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# Utilization of Herbal Medicines among Diabetic Patients Attending Kenyatta National Hospital Outpatient Clinic

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***Authors' contributions***

*This work was carried out in collaboration between all authors. Author OME designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors KK and DN managed the analyses of the study. Author EM managed the literature searches. All authors read and approved the final manuscript.*

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## ABSTRACT

**Background:** World Health Organization has estimated that 70-90 % of Africa's population still relies on herbal remedies in order to meet their healthcare needs. Although the role of herbal medicines in the management of diabetes is an emerging health issue, use of herb remedies is common among diabetics.
**Objectives:** To evaluate knowledge, perception and describe the pattern of utilization of herbal medicines among diabetic outpatients at Kenyatta National Hospital.
**Methodology:** The study was a tertiary hospital-based cross sectional study. Simple random sampling technique was used to select 251 adult diabetic outpatients who were interviewed. Data was captured into Microsoft Excel computer software and then exported to SPSS version 17.0 for analysis. Descriptive data was analyzed quantitatively and presented in form of charts and tables as appropriate. Statistical significance was determined using Pearson Chi Square at $p<0.05$.

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Where numbers of participants were too small, Fishers exact results were used.
**Results:** The prevalence of use of herbal remedies for managing diabetes mellitus was 7.2%. However, the total prevalence of use of herbs among the diabetic outpatients was 39.5% implying that 32.3% of the study participants used herbs for other medical conditions. The commonest herbs used were ginger and *Aloe vera* used by 50% of the herbal users. Almost half of the herb users did not regard it important to inform the doctor about their use of herbs. The reasons given for use of herbal medicines were varied; the commonest being that herbs could easily be accessed 13 (13.1%) of the herbal users.
There was no statistically significant relationship between socio-demographic characteristics and use of herbs (P>0.05).
**Conclusion:** About 40% of diabetic outpatients are in some form of herbal remedy. In addition, 1 out of 5 of diabetic herbal users use them for managing diabetes; commonest herbs being *Aloe vera* and ginger. Therefore, healthcare workers and researchers should find ways of harmonizing the utilization of herbal and conventional medicines amongst diabetic patients.

*Keywords: Diabetes mellitus; herbal medicines; conventional medicines.*

## 1. INTRODUCTION

Diabetes mellitus describes a metabolic disorder of multiple aetiology characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both [1].

Diabetes mellitus is one major health challenge worldwide which was estimated to affect about 371 million people in 2012 [2]. There are projections that indicate that the number of people affected may exceed 400 million by 2025 [2]. Diabetes mellitus has been classified to be the 3$^{rd}$ and 10$^{th}$ leading cause of mortality worldwide among the females and males respectively and in 2012, almost 5 million deaths were due to diabetes [2].

In Africa, about 14 million individuals were reported to have Diabetes mellitus and this figure may increase to 28 million people by 2030 [2].

According to a Diabetes study in the United Kingdom, Diabetes mellitus has significant implications on the healthcare system since 50% of those with Type 2 diabetes mellitus already have cardiovascular system complications at the time of diagnosis leading to a rise in morbidity and mortality among diabetic patients [3]. In Africa, the rise in diabetic complications has gone hand in hand with the growing disease prevalence [4]. Similarly, in Kenya, Diabetes mellitus a major health concern today [5].

Patients with Diabetes mellitus are frequently encountered in clinical practice and the number of diabetics being reported is on the increase hence indicating that Diabetes mellitus is time bound [6]. The chronic and debilitating nature of this condition requires continuous medical care and patient self-management in order to prevent the short-term complications and decrease the risk of developing long-term complications [7].

The use of traditional herbal medicine is commonly practiced by patients with chronic diseases such as diabetes mellitus mainly to deal with the complications [8]. Herbal medicine has been used worldwide for the treatment of diabetes despite the fact that some of the herbs being used have not been evaluated for their efficacy [9]. Recently, there have been concerns on the rise in the number of patients using traditional herbal medicine to deal with the diabetic associated complications. [10]. It has also been reported that there may be some side effects and interactions with conventional diabetes medicine; hence utmost care needs to be taken by these patients [10].

Herbal medicines are among complementary and alternative medicine therapies widely used among diabetic populations. The others include nutritional supplements, nutritional advice, spiritual healing, and relaxation techniques [11].

In the international market, herbal medicines have been reported to be widely used and highly lucrative, among traditional methods used in management of various diseases [10]. Also, the sale of herbal medicine is also a source of income in many communities worldwide [10].

According to IDF reports, management of Diabetes mellitus had serious implications in the annual revenues worldwide, for instance, in the

United States US$ 471 billion was spent in 2012. [2].

Clinical pharmacists are responsible for monitoring the patients' drug therapy thus offering pharmaceutical care to the patient. They develop and promote the rational, appropriate as well as efficient use of medicines [12]. This clearly demonstrates the importance of assessing the major problems associated with management of this condition.

The healthcare professionals also need to be more informed about the use of herbal remedies alongside conventional medicine and hence educate their patients on the importance of disclosure of use of herbs [13]. This is due to risk of development of complications and potential side effects [8].

This study mainly focused on the use of herbal medicines in Diabetes mellitus management in order to establish a baseline by establishing prevalence of herbal medicine use among diabetic patients in Kenyatta National Hospital, Kenya.

