Original Research Article

Comparison of patients' perceptions of safety and efficacy of herbal and conventional type 2 diabetes treatments in Nairobi, Kenya.

ABSTRACT

Background: Use of herbal medicines is common among patients with type 2 diabetes in Kenya. Studies on patient-reported efficacy and safety of these medicines are lacking.
Aims: To determine and compare satisfaction with safety and efficacy of medicines among patients with type 2 diabetes on herbal and conventional glucose-lowering agents.
Study design: A descriptive cross-sectional study design was used.
Place and Duration of Study: Outpatient diabetes clinics at Kenyatta National Hospital and New Life Herbal Clinic in Nairobi, Kenya. The study was carried out between March 2019 and December 2021.
Methodology: We recruited 80 patients with type 2 diabetes on conventional glucose lowering agents at Kenyatta National Hospital and 37 patients on herbal antidiabetic therapies at New Life Herbal Clinic. A general questionnaire was used to collect data on sociodemographic and clinical characteristics of the participants. Treatment Satisfaction with Medicines Questionnaire was used to assess patient satisfaction with medicines. The Chi-square test was performed to compare the proportions of responses in the two groups. Mann -Whitney U test was used to compare the domain scores at the two study sites. Linear regression analysis was used to identify the determinants of satisfaction with side effects and efficacy of antidiabetic treatments.
Results: The median score on the side effects domain in patients on herbal medicines was 100 [70.83-100] compared to 20.83[0-66.67] among those treated at Kenyatta National Hospital (p<0.001) . Patients treated with conventional medicines had higher scores on the efficacy of medicines domain (100 [83.33-100]) compared to 75 [70.83-100] at the herbal clinic(p=0.006). Treatment at the herbal clinic was associated with significant improvement in satisfaction with side effects of medications(3.144 scores (95% CI=2.534, 3.755 , p<0.001) . Other significant determinants of satisfaction with side effects were distance from healthcare facility (0.518 scores (95% CI=0.065, 0.970), p=0.025), experiencing tingling sensations (-2.251 scores (95% CI=-3.348, -1.154, p=<0.001), infrequent HbA1c monitoring (-0.877 scores (95% CI=-1.402, -0.352), p=0.001), sweating (1.278 scores (95% CI=0.527, 2.029, p<0.001) , numbness (1.045 scores (95% CI=0.285, 1.805, p=0.007). Treatment with inhaled corticosteroids reduced satisfaction in the side effects domain by -1.609 scores (95% CI= -2.750,-0.468, p=0.006). Significant reductions in satisfaction with efficacy of medications scores was associated with presence of comorbidities (-2.559 scores (95% CI=-3.382- -1.736), p<0.001), treatment with *Prunus africana* (-1.433 scores ,95% CI=-2.246- -0.620, p<0.001), concurrent use of herbal and conventional glucose-lowering agents (-0.418 scores, (95% CI=-0.783- -0.052), p=0.025) and use of *Apium graveolens* (-0.878 scores, (95% CI=-1.589- -0.168)), p=0.015).
Conclusion: The study findings highlight significant differences in patients' perception of safety and efficacy of herbal and conventional type 2 diabetes treatments. Treatment at the herbal clinic,

accessibility to healthcare and patient symptoms were significant determinants of patient satisfaction with side effects of medications. Presence of comorbidities and treatment with herbal drugs led to a decline in patients' perception of efficacy of their antidiabetic treatments.

Keywords: Conventional, herbal, type 2 diabetes, satisfaction , side effects, efficacy, medications

1. INTRODUCTION

Diabetes is a growing health concern worldwide. The international Diabetes Federation (IDF) estimates that the disease affects approximately 537 million adults (10.5%) globally (Sun et al., 2022). The worldwide prevalence is projected to rise to 12.2% by 2045 with the greatest increases occurring in the low- and middle-income countries (Sun et al., 2022). In Kenya, diabetes affects 3% (821,000) adults. Factors fueling the increasing incidence of diabetes in Kenya include obesity, unhealthy diets, physical inactivity, tobacco, and alcohol use (Manyara et al., 2024).

