(RESEARCH ARTICLE)

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Assessing community perceptions on diabetes in a rural area in Sudan 2023: A study on knowledge, behaviour, and practice

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Abstract

Background: Diabetes Mellitus (DM) is a chronic condition characterized by high blood sugar level. It becomes a hidden epidemic in developing countries including Sudan, with significant impact on health and economic resources. Good knowledge and behaviour towards D.M is essential to decrease the burden of the disease on individuals. This study aimed to assess the knowledge, attitude, and practice (KAP) concerning diabetes mellitus among the general population in a rural area in Sudan.

Methodology: A community-based cross-sectional descriptive study was conducted over several months, in 2023, involving 140 participants from the general population in a rural area in Sudan. A well-structured KAP questionnaire was used to collect data on demographic characteristics, knowledge, attitude, and practice related to diabetes. The responses were analyzed using SPSS version 22.

Results: The majority of participants were females (52.9%), and males were (47.1%). Age Distribution: Majority aged 45-59 years (32.9%). There was a diabetic member in the family in 54.3%. A significant association exists between having a diabetic family member and knowledge about normal blood sugar levels (p=0.002) and symptoms of diabetes (p=0.024). The overall net result of good knowledge in this study was 63.2%, good attitude 67.6% and good practice was found in only 55.5%.

Conclusion: The results of this study revealed good knowledge and attitude with average practice towards diabetes. Addressing the gap in KAP through targeted education, robust healthcare systems, and international cooperation can significantly improve diabetes management and patient outcomes.

Keywords: Diabetes Mellitus; Knowledge; Attitude; Practice; Rural area; Sudan

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1   Introduction

Diabetes Mellitus is a condition characterized by the impaired oxidation of glucose to produce energy due to insulin deficiency. It is classified into two types: Type 1 Diabetes Mellitus (T1DM), characterized by an absolute or near-absolute insulin deficit, and Type 2 Diabetes Mellitus (T2DM), characterized by insulin resistance with insufficient compensatory increase in insulin secretion [1]. According to the International Diabetes Federation, approximately 465 million people globally are affected, with this number projected to increase to almost 700 million by 2045. In Africa, 19 million individuals are affected, a figure estimated to rise to around 41.5 million by 2035. Sudan has one of the highest diabetes prevalence rates globally, with an estimated prevalence of 22.1% among those aged 20 to 79 years [2]. In 2012, diabetes was the primary cause of 1.5 million deaths worldwide, with an additional 2.2 million deaths attributed to the increased risk of cardiovascular and other diseases associated with hyperglycaemia [3,4]. In 2019, diabetes was responsible for 366,200 deaths, including 25,800 children aged 0 to 19 diagnosed with T1DM [5]. By 2030, diabetes is anticipated to become the seventh leading cause of death [4].

Diabetes prevalence is increasing worldwide, particularly in Africa and the MENA region [6]. Diabetes Mellitus (DM) is marked by hyperglycaemia, influencing the development of chronic complications [7]. It is caused by improper metabolism of glucose, fat, and protein, leading to long-term complications such as macrovascular, microvascular, and neuropathic problems [8]. Many individuals remain unaware of their diabetic status until life-threatening complications arise [9]. Due to the disease's subtle nature, many go untreated until difficulties emerge [10]. Consequently, diabetes is the leading cause of cardiovascular disease, blindness, renal failure, and lower limb amputation in many high-income countries [11], and it significantly increases mortality risk [12]. Diabetic patients' health and well-being are influenced by their own actions, not just by healthcare providers [13]. Patient education is the cornerstone of effective diabetes management [14,15]. Studies have shown that the final outcome of diabetes depends on patients' education and medical management [16]. This is critical in Sudan due to the high prevalence of diabetes complications such as retinopathy, nephropathy, ischemic heart disease, and diabetic septic foot [17,18]. The serious spread of diabetes threatens to cripple the nation's economic and human resources, making it crucial to address all aspects of the disease now. Proper diabetes education and guidance can significantly alter patients' lifestyles, promoting good glycaemic control. Effective education for diabetic patients requires understanding their knowledge, attitudes, and practices (KAP). The KAP is well known to affect patient compliance and play an important role in management of diabetes. This study aims to examine the KAP among the community to form future health education programs and strategies [19]. Current diabetes management in Sudan primarily relies on medical therapy with minimal emphasis on patient education and self-care. Prior research underscores the importance of diabetes education, noting that proper dietary information, attitudes, and behaviours can prevent onset and manage complications [20, 21]. Therefore, this study aims to analyze the overall characteristics of diabetic patients and their baseline knowledge, attitudes, and practices regarding diabetes.

