Nutritional Status and the Use of Traditional Medicine Among Diabetic Patients in Mawenzi Hospital, Tanzania

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Abstract

Premature deaths among diabetic people are common in developing countries probably due to late diagnosis or poor adherence to use of diabetic medicine. This study aimed at assessing nutritional status and use of alternative medicinefor the aim of looking at the association between nutritional status and the use of alternative medications among diabetic patients at Mawenzi hospital. A total of 119 diabetic patients were randomly selected using a table of random numbers. The weights and heights were measured using standard procedures and BMI was computed and used to categorize participants into underweight, overweight, obese and normal status according to WHO standards. The collected data was processed and analyzedusing Statistical Product and Service Solutions (SPSS Inc.) version 20. Mean age of the diabetic patients was 58 years out of whom 77% were females. Mean BMI was 26kg/m2, majority being overweight or obese (58%) and very few (4.2%), were underweight. The prevalence of Type 2 diabetes (T2D) was associated with age above 45 years compared to younger age. About 79% of respondents had diabetic complications and the most common problems were hypertension, vision and pain in the lower limbs. Majority of respondents (73%) used medication provided at the clinic together with diabetic recipe to control blood glucose level. Only 21% reported to use traditional medicine from parts of plants such as drumstick tree (Moringa oleifera) and or java plum tree (Syzygium cuminii). About 45% of the respondents skipped some days without taking their prescribed medicines. There was no any association between uses of traditional medicines with any of the socio-demographic characteristics, family history of diabetes, diabetes complications or BMI of the diabetic patients. There was high prevalence of overweight and obesity among type 2 diabetic adults. Some of the patients used traditional medicines in addition to diabetic medicine provided at the clinic. Further research is needed on the weight reduction interventions among diabetic patients and among general population and on the composition and dose of the used traditional medicines.

Keywords: Type 2 diabetes, compliance, nutritional status, alternative medicine

Introduction

Diabetes mellitus type 2 (also known as type 2 diabetes) is a long term metabolic disorder that is characterized by high blood sugar, insulin resistance, and relative lack of insulin (NID and DKD, 2014). There is progressive increase of T2D around the world due to progressive increase in adoption of sedentary lifestyle behavior and aging population associated with the globalization. International Diabetes Federation (IDF) estimates that there are about 415 million adults with diabetes worldwide some of them are undiagnosed (IDF, 2015). The increased number of diabetic patients results into increased cost due to premature deaths and expenditure in health care. In developing countries, it is common to find premature deaths among diabetic people probably due to late diagnosis or poor compliance to the use of diabetic medicine. High prevalence of T2D especially in low and middle income countries could be a result of changes in lifestyle

specifically increased consumption of energy dense foods and sedentary lifestyle (Popkin, 2015).

Astudy conducted in Tanzania showed gender differences on prevalence of overweight and obesity which was almost twice in females compared to males. Prevalence of T2D was 9% in 2012 and there were huge regional variations (Mayige *et al.,* 2011).

Adherence to diabetic medicine and dietary advice improves control of glucose levels and reduces the risk of diabetes complications. However, in African setting, poverty and limited care for management of diabetic patients and depression could be some of the reasons for failure to follow advices (Gonzalez *et al.,* 2008; Akilen *et al.,* 2014; Mwangome *et al.,* 2017) For example, in a study conducted in Mulago hospital in Uganda, almost one third of respondents (31.3%) in the age group 36 to 50 years did not adhere to medications (Kalyango *et al.,* 2008). In another study conducted in Ibadan, Nigeria revealed that most diabetic patients did not adhereto anti-diabetic drugs due to lack of finance, side effects and perceived inefficiency of diabetic drugs (Yusuff *et al.,* 2008). In a similar study, patients did not adhere to diabetic medicines due to side effects but others failed to adhere due to the increased use of alternative medicines (Akilen *et al.,* 2014). Besides medications, diet and lifestyle behaviour, was reported as a management domain with very low compliance among diabetic patients (Peyrot *et al.,* 2005).