Type 2 diabetes accounts for 90-95% of diabetes cases (Ong et al., 2023). Chronic hyperglycemia in diabetes causes vascular damage leading to macrovascular and microvascular complications (Paul et al., 2020) . Optimal glycemic control to achieve and maintain a glycated hemoglobin (HbA1c) level of 7% and below has been associated with reduced onset and progression of diabetes-related complications. This is achieved through a combination of lifestyle modifications and pharmacotherapy (Samson et al., 2023). However, despite the availability of evidence-based treatment for type 2 diabetes, majority of patients do not achieve adequate glycemic control (Otieno et al., 2021).

The complexity of diabetes treatments, costs and side effects of medications often lead to reduced quality of life and satisfaction with treatment. Consequently, patients turn to complementary and alternative medicines (CAM) for management of their blood sugars. The global prevalence of complementary and alternative medicine (CAM) use among individuals with type 2 diabetes is estimated to be 51% (Alzahrani et al., 2021). Herbal medicines are highly popular among diabetic patients. In Saudi Arabia, 68% of patients with type 2 diabetes reported frequent use of herbal remedies. Approximately 71.4% of these patients self-medicated with herbs without consulting a healthcare provider (Alqathama et al., 2020). In Sri Lanka, 75% of patients with type 2 diabetes preferred self-prescribed herbal treatments for management of their blood sugars over conventional oral glucose-lowering agents (Edussuriya et al., 2021),
A study in Ethiopia found that 58.5% of type 2 diabetics used herbal medicines (Kifle et al., 2021). Findings from local studies indicate that approximately 12.4% (Mwangi & Gitonga, 2014) and 40% (Elsa et al., 2017) of diabetic patients in Kenya use herbal glucose-lowering agents. This high prevalence aligns with similar trends observed in other African countries (Niba et al., 2023).

The use of herbal medicines is driven by factors such as the belief that herbal medicines are safe, are more effective than conventional medicines, and can cure the disease. Herbal medicines are also easier to access since they do not require a prescription and are also more culturally acceptable (Elsa et al., 2017). Although several herbs have been reported to have glucose-lowering effects and are safe to use in type 2 diabetes (Mehrzadi et al., 2021; Yu et al., 2018) there are no local guidelines for their use. Despite the widespread use of herbal medicines by type 2 DM patients in Kenya, studies on patients' perception on their safety and efficacy are lacking. This study estimated and compared satisfaction with undesirable side effects and efficacy of medications among patients treated for type 2 DM with herbal and conventional drugs in Nairobi City County in Kenya. Data from this study will enable healthcare providers to develop evidence-based interventions to improve type 2 diabetes outcomes.

2. MATERIAL AND METHODS

The procedure for collection of sociodemographic and clinical data for this study has been described previously (Karara et al., 2022).

Study design, site and population

A descriptive cross-sectional study was conducted between March 2019 and December 2021. This comparative study was carried out in the outpatient diabetes clinics at New Life Herbal Clinic (NLHC) and Kenyatta National Hospital (KNH) which is the largest teaching and referral hospital in Eastern Africa. The study population were adult outpatients diagnosed with type 2 diabetes who had been on treatment at the study sites for at least 6 months.

Inclusion and exclusion criteria

Patients were eligible for recruitment into the study if they were above 18 years of age, had a documented diagnosis of type 2 diabetes and had been on follow- up for at the study sites for least 6 months and provided informed consent. Pregnant women and patients with incomplete records were excluded from the study.

Sample size

The Flight & Julious (2016) equation was used to calculate the sample size (Flight & Julious, 2016). Due to low numbers at the herbal clinic, an allocation ratio of 2 patients at KNH for every 1 patient at the herbal clinic was used. The level of significance was set at 5% and the power of the study was 80%. Using an effect size was 0.7, a standard deviation of 1 and 10% non-response rate, the calculated sample size was 73 patients on conventional therapies and 37 patients on herbal treatment for type 2 diabetes.

2.4 Sampling and recruitment of participants

Patients with type 2 diabetes at Kenyatta National Hospital and New Life Herbal Clinic were recruited consecutively during their follow-up appointments. Patient files were used to identify patients who met the inclusion criteria for the study. Eligible patients who were willing to participate in the study were asked to sign the informed consent form.