2   Material and methods

A community-based cross-sectional descriptive study was conducted over two months (February – March 2023) in Safia and Katfia, rural areas in the Gezira region of central Sudan. Data collection was conducted by Batch 40 medical students from the University of Gezira during their rural residency course. A well-structured KAP questionnaire, self-developed based on previous similar studies, was used to collect data from the adult population of Safia and Katfia, including both diabetic and non-diabetic individuals. The variables studied included demographic characteristics (age, gender, marital status, occupation) and questions about knowledge, attitude, and practice towards diabetes. The interviewer did not attempt to improve the respondents' knowledge. A total of 140 participants were included in the study. Ethical approval was obtained from the Ethical Committee of the Faculty of Medicine, University of Gezira as well as verbal consent from participants. Responses were analyzed using SPSS version 22, with descriptive statistics used to study the characteristics of the study population. Chi-square test was used and P-value of 0.05 or less was significant.

2.1   Inclusion Criteria

Participants must be part of the rural area of the study and willing to participate in the study with the ability to provide verbal consent.

2.2   Exclusion Criteria

Participants not belonging to the general population of Safia and Katfia (study area). Unwillingness to participate in the study and inability to provide verbal consent.

2.3 Ethical consideration

Ethical approval was obtained from the ethical committee of the faculty of medicine, university of the Gezira as well as verbal informed consent from each participants.

3 Results

This study included 140 participants. The majority of respondents were between 45-59 years (32.9%) as shown in table1. The least represented age group was 75 years and above (2.9%). Females were (52.9%) participated compared to males (47.1%). Most respondents were married (77.9%). Half of participants were educated up to high secondary school (50.7%). A significant portion of respondents have education below secondary level (35%) and14.3% of the respondents are illiterate. 76 individuals 54.3% have diabetic family member while 64 (45.7%) have not.

Table 1 Distribution of age among participants

Age in years	Frequency	Percent	Valid Percent	Cumulative Percent
15-29	25	17.9	17.9	17.9
30-44	39	27.9	27.9	45.7
45-59	46	32.9	32.9	78.6
60-74	26	18.6	18.6	97.1
75 or >	4	2.9	2.9	100.0
Total	140	100.0	100.0	

3.1 Regarding knowledge towards D.M

Only 45% correctly identified the normal fasting blood sugar range as 80-125 mg/Dl, 31.4% did not know the normal blood sugar levels. 72.9% believe diabetes is caused by genetic factors. 80.7% correctly identified excessive thirst and weight loss as symptoms (Table 2). 10% were unaware of diabetes symptoms. 42.1% identified diabetic foot as a complication. 21.4% do not know about diabetes complications. 53.6% correctly identified diabetes as a non-communicable disease, 45.7% believed otherwise. 85% correctly identified diabetes as a lifelong chronic condition.

Table 2 Knowledge regarding symptoms of diabetes

Symptoms	Frequency	Percent	Valid Percent	Cumulative Percent
Excessive thirst & weight loss	113	80.7	80.7	80.7
Weight gain	10	7.1	7.1	87.9
Other symptoms	3	2.1	2.1	90.0
I do not know	14	10.0	10.0	100.0
Total	140	100.0	100.0	

3.2 Attitudes towards Diabetes Treatment

72.1% believe all diabetic patients should take diabetes medication. 80.7% believe diabetes causes frequent urinary infections. 61.4% strongly agree that diabetes treatment is beneficial. 54.3% believe diabetes treatment can reduce complications. Sadly, 33 (23.5%) were unaware of any drug's adverse effects. 31 (22.2%) people have doubts about the effectiveness of diabetes medications.

3.3 Practice towards D.M

64.3% have some level of doubt about the efficacy of diabetes treatment. 71.4% strongly agree on the importance of health promotion and education from doctors. Furthermore, 24 (17.1%) agreed that diabetes patients should discontinue therapy if they have any complications. Among those with a diabetic family member, 47.1% take treatment

regularly, 39.3% follow up regularly with a doctor, and 25.7% had complications from diabetes. And ten (13.1%) did not take medication.

The overall net result of good knowledge in this study was 63.2%, good attitude 67.6% and good practice was found in only 55.5%.

3.4 Cross-tabulation Insights

3.4.1 Diabetes Knowledge and Family History

- A significant association exists between having a diabetic family member and knowledge about normal blood sugar levels (p=0.002) and symptoms of diabetes (p=0.024).

3.4.2 Beliefs on Causes and Complications

- No significant association between having a diabetic family member and beliefs about the causes (p=0.235) and complications of diabetes (p=0.133).

3.4.3 Attitudes towards Diabetes Management

- No significant association between having a diabetic family member and attitudes towards regular treatment (p=0.948) and following up with a doctor (p=0.000).

3.4.4 Perceptions on Non-Communicable Nature of Diabetes

- No significant association (p=0.644).

3.4.5 Trust and Doubts in Diabetes Treatment:

- No significant association between having a diabetic family member and trust in diabetes treatment (p=0.291).

 Logistic Regression Insights

Significant Predictors:

- Knowledge about normal blood sugar levels and symptoms of diabetes are significant predictors (p<0.05).