A cross-sectional study was conducted among type 2 diabetes mellitus patients who were attending the Diabetic clinic at Muhimbili National hospital between in May 2009 and February 2010 reported that adherence rates to ant diabetic drugs was 60.2 and 71.2% at one week and three months respectively (Rwegerera, 2014). The author found that high cost of medication was significantly associated with anti-diabetic non-adherence. Adherence to anti-diabetic drugs significantly increased with an increase in number of non-diabetic medications. This study assessed adherence to diabetic medicines, BMI status, and the use of alternative medicines among diabetic patients attending diabetes clinic at Mawenzi hospital, Kilimanjao region.

Methodology

Description of the study area, study design and study population

Cross-sectional study was conducted in 2016 at Mawenzi regional referral hospital, Kilimanjaro region providing a range of medical services. This study was done in the community health department specifically in the diabetic clinicand it involved 119 T2D patients without serious complications who were attending the clinic. All diabetic patients with serious complications, pregnant and lactating women and those who declined to participate were excluded from the study.

Data collection

Face -to -face interviews were conductedusing pre-tested structured questionnaire to assess different aspects related to socio-demographic characteristics, duration since diagnosed with diabetes, challenges in diabetes management and the use of alternative medications. Other information collected included methods used to control blood glucose levels, complications of diabetes (if any) and family history of diabetes. Secondary data was collected through reviewing the hospital records through diabetic patients the cards for who accepted to participate in the study. This included blood glucose levels and blood pressure that were recorded during the day of the interview.

Weight and height were measured using standard procedures. Weight (in kilograms) was measured with minimum clothing and without shoes; using SECA electronic scale (SECAgmbh and Co.kg 22061, Hamburg, Germany) and recorded to the nearest 0.1kg. Height (in centimetres) was measured using height measuring board (Shorr productions, Maryland USA) and recorded to the nearest 0.1cm. Body mass Index (BMI) was calculated as weight divided by height in meter square (kg/m^2). Respondents were categorized as underweight, normal, overweight or obese using the WHO (2005) categories.

Data were coded, processed and analyzed by using Statistical Package and Service Solutions (SPSS Inc.) computer software version 20. Descriptive statistics such as frequencies, percentages and cross-tabulations were used to describe demographic characteristics of the study participants. Statistical measures such as percentages, ranges and standard deviations were used to describe the population. Furthermore, t-test and Chi-square test were used to determine differences between male and female respondents for parametric and categorical variables respectively. Significance level was set at $p \leq 0.05$.

Permission to conduct the study was sought from Sokoine University of Agriculture and from Mawenzi hospital management. All ethical principles in research were followed and informed written consent was obtained from each respondent before the interview. Confidentiality was assured and names of respondents were not recorded.

Results

Socio-demographic characteristics showed that about 23.5% of the respondents were males; 28% were within the age range of 21 to 60 years. Most respondents (71%) were married, about 45% engaged in farming activities and majority (61%) attained primary education (Table 1).

Table 1: Socio-demographic and anthropometric characteristic of the respondents

Characteristic	n	%
Sex		
Males	28	23.5
Females	91	76.5
Age categories (years)		
≤ 40	15	12.6
41- 50	19	16.0
51- 60	33	27.7
61-70	32	27.0
>70	20	16.7
Marital status		
Married	84	70.6
Single	12	10.1
Widow/widower	23	19.3
Main source of income		
Formal employment	18	15.1
Farmer	53	44.5
Self employed	31	26.1
Pension/remittance	17	14.1
Education level		
Informal	23	19.3
Primary	73	61.3
Secondary	20	16.8
Post-secondary	3	2.5

Based on the anthropometric measurements shown in Table 2, mean height of the respondents was 160.6 cm, females being

Table 2: Anthropometric characteristics and nutrition status of respondents by gender

Characteristic	Female (N=91) mean (SD)	Male (N=28) Mean (SD)	Total (N=119) Mean (SD)	P-value*
Age	57.4 (12.2)	57.7 (14.8)	57.7 (12.8)	0.983
Weight	66.1 (11.4)	69.1 (8.5)	66.8 (10.8)	0.138
Height	159.1 (7.4)	165.3 (6.2)	160.6 (7.6)	0.000
BMI	26.2 (4.5)	25.4 (3.5)	26.0 (4.3)	0.335
Systolic BP	142.5 (2.6)	136.6 (24.1)	141.1 (24.4)	0.265
Diastolic BP	85.2 (11.7)	82.6 (10.4)	84.6 (14.4)	0.279
	Female n (%)	**Male n (%)**	**Total n (%)**	**P-Value****
BMI categories				
Underweight (<18.5 kg/m^2)	4 (4.4)	1 (3.6)	5 (4.2)	0.561
Normal (18.5-24.9 kg/m^2)	32 (35.2)	13 (46.4)	45 (37.8)	
Overweight (25- 29.9 kg/m^2)	40 (44.0)	11 (39.3)	51 (42.9)	
Obese (≥30 kg/m^2)	15 (16.5)	3 (10.7)	18 (15.1)	