## 2. METHODOLOGY

### 2.1 Study Design

The study was a tertiary hospital-based cross sectional study. Data was collected from eligible patients using a questionnaire.

### 2.2 Study Site

The study was conducted at Kenyatta National Hospital, which is currently the largest national referral, teaching and research hospital in East and Central Africa. The hospital is located within Upper-hill area, in Nairobi, Kenya. Data from the medical records department in KNH indicated that there are approximately 50 patients who attend the diabetic outpatient clinic weekly.

### 2.3 Study Population

The study targeted adult patients, both male and female, aged 18 years old and above diagnosed as having diabetes mellitus, either Type 1 or Type 2, and who are attending Diabetic outpatient clinic at KNH.

### 2.4 Inclusion Criteria

The patients that were included in the study were adult patients aged 18 years and above, those diagnosed as having either Type I Diabetes Mellitus or Type 2 Diabetes Mellitus and those who were able to give informed consent to participate.

### 2.5 Exclusion Criteria

Patients excluded from this study were those below 18 years of age, those not diagnosed as having Diabetes mellitus, those who did not give informed consent to participate, the vulnerable population such as pregnant women, those with intellectual disability or active psychiatric disease that would have prevented them from giving informed consent.

### 2.6 Sample Size Determination

The sample size was calculated using the Fischer's formula. The desired sample size was a minimum of 246 patients.

### 2.7 Sampling Procedure

The recruitment strategy for the participants initially involved screening of patient files so as to determine those that fitted into the inclusion criteria. The outpatient numbers of the eligible files were then noted down. The participants to be enrolled into the study were randomly selected using simple random sampling method. Those who were selected were taken through the consent explanation form and only those who agreed to participate in the study were requested to sign the consent form and thereafter invited for a face to face interview with the principal investigator assisted by two trained research assistants.

### 2.8 Data Collection Procedure

The principal investigator and trained research assistants conducted face to face interview with the patients as they waited for the clinician, the questionnaire (Appendix 1) was administered. Before each consecutive patient was enrolled into the study, each participant's outpatient number was counter-checked so as to avoid replication of the outpatient numbers and hence carrying out re-interviews.

Each study participant was assigned a specific study serial number which was a unique identifier to avoid replication and confusion in data collection. Every question in the questionnaire was read and interpreted in a comprehensible

manner to each participant. The responses to the questions were written in the questionnaire in the way they were given by the patients.

### 2.9 Variables

**Independent variables** were patient socio demographics such as age, gender, highest education level, employment status and marital status.

**Dependent variable** was use of herbal medicine.

### 2.10 Quality Assurance

Data collection forms were pre-tested before use. Modifications were done whenever inconsistencies or inadequacies were noted. After completion of data collection, data was checked for completeness and omissions were corrected at source after which the data was completely entered into Microsoft Excel version software. Data cleaning was done before analysis. Training of the two research assistants prior to the study enhanced the quality of data collected.

### 2.11 Approval to Carry out Study

Permission to carry out the research was sought from the KNH/U.O.N Ethics and Research Committee before the research was carried out. Approval was granted as per letter of reference Number KNH-ERC/A/120 dated 22nd May, 2013.

### 2.12 Confidentiality

Interviews with the participants was carried out for each patient at a time and in a separate room that ensured privacy such that the principal investigator and the assistants were the only ones able to access information given by the patients. Confidentiality of patient identification details was observed, omitting patient name, study numbers were assigned to each patient.

### 2.13 Study Benefits

The study participants who took part in the study benefitted in that they were evaluated during the interview and any problems that they had regarding their medications were addressed immediately or concerning their disease condition were communicated to the attending physician. The findings from the study were used to make recommendations aimed at improving quality of care in management of diabetes mellitus in KNH.

### 2.14 Data Analysis

Data that was collected was coded and entered in a pre-formed Microsoft Excel data sheet then exported to SPSS version 17.0 which has range and consistency checks embedded in the software, for analysis. Descriptive data was analyzed quantitatively using descriptive statistics and was presented in form of numbers, as percentages, ranges and in form of pie charts and tables as appropriate. Chi-Square was performed on the discrete variables to test for associations using the level of significance of 0.05 to show significant associations between different variables and use of herbal remedies. Where numbers were too small Fishers exact results were used.

## 3. RESULTS

### 3.1 Demographic Characteristics of the Study Population

143 (56.5%) were females, giving a female to male ratio of 1:0.8. The mean age was 51.8 years (±SD 14.35) whereas the median age was 53 years (IQR 18-90). Majority of the participants, 71 (28.5 %) were in the 51-60 age group (Table 1).

### 3.2 Clinical Characteristics of the Study Population

Type 2 Diabetes mellitus patients were slightly more than type 1 Diabetes mellitus. Eighty six (34.3%) of the study participants had had diabetes for more than 10 years majority of whom were type 1 patients 53 (43.4%). Both groups were satisfied with conventional treatment (Table 2).

### 3.3 Characteristics of Patients Who Used Herbal Remedies

A significant association was found between regular attendance of clinic and herb use. (p=0.003). There was no relationship found between use of herbal medicines and other factors such as type of diabetes mellitus, duration of diabetes, treatment used for diabetes and level of satisfaction with healthcare provision.

### 3.4 Utilization of Herbal Medicines by the Study Participants

Eighteen (7.2%) of the study participants were currently using herbal remedies for managing diabetes. Ginger and *Aloe vera* were the most commonly used herbal medication for diabetes. Eighty one (32.3%) participants reported to use herbal medicine for other medical conditions. Hence, the prevalence of herb use in the study population was 39.5%. (Table 4).

