3]. Diabetes was the second most common underlying cause of mortality in South Africa, according to Statistics South Africa [4]. In addition, effective diabetes self-care practices must be quickly implemented if the condition is to be treated and controlled [5].

Understanding the right medicine dosage, timing, and administration is a necessary component of self-management

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for maintaining glucose control [6]. The prevalence of health problems resulting from poorly managed diabetes is linked with insufficient knowledge [7]. Conversely, having enough knowledge about diabetes is linked to a reduced chance of preventing comorbidities, and improved patients' quality of life [8]. Moreover, adequate knowledge helps people evaluate the dangers of diabetes and ultimately encourages them to seek treatment. A South African study showed that patients with diabetes had knowledge of how best to manage their condition [9]. However, the study did not look at the knowledge of self-management activities.

The management and control of diabetes rely heavily on self-management actions [6]. Diabetes patients are frequently encouraged to take part in a variety of self-management activities in order to track their blood glucose levels, alter their lifestyles, take their medications (oral antidiabetic or insulin) as prescribed, and avoid problems [10]. Adopting a healthy dietary regimen is essential for managing diabetes [11]. Patients are frequently instructed to keep an eye on their carbohydrate intake, choose wholesome foods, and control portion sizes [12]. Diabetes management benefits from regular exercise. Planning and implementing exercise into everyday activities, keeping track of blood glucose levels before, during, and after physical activity, and modifying medication or food intake as necessary are all parts of self-management [13, 14]. Diabetes management can be emotionally taxing. Patients can practice self-management techniques such as stress management and healthy coping methods [15]. Monitoring for indications of hypoglycemia (low blood sugar) or hyperglycemia (high blood sugar) and responding appropriately to these conditions are self-management tasks [10].

Poor diabetic self-care behaviours among patients have been found to contribute to diabetic complications [6]. Patients with adequate diabetes knowledge are most likely to take and implement appropriate measures to improve health outcomes. Patients gain from learning about managing their diabetes and any associated consequences. It is of utmost importance to investigate knowledge of self-care activities. Knowledge of self-management activities is crucial for disease management, health maintenance, medication management, acute event prevention, empowerment, and general quality of life [16, 17]. Therefore, this study intends to explore knowledge regarding self-management practices of diabetic patients receiving treatment in basic healthcare facilities in the Elias Motswaledi Municipality.

## 2. METHODS

### 2.1. Study Method and Design

Qualitative approach and phenomenological exploratory design were applied in selecting individuals living with diabetes and receiving treatment in clinics located at Elias Motswaledi municipality.

### 2.2. Study Setting

This study was carried out in the primary healthcare facilities in Elias Motswaledi municipality within the Sekhukhune region in Limpopo province, South Africa. Although Elias Motswaledi has a total of 14 public clinics, the study was only undertaken at five of them. The clinics, amongst other services, provide diabetes care to patients and keep a register of patients with diabetes. The study setting was chosen because researchers wanted to have access to patients living with diabetes mellitus for the purpose of exploring their knowledge regarding self-management strategies. Most of the residents in the municipality speak and observe Sepedi culture.

### 2.3. Target Population and Sampling

Patients living with diabetes and receiving treatment at Elias Motswaledi Municipality's clinics were the study's target population. Clinics and patients were chosen or sampled using a non-probability purposive sampling technique. The sampling of patients depended on data saturation, which was reached with 19 participants. Inclusion criteria for this study were patients who have been receiving diabetes treatment therapy for more than 12 months were included. Five clinics were included in this study because they had many patients receiving diabetes treatment, and as such, it was easier to get patients who met inclusion criteria.

### 2.4. Data Collection Instrument and Procedure

Data collection method adopted and applied in this study is semi-structured interviews, which involve the use of open-ended questions and an interview guide. One-on-one interviews were conducted after obtaining informed consent from 17 participants using voice recorders and field notes for non-verbal cues observed. The interviews were conducted in Sepedi, which is a dominant language in the area. The principal question for the interview was "*Please describe the understanding of self-management approaches in diabetes management."* In order to elicit more information, follow-up questions that probe further and seek clarification were asked in response to each response. By asking, "*May you please tell more"* or *"Please let us discuss more about that,"* the researcher encouraged individuals to divulge more information about their own experiences. The data collection process took less than two months, and respondent interviews ranged in length from 25 to 45 minutes. The researcher made bracketing, intuiting, and reflecting remarks during the interviews. The researcher used bracketing, disregarding what was known about respondents' real experiences in order to avoid depending on preconceived conceptions and beliefs. The researcher kept to the interview guide's questions and preserved his naivete in order to avoid intuiting his own ideas. Finally, the researcher responded to participants' fascinating comments by adding, "*So what you are actually saying is...."* in order to encourage additional information.