**t-test; ** Chi-square test*

significantly shorter with the mean height of 159 cm compared to 165 cm for males. Majority of the females were overweight (44.0%) or obese (16.5%) compared to their males counterparts.

Medical history of the participants (Table 3) showed that about 57% were diagnosed with diabetes within five years ago and few (3.4%) were diagnosed within the past 6 months. Respondents with family history of T2D were 28% and most of them reported multiple diabetes related complications such as hypertension, cardiovascular, kidney problems, vision and foot ulcer. About 74% use drugs and diet therapy while others use either medicine alone (24%) or diet only (3.4%). Forty three percent reported to have skipped some days without medication and the reasons for skipping were either finished stock of drugs or normal blood glucose levels.

Table 4 shows the use of alternative medications whereby a total of 25 respondents (21%) reported to use herbs/alternative medications to control blood glucose levels. The source of information on alternative medicines was either obtained from relatives, friends or media reported by 48, 28 and 24% of the respondents respectively. The common reported herbs were drumstick *(Moringa oleifera)* leaf powder, its seeds (36%), flowers and its bark and the seeds and the barks of java plum tree (Syzygium cuminii) (24%). Twelve percent used herbs which were grounded to powder form and could not tell the exact name while 4% used garlic, cinnamon and honey. Eleven (44%) of the respondents who reported to use herbs confessed that herbs did not lower blood glucose levels while 7 (28%) said that herbs were good for them.

There was no any association found between uses of traditional medicine with any of the socio-demographic characteristics or BMI of the patients (Table 5).

Discussion

This study aimed to assess nutritional status and use of traditional medicine among diabetic patients attending clinic at Mawenzi hospital, Kilimanjaro region. Most of the studied subjects were females and majority were above 50 years. The large number of diabetic women might be attributed by undiagnosed gestational diabetes which may have been recurring in every pregnancy. Evidence shows that, gestational diabetes may disappear after delivery but may cause long term health risks to the mother and the child, such as predisposition to obesity, development of type 2 diabetes and impaired fasting or glucose intolerance within five to ten

Table 3: Medical history of diabetic patients attending clinic at Mawenzi hospital

Duration since diagnosed	n	%
Less than 6 months	4	3.4
6 to 12months	11	9.2
1 to 5years	68	57.1
More than 5 years	36	30.3
Hypertensive		
Yes	54	44.5
No	65	55.5
Any complications		
Hypertension, sight, heart	31	26.1
Eyes/sight problems and kidney	16	13.4
Sight and hypertension	9	7.6
Hypertension and lower limbs	2	1.7
Sight only	9	7.6
Lower limbs	15	12.6
Hypertension only	12	10.1
None	25	21.0
Ways of controlling glucose levels		
Diabetes medicine	28	23.5
Diet	4	3.4
Both	87	73.6
Family history of diabetes		
Yes	33	27.7
No	86	72.3
Skipping some days without taking medicine		
Yes	51	42.9
No	66	55.5
Do not use medication	2	1.7
Reasons for skipping medicine (n = 51)		
Medicine was finished	22	43.1
Normal blood glucose levels	20	39.2
Normal blood glucose levels and medicine was finished	9	17.6

years postpartum if not diagnosed (IDF, 2014). In addition, in a recent study in Kilimanjaro region by Njete *et al.* (2018), it was reported that the prevalence of gestational diabetes was 19.5%. It could also be a result of high prevalence of overweight and obesity among Tanzanian females compared to males as observed in other studies conducted in Kilimanjaro region (Mayige *et al.* 2011; TFNC, 2014). A study done in Nigeria found similar results that majority of diabetic patients in a medical University were females (Runrayo, 2013).