Data collection on satisfaction with medications

The treatment satisfaction with medicines questionnaire (SATMED-Q) was used to collect data on satisfaction with medications. The questionnaire is composed of 17 items investigating 6 dimensions: undesirable side effects (3 questions), treatment effectiveness (3 questions), and convenience of use (3 questions), impact on daily activities (3 questions), medical care (2 questions) and global satisfaction (3 questions) (Ruiz, et al., 2008). Each item was scored on a 5-point Likert scale of 0-4 (0-Not at all, 1-A little bit, 2-Somewhat, 3-Quite a bit, 4-Very much). The tool has excellent internal consistency with Cronbach's alpha coefficients of approximately 0.9.

Statistical analysis

As per the SATMED-Q's author's instructions, the scores on the undesirable side effects were reversed . The direct scores of the items in the questionnaire were then summed up to yield a total composite score ranging between 0 and 68. The score was converted to a percentage using the following formula provided by the author:

$Y' = [(Yobs-Ymin) / (Ymax-Ymin)] * 100 = Yobs * 1.471.$

Where:

Ymax = 68 (maximum total score);

Ymin = 0 (minimum total score);

Yobs = total score obtained by the patient;

Y' = transformed score.

Chi-square test was used to test for differences in responses to the items in each domain. Total domain satisfaction scores for the two groups were compared using the Mann-Whitney U test. Linear regression analysis was performed to identify the determinants of satisfaction with side effects and efficacy of medications.

1. RESULTS AND DISCUSSION

Characteristics of study participants

The sociodemographic and clinical characteristics have been described previously (KARARA ET AL., 2022).This study recruited 80 patients with type 2 diabetes at KNH and 37 patients on herbal glucose-lowering therapies at NLHC (Table 1). More females (52, 65%) participated in the study at KNH compared to the herbal clinic (13, 35.1%). Patients at the herbal clinic were younger (55.95+13.99 years) compared to those at KNH (62.31$\pm$13.91 years). Patients at KNH had a longer duration of type 2 diabetes (10[4-18]) than those at the herbal clinic (3[1-7]. Concurrent treatment with herbal and conventional glucose-lowering agents was reported in 17 (21.3%) of the participants at KNH.

Patterns of responses on undesirable side effects domain

The satisfaction with undesirable side effects domain comprised three items evaluating the interference of side effects of medicines on physical, leisure and daily activities. A comparison of patients' rating of their perceptions on the individual items in this domain at the two study sites are presented in Table 2. A Significantly higher number of participants on conventional antidiabetic treatments at Kenyatta National Hospital indicated that their medicines interfered to a great extent (a score of 4) with their physical ($p<0.001$), leisure ($p<0.001$) and daily ($p<0.001$) activities compared to those at the herbal clinic.

***Table 1*: Characteristics of participants at KNH and NLHC**

Characteristic	Category	Conventional therapies (n=80) n (%)	Herbal therapies (n=37) n(%)
Gender	Female	52 (65)	13 (35.1)
Age (years) (mean±SD)		62.31±13.91	55.95+13.99
Married	Yes	61 (76.3)	31 (83.8)
Highest education level	No formal education Primary Secondary Tertiary(college/university)	16 (20) 28 (35) 30 (37.5) 6 (7.5)	1 (2.7) 17 45.9) 13(35.1) 6 (16.2)
Body mass index (BMI)	<18.5 (underweight) 18.6-24.9 (normal) >25(overweight/obese)	1 (1.3) 24 (30.0) 55 (68.7)	1 (2.7) 11 (29.7) 25 (67.6)
Alcohol history	Yes	25 (31.3)	28 (75.7)
Smoking history	Yes	11 (13.8)	21 (56.8)
Years with DM (median (IQR))		10(4-18)	3 (1-7)
Own glucometer	Yes	52 (65)	2 (5.4)
Previous (last 6 months) HbA1c	Yes	36 (45.0)	0 (0.0)
Complications	Microvascular Macrovascular	55 (68.8) 27 (33.8)	23 (62.2) 2 (5.4)
No. of comorbidities	None 1 >1	0 (0.0) 15 (18.8) 65 (82.1)	3 (8.1) 10 (27) 24 (64.9)

Table 2: Pattern of responses to the items in satisfaction with undesirable side effects domain