### 3.5 Relationship between the use of Herbal Medicines and Socio-Demographic Characteristics

There was no statistically significant difference in the relationship between the use of herbal medicines and the socio-demographic factors such as age, gender, marital status, employment status and highest level of education (Table 5).

### 3.6 Factors Influencing the Use of Herbal Medicines

The factors identified as influencing the users to use the herbs were mainly ease of accessibility of the herbal remedies 13 (13.1%) and faster relief of symptoms by the herbs 6 (6%) (Fig. 1).

#### 3.6.1 Reasons why herbal users stopped using herbal remedy at one point

The reasons given by the study participants as to why they stopped using the herbal medicines are as stated in Fig. 2.

#### 3.6.2 Perception of study participants towards use of herbal medicine

Forty three participants reported that they were using a type of herbal medicine for a reason, and all of them affirmed that their doctor was not aware they were using herbal medicines. A significant number of the users 10 (77.8%) were satisfied with use of herbs in diabetes. Almost half of the participants affirmed that they would use herbs given positive benefits about them in future.

## 4. DISCUSSION

Our study revealed that there was female preponderance. Moreover, there were more participants diagnosed with type 2 diabetes mellitus than type 1.

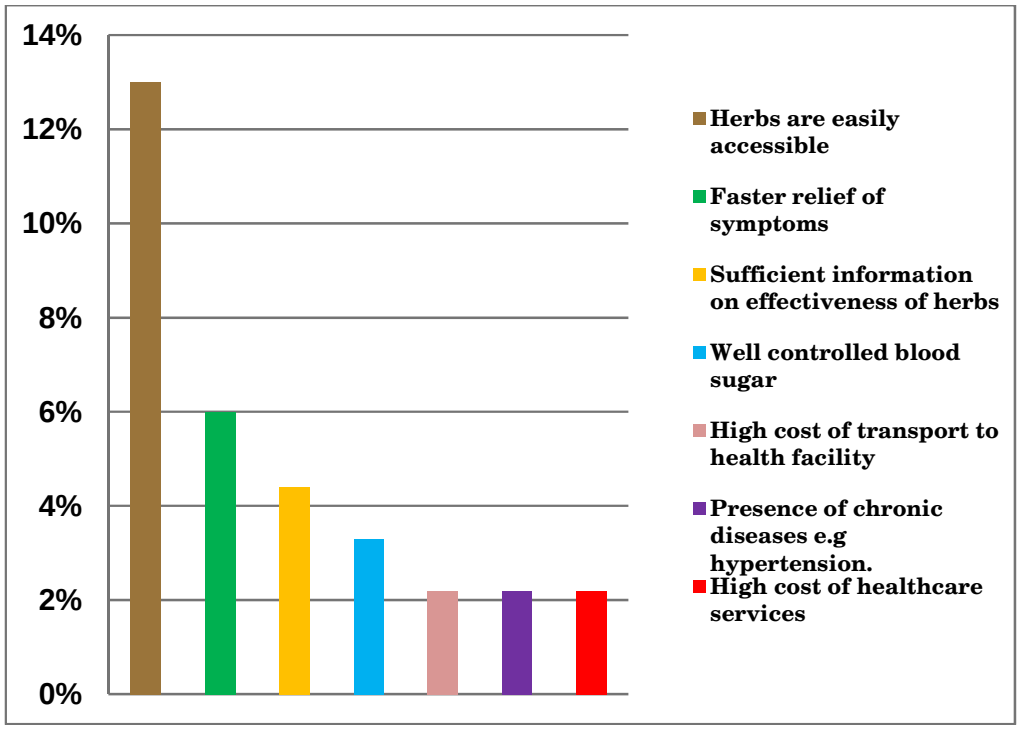


**Fig. 1. Reasons for taking herbal medicines**

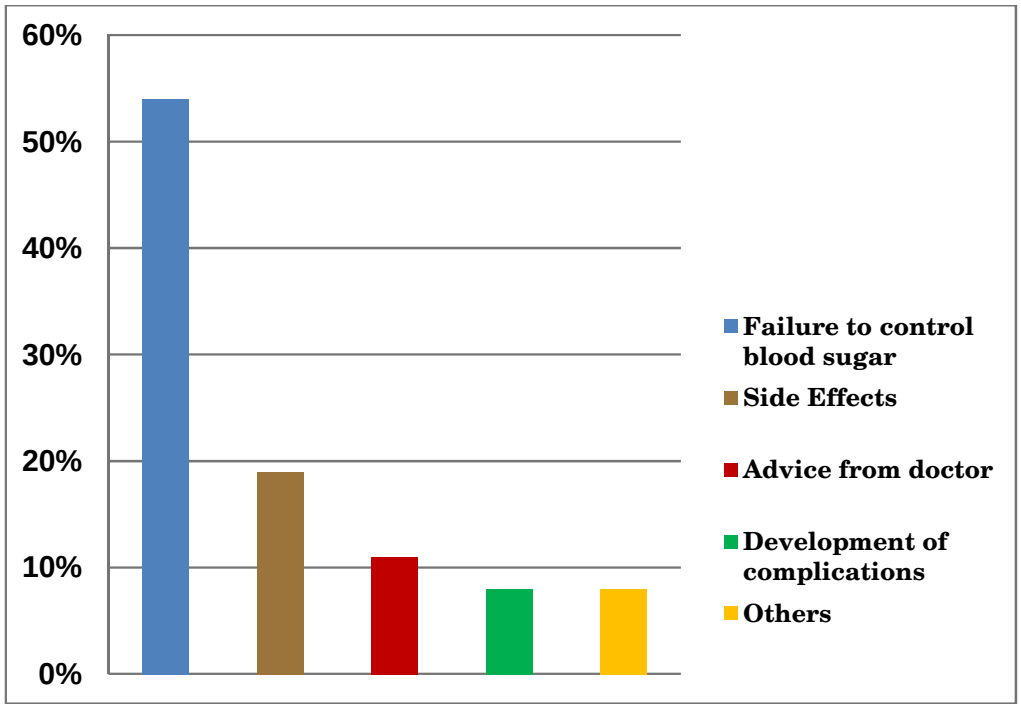


**Fig. 2. Reasons why the study participants stopped using herbal remedy**

**Table 1. Socio-demographic characteristics of the study population**

| Socio demographic variable | Frequency (n=251) | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Male | 108 | 43.5 |
| Female | 143 | 56.5 |
| **Marital status** | | |
| Single | 38 | 15.4 |
| Married | 172 | 69.9 |
| Divorced | 7 | 2.8 |
| Widowed | 29 | 11.8 |
| **Age** | | |
| 18-20 | 2 | 0.8 |
| 21-30 | 19 | 7.6 |
| 31-40 | 33 | 13.3 |
| 41-50 | 57 | 22.9 |
| 51-60 | 71 | 28.5 |
| 61-70 | 48 | 19.3 |
| 71-80 | 16 | 6.4 |
| 81-90 | 3 | 1.2 |
| **Highest level of education** | | |
| Informal | 23 | 9.2 |
| Primary | 86 | 34.3 |
| Secondary | 100 | 39.8 |
| Tertiary | 42 | 16.7 |
| **Employment status** | | |
| Unemployed | 64 | 26.9 |
| Formally employed | 52 | 21.8 |
| Self-employed | 122 | 51.3 |

**Table 2. Clinical characteristics of the study population**

| Variable | Type 1 (n=122) | Type 2 (n=127) | Total respondents (n=251) | P value |
|---|---|---|---|---|
| **Years since diagnosis** | | | | |
| < 1 | 13 (10.7%) | 14 (11%) | 27 (10.8%) | |