Prevalence of overweight and obesity was high among studied patients whereby more than half of the respondents (58%) were either

Table 4: Use of alternative medicines by respondents

	n	%
Use of alternative medicines		
Yes	25	21
No	94	79
Source of advice on alternative medicines (n = 25)		
Relative	12	48
Friends	7	28
Mass media	6	24
Duration of using alternative medicines (n 25)		
<6 months	17	68
≥6 months	8	32
Types of alternative medicine used (n = 25)		
Bark of the java plum tree (Syzygium cuminii) and drum stick tree (Moringa oleifera)	6	24
Bark of drum stick and avocado (Persea Americana)	1	4
Mixed herbs and milk	3	12
Leaf powder and seeds of drum stick (Moringa oleifera)	9	36
Different bark of trees combined	3	12
Ginger and honey, guava leaves	2	8
Garlic, cinnamon and honey	1	4
Do herbs work for you		
Yes	7	28
No	11	44
I don't know	7	28

overweight or obese. The mean BMI of the study subjects was 26 kg/m^2, in which females had higher mean BMI compared to men. High prevalence of overweight and obesity could be associated with their dietary intake and sedentary lifestyles. In Tanzania, females are at increased risk of being obese or overweight compared to males, specifically in Kilimanjaro region where overweight may be a result of post-delivery care which is considered as a prestige. This may cause majority of women to be overweight or obese which is a known risk factor for T2D. The increase in prevalence of T2D and hypertension could be associated with increased trend of overweight and obesity. Another study reported that the escalating prevalence of diabetes and hypertension is contributed by growing prevalence of overweight and obesity. Nyamdorj *et al.* (2008) found that, 1-SD increase in BMI led to a 30% increased risk of hypertension and diabetes compared to persons whose weight did not change. Furthermore, people with diabetes often become obese because they over eat due to the cell's resistance to insulin (Mayige *et al.,* 2011). In this study, overweight or obesity was not associated with the use of herbs. Similarly, researchers in Pakistan found no relationship between use of herbs to treat diabetes and BMI (r = - 0.079) (Neriman Inanç *et al.,* 2007).

Prevalence of T2D was also associated with age whereby higher prevalence was reported among those above 45 years compared to younger age. Similar results found that, T2D will continue to increase in the next twenty years, and more than 70% of the patients will appear in developing countries, with the majority of them being 45-64 years old (Wild *et al.,* 2004)

Table 5: Relationship between the use of herbs and some socioeconomic, BMI and medical characteristics of the study subjects

Characteristics	Using traditional medicine (n = 25)		Not using traditional medicine (n = 94)		P-value
	n	%	n	%	
Sex					
Male	9	32.1	19	69.9	0.098
Female	16	17.6	75	82.4	
Education level					
Informal	7	30.4	16	69.6	0.480
Primary	15	20.5	58	79.5	
Secondary	3	15.0	17	85.0	
Post-secondary	0	0.0	3	100	
Main source of income					
Formal employment	2	11.1	16	88.9	0.655
Farmer	13	24.5	40	75.5	
Business	7	22.6	24	77.4	
Remittance/pension	3	17.6	14	82.4	
BMI classification					
Underweight	0	0.0	5	100.0	0.201
Normal	7	15.6	38	84.4	
Overweight/obese	18	26.1	51	73.9	
Family history of diabetes					
Yes	9	27.3	24	72.7	0.299
No	16	18.6	70	81.4	
Complications					
Yes	20	21.3	74	78.7	0.889
No	5	20.0	20	80	

In this study we observed that, most of the patients had one or more diabetes complications which may be caused by late diagnosis or poor management. Poor management of diabetes was observed because other patients could not take their medication as instructed by the physician. It is also less common for Tanzanians to do regular medical check-up even for those who are at risk for developing non-communicable diseases. Similar results were reported by Standards of medical care in diabetes that, half of those who have been diagnosed with T2D have already developed clinical complications at the time of diagnosis such as blindness, renal disease, and amputations, which increase burden on the health-care system (CDCP 2013, 2014,). It is therefore, important to diagnose the disease when an individual is on transitions from being disease free to the asymptomatic state. Hence early identification of patients and treatment can reduce the occurrence of complications associated with diabetes and therefore testing for diabetes in asymptomatic patients with risk factors for diabetes is recommended.