### 2.5. Steps to Ensure Trustworthiness

Trustworthiness was ensured through credibility, transferability, confirmability, and dependability were all guaranteed [18]. Prolonged engagement and member check were used to determine credibility. Prolonged engagement involved conducting interviews for a longer period to allow probing, and the researcher responsible for data collection worked at the clinics the study was conducted. Whilst, member

check were observed through follow-up interviews with participants. Transferability was established through thick description or detailed methodology. Confirmability was ensured by peer review wherein researchers responsible for data collection analysed data individually and thereafter submitted it to supervisors and independent coder for analysis, and subsequently agreeing on themes and sub-themes. Dependability was established through reliance on supervisors and independent coders, as well as voice recorders and field notes.

### 2.6. Data Analysis

Each interview was audio recorded, followed by transcription. Prior to analysis, the researchers had the interviews, which were conducted in Sepedi, translated into English by a language translator. The verbatim transcripts were then independently analysed by each researcher and their supervisors. In a consensus meeting, all researchers and an independent coder came to an understanding of the themes and sub-themes that arose from the independent analysis of the transcripts of the interviews. Direct quotations from participants were taken and recorded to corroborate the conclusions. The eight steps of Tesch's open coding qualitative data analysis method by Creswell [19] were used to analyze the data. Researchers carefully and repeatedly read all transcripts and developed codes. Topics from codes were grouped together according to similarity, abbreviated, and written next to the appropriate segments of the transcription. Thereafter, themes and sub-themes were developed.

### 2.7. Ethical Considerations

Turfloop Research Ethical Committee (TREC) approved the study and allocated clearance certificate number TREC/255/2017:PG. All respondents voluntarily gave and signed written informed consent for participation in the study. Participants were alerted about their privileges to withdraw from the study at any stage without punishment, and that their withdrawal would not affect diabetes treatment received from the facilities. None of the respondents withdrew from the study. Privacy of the respondents was maintained by interviewing patients in private consulting rooms of the clinics. Confidentiality was maintained by not capturing the real names of participants.

## 3. RESULTS

### 3.1. Demographic Profile

Table **1** shows that 19 participants were part of this study, of which 15 were 46 years old or older, 11 were single, and 12 had been on diabetes treatment for over 24 months, whilst 15 were illiterate pensioners with secondary education or less.

### 3.2. Themes and Sub-themes

#### *3.2.1. Theme 1: Knowledge of Self-management Activities*

Diabetes self-management behaviours or activities include a range of activities that helps in achieving better glucose and health outcomes. The four sub-themes which emerged from this theme outline activities which are considered fundamental.

**Table 1. Demographic characteristics.**

| **Total number of patients interviewed** | | **19** |
|---|---|---|
| Age range | 25-45 years | 04 |
| | >46 years | 15 |
| Marital status | Single | 11 |
| | Married | 08 |
| Period of treatment | 12 – 24 months | 07 |
| | >24 months | 12 |
| Education | Tertiary | 4 |
| | Secondary or less | 15 |
| Occupation | | 2 retired teachers |
| | | 1 professional nurse |
| | | 1 academic |
| | | 15 illiterate pensioners |

##### *3.2.1.1. Sub-theme 1.1: Importance and Adherence to Diabetic Diet*

Throughout the interactions with diabetes patients, they showed that they were knowledgeable about diet, its benefits and adherence. It was noted that patients understand that a diet plays a key role in the preservation of their health, which is corroborated by the claim that *"I get unwell when I eat anything with sugar; I avoid sugary foods and consume a lot of water. Despite having a diagnosis from 2010, I didn't start medication until 2015 because I was eating well"* (P1).