Domain item	Likert scale*	KNH (n=80) n(%)	NLHC (n=37) n(%)	P-value
Interference with physical activities	0	6(7.5)	21(56.8)	**<0.001**
	1	20(25)	8(21.6)	
	2	12(15)	6(16.2)	
	3	3(3.8)	2(5.4)	
	4	39(48.8)	0(0)	
Interference with leisure activities	0	8(10)	24(64.9)	**<0.001**
	1	7(8.8)	5(13.5)	
	2	17(21.2)	6(16.2)	
	3	10(12.5)	2(5.4)	
	4	38(47.5)	0(0)	
Interference with daily activities	0	5(6.2)	25(67.6)	**<0.001**
	1	15(18.8)	4(10.8)	
	2	11(13.8)	6(16.2)	
	3	4(5)	2(5.4)	
	4	45(56.2)	0(0)	

:0-Not at all, 1-A little bit, 2-Somewhat, 3-Quite a bit, 4-Very much

Representative graph showing the patterns of responses for this domain are shown in Figure 1.

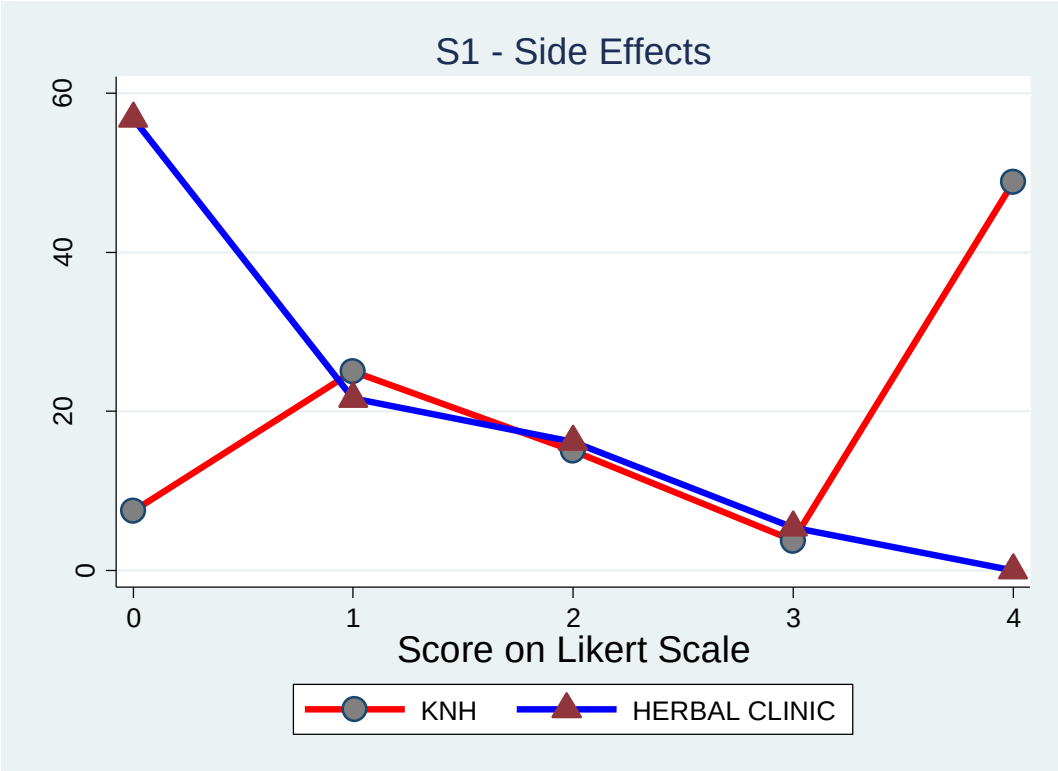

Figure 1: Pattern of responses to Item S1 on undesirable side effects domain

Participants' responses on efficacy of medicines domain

The satisfaction with the efficacy of medicines domain assessed the patients perception regarding the effects of the medicines on their symptoms, satisfaction with onset of effect and the perceived improvement since starting the treatment. As shown in Table 2, a significantly higher number of patients on conventional treatment had higher ratings (a score of 4) for all the items in this domain compared to those on herbal treatments.