| 1- 5 | 26 (21.3%) | 48 (37.8%) | 74 (29.5%) | 0.011 |
| 6-10 | 30 (24.5%) | 30 (23.6%) | 60 (23.9%) | |
| >10 | 53 (43.4%) | 33 (26%) | 86 (34.3%) | |
| **Satisfaction with conventional therapy** | | | | |
| Yes | 109 (89.3%) | 110 (86.6%) | 219 (87.3%) | |
| No | 1 (0.8%) | 1 (0.8%) | 2 (0.8%) | 0.928 |
| Somehow | 10 (8.2%) | 12 (9.5%) | 22 (8.8%) | |

**Table 3. Characteristics of patients who use herbal remedies**

| Variable | Currently using herbal remedy for diabetes mellitus (n=18) | P value |
|---|---|---|
| **Type of diabetes mellitus** | | 0.985 |
| Type 1 | 9 (50%) | |
| Type 2 | 9 (50%) | |
| **Duration of diabetes (Years)** | | 0.175 |
| < 1 | 1 (5.6%) | |
| Between 1-5 | 3 (16.7%) | |
| Between 6-10 | 8 (44.4%) | |
| > 10 yrs | 6 (33.3%) | |
| **Treatment for diabetes** | | 0.301 |
| Just diet & exercise | 0 (0%) | |
| Oral medications & insulin | 1 (5.6%) | |
| Oral medications only | 7 (38.9%) | |
| Insulin only | 10 (55.6%) | |
| **Satisfaction with healthcare provision** | | 0.319 |
| Yes | 15 (83.3%) | |
| No | 3 (16.7%) | |
| **Regular clinic attendance** | | 0.003 |
| Yes | 11 (61.1%) | |
| No | 7 (38.9%) | |

This study reported that herbal remedies use was higher among middle aged patients. Perhaps these are the newly diagnosed type patients who are eagerly searching for cure. These results agree with those of other studies [14]. In contrast, a study done in USA identified that those aged over 65 years as being three times more likely to use alternative medicine than those aged less than 65 years [15].

This may be due to the relatively higher life expectancy in the USA, hence a higher proportion of patients aged over 65 years compared to developing countries [15].

There was no statistical significant association between gender and the use of herbal medicines as seen in other studies [16]. Other studies indicated that women were somewhat more likely than men to use herbs since the $p<0.05$ [15] and [16]. In addition our studies revealed that employment and higher level of education were also not significantly associated with herb use, a result which is inconsistent with that of other studies which indicated that there was a strong association between poverty and the use of herbal medicine [17]. On the other hand, patients who had attained a higher academic level and earn high incomes show the least prevalence in herbal utilization [14] and [15]. This contrasts another study which found out that employment and higher educational attainment are surrogates for higher earning power, which is needed to pay for the out-of-pocket expenses associated with herb use [18].