*"My glucose control is always better because I eat according to how I was educated; I never experienced any health problems"* (P4).

However, another participant indicated the inability to adhere to diabetic diet due to unavailability of food. This was confirmed by a participant who did not have a job. *"Eish, diet is a problem since I can't afford the proper food"* (P17).

##### *3.2.1.2. Sub-theme 1.2: Stress Management*

Stress is a problem among patients living with diabetes, which may lead to increased blood glucose levels. Participants alluded to the importance of the management of stress as crucial to improved diabetes outcomes, and this is collaborated by the following statements:

"*I experienced family problems, which overwhelmed me and lead to increased sugar levels, but now the sugar levels have improved since stressful occasions have passed"* (P1).

*"It is important to avoid stress when living with diabetes, because it increases blood sugar levels and make diabetes uncontrollable"* (P8).

##### *3.2.1.3. Sub-theme 1.3: Regular Intake of Medication*

Regular use of diabetes medication helps in putting glucose levels under control, and that medication should be taken as prescribed. The following quotations show that participants understand the importance of medication and its intake:

*"Diabetes medication is important and helps in achieving better outcomes and prevention of complication"* (P3).

The South African health departments provide free diabetic

medication to the patients, which are collected at the facilities. Participants further indicated that they are sometimes told that medication is not available and should come back on a particular day, which requires more transportation costs to the crowded clinics. The following quotations support participants' claims:

*"It happens that occasionally when you arrive at clinic they say there is no medication. I was given a new date for collection and that I must find transport to bring me here"* (P14).

*"Just that occasionally when you get to clinic they inform you that your prescription is not available and they give me another day, and this affect adherence since sometimes medication is finished"* (P15).

As a result of the unavailability of the medications at the clinics, some participants reported that they had missed scheduled clinic visits for fear of wasting their money only to be told there was no medication. This is supported by the following claims:

*"I stopped honouring clinic visits after I was told there is no medication and requested to come on a particular data, and on the same date, I was told similar story of no medication. Then I decided to stop so that I don't waste my money which I can but food with"* (P5).

*"When you visit a clinic, they may occasionally inform you that no medications are available. For instance, last week I was given another date, but I missed and did not go"* (P14).

#### *3.2.1.4. Sub-theme 1.4: Physical Activity*

Physical activity is important in diabetes management and helps in improving outcomes and preventing complications. This is supported by below quotes:

"*Exercise is important in diabetes managing and helps in preventing and minimising chances of developing complications"* (P8).

*"Exercising puts diabetes and sugar levels under control and reduce risk of health problems associated with the condition"* (P15).

## 4. DISCUSSION

Participants in this study highlighted that it is important to adhere to diabetes diet in order to maintain normal blood sugar levels and feel better. Knowledge of the importance of adherence to diabetes diet is critical since knowledge has been found to be closely linked with practice [8]. Following dietary recommendations is essential for effective treatment in people with diabetes [20], hence it is significant to examine factors which may impact application knowledge of the adherence or its importance to their daily self-care activities. During probing, it was established that participants do not have the financial capacity to enable adherence to diabetes diet since factors such as accessibility and cost [21]. The government is urged to introduce or distribute food baskets to patients in addition to the pension pay-out to enable accessibility of appropriate food. United Kingdom established food banks to give food to those in need; those who receive it report they could previously afford it, but the additional cost of management of illness prevents them from doing so [22]. On the other hand, perceptions of the healthy diet of the participants could be based on the food choices which are expensive. Urbanization impacted the way of living of Africans and led to more intake of unhealthier meals [23]. Traditional meals are generally less expensive and are healthier, therefore, the restoration of the way of living and eating needs to be restored to improve the intake of healthy meals. Diabetes management self-efficacy, attitudes, and a lack of social support are other variables that influence adherence [24, 25], leading to non-consumption of healthy diet, which is significant in improving diabetes outcomes [26]. Diet adherence is challenging and requires behavioral changes as compared to medication or insulin use [19]. Diet adherence may therefore be more affected than usual by everyday events and emotional reactions, and it may also change significantly over time depending on the individual [27]. Therefore, there is a need to retrain and re-educate on dietary management in combination with behavioural changes in order to improve adherence to a diabetes diet. However, this study did not establish dietary practices of these patients living with diabetes.