Table 3: Proportion of responses on items in efficacy of medicines domain

Domain item	Likert scale*	KNH (n=80) n(%)	NLHC (n=37) (%)	P-value
Effect on symptoms	1	1(1.2)	2(5.4)	**0.003**
	2	0(0.0)	3(8.1)	
	3	10(12.5)	15(40.5)	
	4	69(86.2)	17(45.9)	
Onset of effect	1	1(1.2)	2(5.4)	**<0.001**
	2	0(0.0)	6(16.2)	
	3	7(8.8)	14(37.8)	
	4	72(90.0)	15(40.5)	
Perceived improvement	1	0(0.0)	2(5.4)	**<0.001**
	2	1(1.2)	5(13.5)	

	3	4(5.0)	13(35.1)	
	4	75(93.8)	17(45.9)	

: 1-A little bit, 2-Somewhat, 3-Quite a bit, 4-Very much

Comparison of Total Domain Scores Across the Study Sites

Mann-Whitney U test was used to compare satisfaction scores of patients treated at KNH and NLHC (Table 4). Patients at the herbal clinic had significantly higher satisfaction scores in the side effects domain compared to those on conventional glucose-lowering agents (p<0.001). Conversely, the patients' rating of the efficacy of antidiabetic medicines was significantly higher at Kenyatta National Hospital than at the herbal clinic (p=0.006).

Table 4: Comparison of total domain scores across the study sites

	Study site		
SATMED-Q Domain	**KNH (N=80) Median (IQR)**	**NLHC (n=37) Median (IQR)**	**P-value**
Undesirable side effects	20.83 (0-66.67)	100 (70.83-100)	**<0.001**
Efficacy	100 (83.33-100)	75 (70.83-100)	**0.006**

DETERMINANTS OF SATISFACTION WITH UNDESIRABLE SIDE EFFECTS OF MEDICINES

Treatment with herbal drugs was a significant determinant of patients' satisfaction with the undesirable side effects of their medicines in both bivariable and multivariable regression analysis (Table 4). Patients treated at the herbal clinic had a 3.144 increase in satisfaction scores related to side effects of medications (95% CI=2.534, 3.755 , p<0.001)). Participants residing within 30-40km radius of the healthcare facility experienced a 0.518 improvement in their satisfaction scores in this domain (95% CI=0.065, 0.970, p=0.025). Patients who had not undergone an HbA1c test within the prior six months to the study demonstrated a 0.877 reduction in satisfaction scores related to medication side effects (95% CI: -1.402 to -0.352, p=0.001). Interestingly, the presence of sweating and numbness improved satisfaction scores for this domain by 1.278 (95% CI=0.527, 2.029, p<0.001) and 1.045 scores (95% CI= 0.285, 1.805, p=0.007) respectively. However, patients with tingling sensations had a 2.251 decrease in the satisfaction scores related to medication side effects (95% CI=-3.348, -1.154, p<0.001). Treatment with inhaled corticosteroids led to a significant decline in satisfaction scores in this domain (-1.609 scores, 95% CI=-2.750, -0.468, p=0.006).

Table 5: Determinants of satisfaction with undesirable side effects of medicines

Characteristic	Crude β	95% CI	p-value	Adj.β	95% CI	p-value
Study site (NLHC)	2.084	1.542, 2.625	<0.001	3.144	2.534, 3.755	<0.001
Residence-urban formal	-1.219	-1.784, -0.654	<0.001	-	-	-
Years with diabetes	-0.052	-0.078, -0.026	<0.001	-	-	-
Manual Work	1.326	0.762, 1.889	<0.001	-	-	-
No history of alcohol intake	-1.457	-2.285, -0.630	<0.001	-	-	-
Distance to facility : 40-50km	-2.125	-3.451, -0.799	0.002	-	-	-
Distance to facility: 30 -40 km	0.38	-0.135, 0.895	0.148	0.518	0.065, 0.970	0.025
No (Prior 6months) HbA1c test	0.143	-0.381, 0.666	0.593	-0.877	-1.402, -0.352	0.001
Tingling	-0.098	-1.115, 0.919	0.851	-2.251	-3.348, -1.154	<0.001
Sweating	0.268	-0.561, 1.098	0.526	1.278	0.527, 2.029	<0.001
Numbness	0.338	-0.386, 1.062	0.36	1.045	0.285, 1.805	0.007
Inhaled corticosteroids	-0.971	-2.212, 0.270	0.125	-1.609	-2.750, -0.468	0.006

Determinants of satisfaction with efficacy of medicines

Comorbidities and treatment-related factors were the significant factors influencing satisfaction with the efficacy of medicines (Table 6). Patients with comorbidities had a 2.559 decrease in satisfaction with the efficacy of their medications domain scores (95% CI=-3.382, -1.736, p<0.001). Other factors adversely affecting satisfaction in this domain were treatment with *Prunus africana* (-1.433 units,95% CI=-2.246, -0.620, p<0.001), concurrent treatment with both herbal and conventional glucose-lowering agents (-0.418 units, 95% CI=-0.783, -0.052, p=0.025) and treatment with *Apium graveolens* (celery) (-0.878 units, 95% CI=-1.589, -0.168, p=0.015).