In this study, patients who had diabetes for a period between six and ten years used herbal remedies more than those with shorter duration which is in contrast with the results of other studies which showed that patients who had diabetes for less than one year used herbal remedies more than those with longer duration [19]. These findings suggest that newly diagnosed diabetic patients may be searching for more than one type of therapy for cure. However, some studies disagree arguing that patients with long standing diabetes mellitus may not cope well with the diabetic complications due to the disease and so they search for more than one type of therapy [20].

**Table 4. Utilization of herbal medicines by the study participants**

| Variable | Type 1 (n=122) | Type 2 (n=127) | Total n=251 | P value |
|---|---|---|---|---|
| Have come across herbal medicines | 108 (88.5%) | 110 (86.6%) | 218 (86.9%) | 0.891 |
| Currently using herbal remedy for Diabetes mellitus | 9 (7.3%) | 9 (7.1%) | 18 (7.2%) | 0.985 |
| **Type of herb used for diabetes;** | | | | |
| Ginger | 4 (3.3%) | 5 (3.9%) | 9 (3.6%) | 0.819 |
| *Aloe vera* | 5 (4.1%) | 4 (3.1%) | 9 (3.6%) | 0.457 |
| Garlic | 3 (2.5%) | 2 (1.6%) | 5 (2%) | 0.490 |
| Bitter lemon | 2 (1.6%) | 1 (0.8%) | 3 (1.2%) | 0.453 |
| Onion | 1 (0.8%) | 1 (0.8%) | 2 (0.8%) | 0.929 |
| Cinnamon | 0 (0%) | 1 (0.8%) | 1 (0.4%) | 0.331 |
| Cactus | 1 (0.8%) | 0 (0%) | 1 (0.4%) | 0.331 |
| Used herb at one point and stopped | 16 (13.1%) | 19 (15%) | 35 (13.9%) | 0.506 |
| **Herb used in the past for diabetes;** | | | | |
| Cinnamon | 16 (13.1%) | 19 (15%) | 35 (13.9%) | 0.505 |
| Cactus | 16 (13.1%) | 19 (15%) | 35 (13.9%) | 0.505 |
| *Aloe vera* | 7 (5.7%) | 5 (3.9%) | 12 (4.8%) | 0.279 |
| Ginger | 6 (5%) | 6 (5%) | 12 (5%) | 0.713 |
| Garlic | 4 (3.3%) | 3 (2.4%) | 7 (2.8%) | 0.497 |
| Onion | 3 (2.5%) | 2 (1.6%) | 5 (2%) | 0.489 |
| Bitter lemon | 2 (1.6%) | 3 (2.4%) | 5 (2%) | 0.782 |
| Herb used for other medical condition/s | 42 (34.4%) | 39 (30.7%) | 81 (32.3%) | 0.473 |
| **Other medical conditions where herbs were used;** | | | | |
| Common cold | 19 (15.6%) | 15 (11.8%) | 34 (13.5%) | 0.205 |
| Stomach ache | 13 (10.7%) | 10 (7.9%) | 23 (9.2%) | 0.332 |
| Malaria | 8 (6.6%) | 11 (8.7%) | 19 (7.6%) | 0.510 |
| Other | 2 (1.6%) | 3 (2.4%) | 5 (2%) | 0.694 |
| **Who recommended herb to users;** | | | | |
| Family member | 18 (14.8%) | 19 (15%) | 37 (14.7%) | |
| Friend | 7 (5.7%) | 8 (6.3%) | 15 (6%) | |
| Advertisement | 3 (2.5%) | 2 (1.6%) | 5 (2%) | 0.816 |
| Neighbour | 2 (1.6%) | 2 (1.6%) | 4 (1.6%) | |
| Other | 1 (0.8%) | 3 (2.4%) | 4 (1.6%) | |
| Internet | 1 (0.8%) | 0 (0%) | 1 (0.4%) | |
| **Place where herb is acquired;** | | | | |
| Traditional medical practitioner | 21 (17.2%) | 16 (12.6%) | 37 (14.7%) | |
| Other | 11 (9%) | 18 (14.2%) | 29 (11.6%) | 0.129 |
| **Cost of herb per month (Kshs);** | | | | |
| < 1000 | 23 (18.9%) | 22 (17.3%) | 45 (17.9%) | |
| 1000 – 5000 | 5 (4.1%) | 4 (3.1%) | 9 (3.6%) | 0.969 |
| > 5000 | 1 (0.8%) | 1 (0.8%) | 2 (0.8%) | |

**Table 5. Prevalence of herbal remedies use according to socio-demographic factors**

| Variable | Currently using herbal medicines for diabetes mellitus (n=18) | P value |
|---|---|---|
| **Age** | | 0.360 |
| 18-20 yrs | 0 (0%) | |
| 21-30 yrs | 4 (22.2%) | |
| 31-40 yrs | 7 (38.9%) | |
| 41-50 yrs | 5 (27.8%) | |
| 51-70 yrs | 0 (0%) | |
| 71-80 yrs | 2 (11.1%) | |
| 81-90 yrs | 0 (0%) | |
| **Gender** | | 0.166 |
| Male | 5 (27.8%) | |
| Female | 13 (72.2%) | |
| **Marital status** | | 0.894 |
| Single | 3 (16.7%) | |
| Married | 13 (72.2%) | |
| Divorced | 0 (0%) | |
| Widowed | 2 (11.1%) | |
| **Employment status** | | 0.787 |
| Unemployed | 6 (33.3%) | |
| Formally employed | 2 (11.1%) | |
| Self employed | 10 (55.6%) | |
| **Highest level of education** | | 0.537 |
| Informal | 3 (16.7%) | |
| Primary | 5 (27.8%) | |
| Secondary | 8 (44.4%) | |
| Tertiary | 2 (11.1%) | |