Participants in this study stated that stress management is critical in achieving better health outcomes. A diabetes diagnosis can result in long-term stress, which can get worse with the ups and downs of daily life, difficulties understanding how to manage the condition, and negative health consequences or complications. Stress can cause hyperglycemia, an increase in blood sugar levels [28], by triggering the release of a number of hormones [29]. Diabetes mellitus maintenance is challenging and needs both a patient's lifetime commitment and significant lifestyle adjustments. Stress and psychological discomfort are issues for diabetes patients and have been linked to the development and maintenance of the condition [30, 31]. Knowledge of the importance of stress management among participants may lead to improved proper glucose control [32]. Patient experiencing stress may forget what to do or not do in managing diabetes, therefore family support is essential. Patients can benefit from social support and stress reduction from their families [24]. This study recommends partnership of healthcare and family members of patients as part of the stress management program. Incorporating healthy coping strategies into its seven strategic self-care behaviors as the cornerstone of diabetes care, the American Association of Diabetes Educators [33] uses best practices by measuring, monitoring, and managing outcomes. Stress is a major problem for patients, hence it is advised that it be included in a strategy to control diabetes.

Participants indicated that adherence to diabetes medication or insulin is critical for better outcomes. They further pointed out that adherence to medication begins with collection from healthcare facilities at additional traveling costs. The use of medication or insulin is less complicated or challenging [20], however, support in this regard is still necessary to ensure availability and adherence. Study volunteers went further to identify factors that impact on collection and adherence to medication usage, which include cost of travelling to healthcare facilities, overcrowding, and lack of medication at the facilities. Transportation costs to

healthcare facilities have been shown in prior studies to affect adherence [34 - 36]. Patients may be requested to come back to collect medication after not being provided due to unavailability at facilities; this will involve additional transportation costs. Therefore, it is necessary for healthcare facilities to use short message services (SMS) as well as community healthcare workers to inform patients when their medications are available. Furthermore, the healthcare system should develop strategies to ensure consistent availability of diabetes medication and alert patients before due date of collection.

Participants stated that exercise is crucial for managing diabetes and aids in preventing complications and getting improved glucose results. Exercise, along with diet and behavior change, is a crucial part of diabetes and obesity prevention and lifestyle intervention programs. Benefits of physical activity include lowering cardiovascular risk factors, assisting with weight loss, improving well-being, and preventing complications [37, 38]. Exercise is a crucial part of all diabetes and obesity prevention and lifestyle intervention programs, along with nutrition and behavior modification [13]. Therefore, it is important to emphasize that adherence to dietary recommendations, stress management, medication use and engaging in physical activity must be practiced together for better health outcomes.

## CONCLUSION

Patients living with diabetes are knowledgeable of self-management activities, which include healthy eating, medication use, engaging in physical activity and importance of managing stress. On the other hand, patients are unable to apply and put into practice their knowledge of self-management due to costs of food, inconsistent availability of medication at healthcare facilities, and transportation costs for the collection of medication. Intervention to improve adherence should include further empowerment of patients through strengthened diabetes self-management education coupled with behavioural changes.

## AUTHOR'S CONTRIBUTION

Mothiba supervised the study and authored the article, while Mphasha co-authored. Bopape supervised the study, while Makofane was responsible for data collection and analysis. The final version of this manuscript was approved by all authors for publication.

## ABBREVIATION

**DM** = Diabetes Mellitus

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Turfloop Research Ethical Committee (TREC) approved the study and allocated clearance certificate number TREC/255/2017:PG.

## HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committee and with the 1975 Declaration of Helsinki, as revised in 2013.

## CONSENT TO PARTICIPATE

Before interviews, participants had to sign informed consent forms confirming voluntary participation.

## AVAILABILITY OF DATA AND MATERIAL

This article depends on the data gathered from patients living with diabetes from Elias Motswaledi municipality in Sekhukhune, Limpopo province of South Africa. The data generated or analysed during the current study are not openly accessible due to planned publication. However, they can be requested from the corresponding author [M.HM].

## FUNDING

None.

## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

## ACKNOWLEDGEMENTS

Patients living with diabetes in Elias Motswaledi municipality are acknowledged for voluntary participation in this study.

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