Table 6: Determinants of satisfaction with efficacy of medicines

Characteristic	Crude β-coeff.	95% CI	p-value	Adj.β-coeff.	95% CI	p-value
Presence of co-morbidities	-2.133	-3.147, -1.118	<0.001	-2.559	-3.382, -1.736	**<0.001**
Prunus Africana	-2.421	-3.278, -1.563	<0.001	-1.433	-2.246, -0.620	**<0.001**
On herbal and conventional medicines	-0.424	-0.814, -0.034	0.033	-0.418	-0.783, -0.052	**0.025**
Apium graveolens	-0.779	-1.589, 0.031	0.060	-0.878	-1.589, -0.168	**0.015**

DISCUSSION

Treatment at the herbal clinic was associated with significant improvement in satisfaction scores in the undesirable side effects domain. Patients' belief in the safety of herbal medicines influences their use and satisfaction with treatment. Majority of participants in a study conducted in Slovenia perceived herbal remedies as having fewer adverse effects and safer to use compared to conventional medicines (Krsnik & Erjavec, 2024) . In a hospital-based study conducted in Kuwait, most patients with type 2 diabetes who utilized herbal therapies reported satisfaction with their treatment (Bayoumy et al., 2021). However, despite the perceived safety and satisfaction among users, adverse effects and drug interactions have been reported with herbal medicines (Başaran et al., 2022; Choi et al., 2024) This highlights the need for patient education regarding the safety of herbal medicines.

In this study, shorter distance to the health facility improved patient satisfaction. Distance to health facilities is a measure of access to health services that impacts satisfaction in patients with type 2 diabetes. In Saudi Arabia, proximity to a diabetes clinic and good transport facilities were associated with patient satisfaction with diabetes care services (Itumalla et al., 2021). Similar to our findings, distance to the clinic was found to be a key predictor of satisfaction among patients with chronic diseases in South Africa (Kagura et al., 2023).

Lack of HbA1c monitoring was associated with lower satisfaction scores in the undesirable side effects domain. Leading clinical guidelines recommend HbA1c monitoring at intervals of three to six months for patients with type 2 diabetes (ADA, 2022). However, access and adherence to these guidelines remains suboptimal, particularly in sub-Saharan Africa. (Ciccacci et al., 2024). The frequency of blood glucose monitoring has been correlated with better medication adherence, glycemic control (Rochmah et al., 2024) and higher patient satisfaction (Al Hayek et al., 2021) .Consistent adherence to HbA1c monitoring has also been linked to improved glycemic control and a reduced risk of diabetes-related complications which may contribute to improvement in treatment satisfaction (Imai et al., 2021).A decline in scores on satisfaction with the side effects was associated with the use of inhaled corticosteroids. Inhaled corticosteroids may cause localized effects such as dysphonia and oral candidiasis (Shang et al., 2022). Patients perceive these effects to be burdensome which may contribute decline in treatment satisfaction (Persaud et al., 2023).

The presence of co-morbidities decreased the likelihood of satisfaction with efficacy of their medicines. This finding is supported by previous studies in which comorbidities have been identified as a key factor contributing to low satisfaction in patients with chronic diseases (Sendekie et al., 2023, Gill et al., 2022).

Presence of certain symptoms reflective of diabetes complications was a significant determinant of satisfaction in the side effects domain. Numbness and tingling sensations are symptoms of peripheral neuropathy while sweating may be indicative of hypoglycemia. Presence of diabetes complications compromises satisfaction in patients with type 2 diabetes (Sendekie et al., 2023). However, in this study, while tingling decreased patient satisfaction, sweating and numbness led to improvement in the side effects domain scores. Due to these varied observations, further studies may be required to explain why these symptoms had opposing effects on satisfaction with medications. The association between treatment with *Apium graveolens* and *Prunus africana* and lower satisfaction with medication efficacy is not well-documented in scientific literature. Consequently, further studies are required to examine the factors contributing to this observation.