The prevalence of use of herbal products in management of diabetes mellitus in this study was 7.5%. However, the prevalence of use of herbal products among the diabetic patients was 39.4%, evidenced by the fact that some study participants 81 (32.3%) used herbs for other medical conditions. This contrasts a study done in Kisii Level 5 Hospital, Kenya which revealed a prevalence of 62.3%. The reason for the difference was probably due to the fact that our population comprised of only adult diabetic patients whereas that of Kisii had children below 12 years of age who were given herbs for various illnesses by their caregivers [21].

In a study done in Kisii, 35.8% of the participants were given more than one herb [21].

Perhaps the deep cultural beliefs among the Abagusii community can influence patients to indulge in herbs. Other reasons could be that the study population in our study involved diabetic patients drawn from the hospital's clinic, in an urban set up and not from a particular community as in Kisii. This would have contributed to the low prevalence because patients in the local community may be easily access the herbs.

Studies in other countries such as Saudi Arabia found the prevalence of use of herbal remedies in the management of diabetes mellitus to be much higher (17.4%) [19], in Turkey (25%) [22]. Palestine (56%) [17] and in Bahrain (46%) [23].

WHO, however, has reported that about 80% of African population use herbal medicines so as to help meet their health care needs [10]. These differences may be attributed to differences in methodology such as differing timeframes, socio-cultural differences as well as sample size. For instance in a study done in Saudi Arabia, there were 884 respondents, [20], in contrast to our 251 respondents.

A study done by Nyamu et al also established that verbal patient education is conducted once a week for two hours at the clinic so as to ensure proper use of medication. Two thirds to three quarters of diabetic patients at the outpatient clinic had sufficient knowledge on the disease [24]. This could have also contributed to the low prevalence of herbal users in KNH since self-medication is discouraged among these patients.

**Table 6. Perception of use of herbal remedies**

| Variable | | Respondents | Total number of respondents |
|---|---|---|---|
| Awareness of the doctor about herbal medicines | Don't regard it important for him to know | 21 (21.2%) | n=99 |
| | Doctor has never enquired about herbal medicine | 9 (9.1%) | |
| | Fear that the doctor may ask me to withdraw | 13 (13.1%) | |
| | No Response | 56 (56.6%) | |
| Satisfaction by herbal medicines in diabetes mellitus | Yes | 10 (77.8%) | n=18 |
| | No | 2 (11.1%) | |
| | Not sure | 2 (11.1%) | |
| Consider using herbs in future given positive information about its benefits from HCPs | Yes | 113 (45%) | n=251 |
| | No | 107 (42.6%) | |
| | Not sure | 23 (9.2%) | |
| | No answer | 8 (3.2%) | |
| Would recommend use of herbal medicine to someone else | Yes | 47 (18.7%) | n=251 |
| | No | 204 (81.3%) | |
| Reasons for recommending herbal medicine to someone else | Used them before | 33 (70.2%) | n=47 |
| | Sufficient information about their effectiveness | 8 (17%) | |
| | Other | 5 (10.6%) | |
| Reasons for not recommending herbal medicine to someone else | Never used them before | 133 (65.2%) | n=204 |
| | Lack of sufficient information about their effectiveness | 8 (3.9%) | |
| | Advised by the doctor not to use them | 27 (13.2%) | |
| | Other | 23 (11.3%) | |
| Medical doctors and herbalists should work together | Yes | 92 (36.7%) | n=251 |
| | No | 159 (63.3%) | |
| Reasons why they should work as a team | Both offer effective treatment for diabetes | 20 (21.7%) | n=92 |
| | To have confidence when seeking services of herbalists | 65 (70.6%) | |
| | Other | 5 (5.4%) | |
| Reasons why they should not work as a team | Lack of sufficient information on effectiveness of herbs | 65 (40.9%) | n=159 |
| | To avoid confusion in the healthcare system | 54 (34%) | |
| | Herbal medicines have unbearable side effects | 22 (13.8%) | |
| | Other | 18 (11.3%) | |

Eighty one (32.3%) participants reported using herbs for other medical conditions other than diabetes. A study done in Tanzania which focused on treatment seeking behaviours of caregivers in the management of disease among their participants showed that almost half of the participants chose to seek services of traditional medical practitioners before resorting to healthcare in the hospitals [25].

Our findings therefore suggest that a third of our participants were seeking herbal treatment for other illnesses before going to the clinician.

Our findings revealed that the opinion of others heavily influenced the decision-making process and the most common reason for initial herbal use was that people close to our respondents believed in the efficacy of herbs. For instance, the influence of family members and friends in use of herbal remedies was reported by 14.7% and 6% of the herb users respectively. This is in agreement with Kumar et al who found out that the main sources of herbal information were friends [26]. Other studies which concur with these findings are those done by Al-Rowais et al. [19] and Winslow et al. [27].