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4 Discussion

The results of this study which included 140 participants from a rural area (Safia and Katfia) in Gezira state in Sudan, showed that the majority were females and the majority of participants were aged 45 to 59 years. The majority of study population were educated up to high secondary school. Regarding knowledge, over half of the participants were unaware of normal blood sugar or the complications of D.M. nearly half of participants did not know the aetiology of diabetes. It showed good knowledge (6.32%), attitude (67.6%) and practice (55.5%). Good knowledge was reflected on good attitude and practice. The good knowledge may be explained by high education among study participants where the majority was educated. A similar result was obtained by the study carried in Sudan in Jabber Abulizz Hospital in 2021where they reported good knowledge, attitude and practice among the participants (54.6%, 79%; and 58% respectively) [22]. A significant association between having a diabetic family member and knowledge about normal blood sugar levels (p=0.002) and symptoms of diabetes (p=0.024), may indicate that relatives of diabetic patients are keen to know the correct facts about diabetes in order to help them in self-care and management. In Philippines: A study on KAP among type 2 diabetic patients in rural Philippines highlighted the importance of community-based diabetes self-management education programs. The findings showed a significant gap in knowledge and self-care practices, similar to the Sudanese context [13]. In Bangladesh: Research in Bangladesh indicated that newly diagnosed diabetic patients had inadequate knowledge and poor self-care practices. The emphasis on patient education and regular follow-up visit is crucial for effective self-care and proper DM management and complication prevention[20]. In Singapore: Public awareness studies in Singapore revealed that while there is a high level of awareness about diabetes, there are still misconceptions about its causes and complications. This is similar to findings in Sudan where a significant portion of the population believed in incorrect aetiologies of diabetes [9].The results of this study was unlike the results of the study that was conducted in Pakistan by Muhammad Umer Ahmed et.al and showed low knowledge regarding complications of D.M and negative attitude towards diabetes [21].

The results of this study were similar to the results of the study conducted by Ronak Karbalaeifar et.al in Tehran, Iran which showed good knowledge (67.99%), attitude (64.69%), and practice (58.22%) [23] This was also found in a study carried out by Salwa Selim Ibrahim et.al in the central region of Saudi Arabia [24]. The level of knowledge, attitude and practice in this study was not similar to another study conducted in Riyadh, Kingdom of Saudi Arabia in 2022, where it showed low level of knowledge, attitude and practice (37.6%, 47.9% and 30.9%) respectively [25]. Similar result to this study was reported in Saudi Arabia in Jazan region were participants with higher education had higher knowledge and attitude compared to other participants [26]. A study conducted in Bangladesh among both diabetic and non-diabetic showed average level in knowledge and practice among Bangladeshi population but the overall level of attitude was good which was similar to this study [27]. Many studies conducted in various developing countries, concluded that, education of p patients with proper practices and attitudes, can significantly reduce the ill effect of diabetes [28]. According to American Diabetic Association (ADA), patient education and proper clinical and self-care will help to manage and prevent the chronic consequences of D.M [26]. A study conducted in Southern Benin, showed Lack of knowledge, poor attitude and practice towards diabetes in contrast to this study [29].

From the above studies (including this study) the key Comparisons include: Knowledge Gaps: Both Sudan and other countries show considerable gaps in public knowledge about diabetes, its causes, and complications. Education levels and awareness campaigns play a pivotal role in bridging these gaps. - Attitudes: Attitudes towards diabetes management, such as the importance of medication and lifestyle changes, show consistency across different regions. However, the degree of agreement varies, reflecting cultural and educational differences. - Practices: The practices related to medication adherence and regular follow-ups are similarly lacking in Sudan and other countries. This highlights the need for improved healthcare infrastructure and patient education programs globally. Proper knowledge and awareness about diabetes, is crucial for proper management and self-care to avoid the complications of this hidden epidemic.

5 Conclusion

This study revealed that, there was generally good knowledge and attitude with average level of practice. Knowledge about diabetes, especially regarding normal blood sugar levels and symptoms, significantly varies with the presence of a diabetic family member. There is a general need for improved awareness and education on diabetes causes, complications, and the importance of consistent treatment and follow-up. Comparing the KAP study results in Sudan with similar studies in other countries reveals common challenges and unique regional issues. Addressing these through targeted education, robust healthcare systems, and international cooperation can significantly improve diabetes management.

Recommendations

- Enhanced Education Programs: Implement community-based education programs tailored to address specific knowledge gaps and cultural beliefs in Sudan.
- Regular Follow-ups: Strengthen healthcare systems to ensure regular follow-up visits and continuous patient support.
- Utilizing Media: Leverage social media, radio, and television to disseminate accurate information about diabetes management and prevention.
- Collaboration: Foster international collaboration to share successful strategies and adapt them to local contexts

Limitations

- The study had several limitations. First, the cross-sectional design does not allow for the establishment of causality. Second, self-reported data may be subject to recall bias and social desirability bias. Third, the study was conducted in a specific rural area, which may limit the generalizability of the findings to other regions.
- Despite these limitations, the study provides valuable insights into the KAP of population in a rural Sudan and highlights the need for targeted health education and intervention programs

Compliance with ethical standards

and the department of Family and Community Medicine FOMUOG and the administrators of FOMUOG, particularly the dean of the faculty Dr. Wail Nouri.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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