4. CONCLUSION

Treatment at the herbal clinic, accessibility to healthcare and patient symptoms were significant determinants of patient satisfaction with side effects of medications. Presence of comorbidities and treatment with herbal drugs led to a decline in patients' perception of efficacy of their antidiabetic treatments.

CONSENT

All authors declare that written informed consent was obtained from the patients who participated in this study. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

ETHICAL APPROVAL

All authors hereby declare that this study was approved by the KNH/UoN Ethics and Research Committee (Approval No. KNH-ERC R/91) and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki." The researcher provided comprehensive information on the study to the patients after which they were asked for voluntary consent to participate in the study.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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APPENDICES

APPENDIX 2: TREATMENT SATISFACTION WITH MEDICINES QUESTIONNAIRE®

(SATMED-Q® Questionnaire)

We want to ask you about **your satisfaction with the medicine** you are taking. You may be taking medicines to treat more than one medical condition. If so, please answer the questionnaire for **ONLY ONE** of the conditions and the one of the medicine you have taken for the condition.

Medical condition for which you are taking the medicine .....

For each question, **put a cross through** the number that best reflects your opinion. There are no right or wrong answers. If you are not sure of any of the answers, mark the one you consider most appropriate.

- Have you experienced any **side effects** caused by the medicine?

⓪ No, none ① Yes, at least one.

- This section is about the **undesirable side effects** of the medicine.

	Not at all	A little bit	Some-what	Quite bit	a Very much
1. The side effects of the medicine interfere with my physical activity (e.g. lifting, walking, jogging, etc.).	⓪	①	②	③	④
2. The side effects of the medicine interfere with my leisure and free time activities (e.g. gardening, reading, dancing, visiting friends, etc.)	⓪	①	②	③	④
3. The side effects of the medicine interfere with my daily activities (e.g. shopping, working, housekeeping, etc.).	⓪	①	②	③	④

- This section is about the **efficacy of the medicine**, i.e., its effectiveness in treating your condition and reducing its symptoms.

	Not at all	A little bit	Some-what	Quite bit	a Very much
4. The medicine I am taking reduces my symptoms.	⓪	①	②	③	④
5. I am satisfied with the time it takes for the medicine to start to have an effect.	⓪	①	②	③	④

6. I feel better now than I did before starting the treatment.	⓪	①	②	③	④

- This section is about the **convenience and ease of use** of the medicine.

	Not at all	A little bit	Some-what	Quite a bit	Very much
7. I find my medicine convenient to take.	⓪	①	②	③	④
8. I find it easy to use/take the medicine in its present form (taste, size, etc).	⓪	①	②	③	④
9. The timetable for taking the medicine suits me.	⓪	①	②	③	④

- This section is about the **impact of the medicine** on your everyday life.

	Not at all	A little bit	Some-what	Quite a bit	Very much
10. Thanks to the medicine I am taking I can undertake my leisure and free time activities.	⓪	①	②	③	④
11. Thanks to my medicine I can more easily look after my personal hygiene (e.g. shaving, brushing my hair, bathing, etc.)	⓪	①	②	③	④
12. Thanks to my medicine I can perform my everyday chores better.	⓪	①	②	③	④

- This section is about the **medical follow-up/review** of your condition

	Not at all	A little bit	Some-what	Quite a bit	Very much
13. My doctor has informed me in detail about my medical condition.	⓪	①	②	③	④
14. My doctor has informed me about the right way to treat my medical condition.	⓪	①	②	③	④

- Finally, some questions on your **overall opinion** of the medicine and your health

	Not at all	A little bit	Some-what	Quite a bit	Very much
15. I intend to continue using this treatment.	⓪	①	②	③	④

16. I feel happy with my treatment.	⓪	①	②	③	④
17. In general, I feel satisfied with the treatment.	⓪	①	②	③	④

Interpretation and Analysis of missing data	A missing score should be substituted by the worst possible score (items 1 to 3: missing=4; items 4 to 17: missing=0). If more than 1 answer is missing in a given dimension the questionnaire should be discarded.
Interpretation of multiple answers for one item	What to do when more than one answer is ticked by the patient ? - If two contiguous response categories are selected for one item, the worst score should be selected as valid. - When two non-contiguous response categories are selected, the response should be considered as missing.

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