Ginger and *Aloe vera* have been found to have hypoglycemic activity, [9] and these had the highest prevalence of use in our study. The hypoglycemic effect of *Aloe vera* juice may be mediated through stimulating synthesis and/or release of insulin from the beta-cells of Langerhans. Ginger may help increase insulin sensitivity in patients with type 2 diabetes. The mechanisms underlying these actions are associated with insulin release and action, and improved carbohydrate and lipid metabolism [27]. The most active ingredients in ginger are the pungent principles, gingerols, and shogaol. Ginger has shown prominent protective effects on diabetic liver, kidney, eye, and neural system complications [28] and [29].

Garlic and onion were also widely used by the diabetic patients. These herbs were found to have a role in lowering blood sugar levels [30].

The effect of garlic is thought to be due to increased hepatic metabolism, increased insulin release from pancreatic beta-cells and/or insulin sparing effect [31].

In the current study, most herbal users said that they easily accessed the herbal medicines and the herbs gave them a faster relief of symptoms. Kumar et al found out that about 90% of the herb users claimed that they had perceived some relief of symptoms from the use of traditional herbal medications. In addition, herbs were also affordable to many of our participants. There existed a statistically significant association on the effectiveness of herbs amongst the users since the p value was $< 0.05$. This could probably explain why some participants opted for herbs as an alternative means of treatment.

In other studies, lower cost of herbal therapy was the main factor that influenced the caregivers to consult herbalists and that herbalists were easily accessed compared to high cost of transport to the hospital [21]. A study conducted in Nairobi by the Ministry of Health indicated that the traditional medical practitioners are readily available and traditional beliefs are influenced by cultural practices.

Herbalists can also be paid in kind, for instance, one can give out a chicken in exchange for the services not necessarily monetary terms, making them more affordable compared to the medical professionals [32].

In this study, as in similar studies, [19,23] and [33], there was a low disclosure rate of herbs use to doctors.

About 1 in 5 of the herbal users reported that they did not regard it important for the doctor to know that they were on herbal medications and majority feared that the doctor would ask them to withdraw since they were worried about the negative attitude of doctors towards herbs. Therefore, a more positive attitude from doctors may encourage patients to talk more regarding their use of herbs. One in ten of the users claimed that the doctor or nurse had never enquired about herbal medicine use from them suggesting that medication history taking from the patient is scant. Studies have revealed that doctors and nurses may neglect to ask about use of herbal remedies [22] and pharmacists may stand a better chance since this is their custody.

## 5. CONCLUSION

The prevalence of current use of herbal medicines in management of diabetes mellitus amongst the diabetic outpatient clinic attendants was 7.2%. and there was no much difference in prevalence of herbal use among type 1 and type 2 diabetes mellitus.

The factors that influenced the use of herbal medicines among the users were mainly a perceived faster relief of symptoms and easy accessibility of the herbal medications.

Healthcare workers should encourage diabetic patients to talk regarding the use of herbs as it may affect the outcome and the management of their disease.

## 6. RECOMMENDATIONS

1. Proper health education on medications used in diabetes mellitus should be

emphasized since it can also persuade a higher percentage of diabetic patients to inform their doctors regarding their use of herbs.

2. Comparative studies of herb users and non-herb users need to be further evaluated among the diabetics with respect to monitoring therapeutic response in which HbA1c can be used as a surrogate marker for the efficacy of the herbal medicines.
3. This study has demonstrated the use of herbal medicines for a chronic illness. Other prevalence studies on herbal medicines need to be done among patients with other illnesses as well, for instance hypertension, heart failure and renal failure.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

## ETHICAL APPROVAL

As per international standard or university standard, written approval of ethics committee has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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## APPENDIX 1: DATA COLLECTION FORM

Patient File Number: ……..

### A. Participant Socio-demographic Data

Participant initials: …… Date of interview: ……

Patient Code Number: …… Data Collector's initials: ……

**Age:** ……Years **Ethnicity:** ……..

**Place of residence:** ……

**Gender:** Male ( ) Female ( ) **Marital Status:** Single ( ) Married ( ) Divorced ( ) Widowed ( )

**Highest level of education:** Informal ( ) Primary ( ) Secondary ( ) Tertiary ( ) **Employment Status:** Unemployed ( ) Formally employed ( ) Self-employed ( )

### B. Diabetes-specific information

1. What type of diabetes do you have?

   Type 1 ( ) Type 2 ( ) Not sure ( )

2. How long have you had diabetes?

   A. < 1yr ( ) B. Between 1 - 5 yrs ( ) C. Between 5 -10 yrs ( ) D. > 10 yrs( )

### C. Conventional Medicine Utilization

1. What treatment do you take for your diabetes currently?

A. Just diet and exercise ( ) C. Oral medications ( )

B. Oral medications and insulin ( ) D. Insulin only ( )

2. If on drug therapy, kindly name the drug and explain how you take it.

| Drug Name | Dose | Frequency |
|---|---|---|
| | | |
| | | |

3. Do you feel any better now that you are on treatment?

   A. Yes ( ) B. No ( ) C. Somehow ( )

If No, Kindly describe how you feel.

A. I experience side effects from the medicines
B. I have developed a complication
C. My blood sugar levels are uncontrolled
D. Other? .....

4. Have you ever missed any clinic appointment?

   A. Yes ( )  B. No ( )

If Yes, kindly state the reason/s.

A. High cost of healthcare service
B. High cost of transport to health facility
C. My blood sugar levels are well controlled
D. Other? ……..