Diabetes is a lifelong disease but some patients do believe that, it can be cured through the use of herbs or alternative medicines and live a normal life. This belief, together with cost for purchasing drugs and convenience of obtaining drugs from hospitals which needs a person to go to the clinic and stay for the whole day, makes them to consume as many types of herbs as they can (Wang *et al.,* 2013). Proportion of patients (21%) who used herbs was comparable to what was reported in other studies conducted in other countries (Neriman Inanç *et al.,* 2007). The main source of the information on traditional medications was from relatives or friends. Since these medications are provided by non-registered traditional healers, the dosage and concentration of active ingredients may not be known. In addition, there could be other ingredients in the herbs used that are contraindicated especially because majority of the diabetic patients may have one or more complications. Out of 25 patients who reported to have used herbs, 11 (44%) confessed that herbs did not work. The commonly used herbs were part of the trees believed to be medicinal plants. Some used mixture of herbs which they could not report the names. Example of the most commonly used herbs in the study area as traditional medicines were Syzygium cuminii, Moringa oleifera, avocado and guava. In most African countries herbs are believed to cure several diseases and are used without proper advice. This may lead to low regulation of blood glucose levels and hence to increased diabetes complications. Similar study done in Northern Tanzania revealed that prevalence of T2D was about 9% and about 77% of the diabetics were using herbs such as avocado (Persea americana), Moringa oleifera, and guava. All of these were identified as diabetes mellitus care and had a wide-range of effects that could be potentially beneficial or harmful (Lunyera *et al.,* 2016). Some studies attributed Moringa oleifera leaves, bark, pods and seeds and flowers with several nutritional and medicinal values (Anwar *et al.,* 2007). It was also reported to have some therapeutic potential for chronic hyperglycemia and hyperlipidaemia (Mbikay, 2012). The leaf powder of Moringa oleifera was effective to reduce serum glucose and low density lipoprotein (LDL) levels of obese diabetic patients in India. Likewise, Syzygium cuminii is known to be widely used by the traditional healers for the treatment of various diseases especially diabetes and related complications (Ayyanar and Subash-Babu, 2012).

Some patients reported to have skipped some days without taking medication and the reasons were that medicines were out of stock or low levels of blood glucose. This habit is dangerous because it may lead to increased blood glucose level, which is dangerous for the patient. Improved counseling to patients on the importance of adherence to diabetes treatments may improve the situation. Formation of community diabetes groups, improved services and subsidized diabetes medicines may help to improve adherence. Similar results were reported in a study conducted at Muhimbili teaching hospital in Dar es Salaam that, the main reason for non-adherence was high cost of medication (Rwegerera, 2014).

Other studies in Africa for example in Uganda (Rutebemberwa *et al.,* 2013) found that, the reasons for taking traditional medications included finding difficulties in accessing hospitals, diabetic drugs being out of stock, traditional medicine being acceptable and available within communities, as well as being supplied in big quantities. Similar studies reported, traditional medicines being cheaper than biomedical treatment and payment for it being done in installments. Traditional medicine was also more convenient to take and was marketed aggressively by the herbalists.

Nevertheless some of the studied patients in this study leave medication and base on prayers believing that, they can be cured without going to hospital or taking any medications. Hence the influence of family, religious beliefs and friends as well as traditional healers may have contributed to use of traditional medicine.

Other reasons could be limited availability and affordability of medicine for chronic diseases (Cameron *et al.,* 2009). A study in rural Tanzania reported low support on self diabetes

management among patients and their families (Mwangome *et al.,* 2017), which could be a reason for skipping medications for some days or using traditional medicine.

Conclusion

Most study participants were overweight or obese and some of the patients used traditional medicine in addition to diabetic medicine provided at the clinic. Availability of diabetes medicine and costs were some of the reasons for using herbs. This made most of the patients not to adhere to recommended management of diabetes. Although herbs are believed to cure diabetes, none of the patients reported to be cured. Further research is needed on the weight reduction interventions among diabetic patients and on the composition and dose of the commonly used traditional medicine.

Conflict of interest

No conflict of interest is declared

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