**D. Information on Utilization of Herbal medicines**

*Herbal medicines play important roles in health seeking behaviours among many communities. Many of these conventional drugs we use have originated from herbs.*

1. Have you come across any herbal medication in your day to day life?

   A. Yes ( ) B. No ( )

2. If Yes, Is there any herbal remedy you are using specifically to help manage your diabetes currently?

   A. Yes ( ) B. No ( )

3. If Yes, which one is it and how often do you take it? N/A ( )

| **Name of herbal medicine** | **Tick** | **Frequency of Use (Indicate whether Daily/ Weekly/Monthly/Other-State)** |
|---|---|---|
| Ginger (Tangawizi) | | |
| *Aloe vera* | | |
| Cactus | | |
| Cinnamon (Mdalasini) | | |
| Garlic (Kitunguu saumu) | | |
| Bitter Lemon (Limau) | | |
| Onion (Kitunguu) | | |
| Any Other? | | |

4. If you are currently using herbal medication, when did you start using it?

   A. Before diagnosis ( ) B. After diagnosis ( ) C. N/A ( )

5. Do you take the herbal medicines together with your conventional medicines?

   A. Yes ( ) B. No ( ) C. N/A ( )

6. If you are not using herbal medication currently, have you ever used any herbal medication before to help manage your diabetes?

   A. Yes ( ) B. No ( )

7. If Yes, Please state which one you used. N/A ( )

| Name of Herbal Medicine | Tick (Which one?) |
|---|---|
| Ginger (Tangawizi) | |
| *Aloe vera* | |
| Cactus | |
| Cinnamon (Mdalasini) | |
| Garlic (Kitunguu saumu) | |
| Bitter Lemon (Limau) | |
| Onion (Kitunguu) | |
| Any Other? | |

8. Kindly state the reason/s as to why you stopped using the herbal medication.

   A. My doctor advised that I stop taking them

   B. I experienced side effects from the herbal medicines

   C. My blood sugar levels were uncontrolled

   D. I developed some complications

   E. Other? .....

*(For those who have never used herbal medicines before, kindly skip to the next section F on perceptions towards use of herbal medicines).*

9. Do you use any herbal remedy for any other medical condition other than your diabetes?

   A. Yes ( ) B. No ( )

10. If yes, which medical condition/conditions are they?

    A. Malaria ( ) B. Common cold ( ) C. Stomach ache ( ) D. Other? .....

11. Who recommended the herbal medicine to you?

    A. Doctor/Nurse ( ) D. Friend ( ) F. Neighbour ( )

    B. Family member ( ) E. Internet ( ) G. Advertisement ( )

A. Other: ……

12. Where do you get your herbal medicine from?

A. Purchase from pharmacy ( ) C. From a Traditional medicine practitioner( )

B. Get from my doctor/Nurse ( ) D. Vendor ( )

13. How much money do you spend on herbal medication per month?

A. < Kshs 1000 ( ) B. Between Kshs 1000-5000 ( ) C. > Kshs 5000 ( ) D. N/A( )

**E. Factors Affecting Use of Herbal Medicines**

1. Which of the following factors affect your decision to use the herbal medicine? Tick where applicable. N/A ( )

| Factor | Strongly disagree | Disagree | Undecided | Agree | Strongly agree |
|---|---|---|---|---|---|
| Faster relief of symptoms | | | | | |
| High cost of healthcare service in KNH | | | | | |
| High cost of transport to KNH | | | | | |
| I have sufficient information on herbs | | | | | |
| My blood sugar levels are well controlled | | | | | |
| I have experienced side effects from drugs | | | | | |
| Herbal medicines are easily accessible to me | | | | | |
| Presence of complications | | | | | |
| Presence of other chronic diseases e.g Asthma, epilepsy, hypertension etc. | | | | | |
| Any other? | | | | | |

**F. Perception towards use of Herbal Medicines**

1. If you are currently using any type of herbal medicine for any reason, does your doctor know you are using it?

   A. Yes ( ) B. No ( )

If No, kindly state the reasons.

A. I don't regard it important for him to know

B. My doctor has never enquired about herbal medicine

C. Fear that my doctor may ask me to withdraw

D. Not sure

E. Other? .....

2. If you are currently using herbal medication, are you satisfied that it is helping you to manage your diabetes?

A. Yes ( ) B. No ( ) C. Not sure ( )

3. If you do not currently use any herbal medication, would you consider using it to help manage your diabetes in the future if you had positive information about its benefits from your health care provider?

A. Yes ( ) B. No ( ) C. Not sure ( )

4. Would you recommend somebody else to use herbal medicines when they are sick?

A. Yes ( ) B. No ( )

If Yes, Kindly give reasons.

A. I have used them before and they worked for me

B. I have sufficient information that they are effective

C. Other? .....

If No, Kindly give reasons.

A. I have never used them before

B. I do not have sufficient information that they are effective

C. I have been adviced by my doctor not to use them

D. Other? .....

5. Do you think herbalists and medical doctors should work together as a team to help in managing your condition?

A. Yes ( ) B. No ( )

If Yes, Kindly give reasons.

A. Both offer effective treatment for my diabetes

B. So as to give us more confidence when seeking services from herbalists

C. Other? .....

If No, Kindly give reasons.

A. Unless there is sufficient information given on herbal medicines

B. I will bring about confusion in the healthcare system

C. Herbal medicines have side effects which can be unbearable

D. Other? .....

**Thank you for participating and offering me your time during this interview.**



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