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DESIGNING EDUCATIONAL PROGRAM FOR TRADITIONAL HEALERS TOWARDS DIABETES MELLITUS IN KHARTOUM STATE

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ABSTRACT

Traditional medicine has a crucial role in building the health system in developing country. The World Health Organization also recognized traditional medicine as a vital health-care resource in developing countries and has encouraged governments to adopt policies to officially acknowledge and regulate the practice of traditional medicine. Moreover, many of the pharmaceutical products used in modern medicine, have directly or indirectly derived from the knowledge of traditional medicine (Abyot, 2014). The main objective of the study was to train traditional healers towards diabetes mellitus, and determine the awareness about diabetes also to exploresome of socio-demographic characteristic of the healers. The target population of the study was traditional healers in Khartoum state. The data were collected through pre and post questionnaires and interviews. The result found that (40%) of the respondents' have poor knowledge about definition of diabetes before the diabetes course and after the training course become (11.4%), and there is statistical improvement in knowledge of diabetes causes, the study revealed that the traditional healers stated many of diabetic complications which was similar to those of modern medicine. Diabetes education, with consequent improvements in knowledge, attitudes and skills, will lead to better control of the disease, and is widely accepted to be an integral part of comprehensivediabetes care. The study concludes that lecture is successful way to train of traditional healers.

KEYWORDS: Training of traditional healers, diabetes mellitus, traditional medicine, knowledge of traditional health practitioners.

INTRODUCTION

Diabetes disease appeared during the second century BC by Demetrio of Apamaia, diabetes rooted from the Greek word diabetinein which means siphon or to go to excess, where the word mellitus a Latin word stands for honeysweet had been added to the term as result of the sweet tasting urine. According to the world health organization diabetes defined as a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrates, fats and proteins metabolism resulting from defects insulin secretion, insulin action or both(Mowia,2006). Until recently diabetes had been considered as a rare in African countries, probably due to the lack of awareness of diabetes by doctors and compounded by the lack of diagnostic facilities.Most of the African countries and Sudan, growing wave of urbanization has altered many people's lifestyles.Diabetes mellitus is associated with acute complications, such as diabetic keto-acidosis, a hyper-glycaemic state, hypoglycaemia, thrombosis and electrolyte disturbance, retinopathy, neuropathy and renal problem (Saeed, etal, 2019). In the urban population of Sudan, chronic non-communicable diseases such as diabetes mellitus and hypertension are now emerging as important health problems. Now diabetes is considered as one of the major health problems in Sudan resulting in 10% of all hospital admissions and mortality. According to the annual report of the health information system in ministry of health in Sudan stated that diabetes represent number six in hospital admission, and death from diabetes was 3.2%, 4% represents hospital visit. By the year2025, the number of people with diabetes is expected to increase from 135million to 300 million(Ahmed, 2001). In managing diabetes patients seek conventional or traditional health care or a combination of both systems.

Type 2 diabetes mellitus is one of the major chronic ailments widely treated by using traditional medicine. According to WHO 80% of the population in developing counties rely on traditional medicine for treatment of various disease. Traditional medicine is easily available, affordable and acceptable compared to allopathic medicine (Irene, 2015). The world health organization(WHO) define traditional medicine as the sum total of all the knowledge and practical whether explicable, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation weather verbally or in writing (pitso, etal, 2013). In poor communities traditional

medicine has remained as the most reasonable source of treatment of several disease and microbial infections (Mohammed, 2017). In Sudan traditional healers can be divided into two distinct groups: religious healers influenced by Islamic and Arab culture such as Quranic healers and sufi healers. Non religious healers influenced by religious healers such as zartalasim and kogor (Ehab, 2008). In religious healers the success of treatment depends on the reliability of the healer and the degree of his beliefs in the Quran as the source of treatment.

Type of traditional medicine

Traditional medicine is primary health care for the majority of the population in developing countries especially in rural areas, where there is a lack in modern health facilities. There are different systems of traditional medicine according to differences in cultures. These different traditional medicines have common goal of providing health care. Tradition alternative medicine, this field includes more main stream and accepted forms of therapy such as acupuncture, ayurveda, homeopathy, neuropathy, Chinese traditional medicine, herbs and diet, yoga etc.

The role of traditional medicine in diabetes treatment

Various myths may influence diabetics' health-seeking behavior, and they may use traditional medicines, which include normal foods and herbs, for primary health care. Study done by Rose (2019), to determine the patients and herbalist practice' and perspective' regarding the use of traditional medicine and the role of traditional medicine in diabetes management.The result revealed that the majority of diabetic participants believed that diabetes is caused by high carbohydrate diet. 67.2% of the participants using traditional medicine to manage their diabetes, and 58.6 % stated that using both conventional medicines and traditional medicines. Some participants believed that combining conventional and traditional medicine effectiveness of treatment. Another study in South Africa, the purpose of the study was to assess the concepts and treatment modalities for diabetes among traditional and faith healers in Northern Province in South Africa. The results indicate that all healers were familiar with diabetes. The perceived causes of diabetes were diet, heredity, supernatural and psychological causes.

In Sudan all traditional medicine types were found, but in diabetes management herbal medicines is more used, in recent years faith traditional and cupping healers(hajjam) were appeared. Sudan is very rich with medicinal herbs and plants. The flora of Sudan consists of

3137 documented species of flowering plants belonging to 170 families and 1280 genera. It is estimated that 15% of these plants are endemic to Sudan. The intersection of cultures and the unique geographical position of Sudan hold great potential for research in many fields, the most important of which is medicinal and aromatic plants (Hassan, et al 2012). Many studies have been carried out on herbs and the control of diabetes mellitus. For example Ahmed, (1999) examined the hypoglycemic and anti-diabetic effects of *Guera senegalensis* I.F. G Mel (algubesh) and medicago sativa L. The findings showed that there is a decrease in plasma glucose by using *Guera senegalensis* I.F G Mel and *medicago sativa L* extracts. Also Elshaygi, (2006) studied the effects of *Nigella sativa* (alkomon) on some immune reactions and the level of blood proteins by studying the phagocytic activity and hypersensitivity in diabetic rabbits. The result showed that *Nigella sativa* decreased glucose level and is considered as anti-diabetic. AbdalGayoum, (2007) studied the anti-diabetic and hypoglycemic effects of *P.anisum* (alyanson). His results indicated that *P.anisum* was a promising anti-diabetic agent and could be used to lower hyperglycemia in diabetic patients and unlikely to be toxic. Study by Baderldin, et al (2014) study herbal medicine used among patients with type 2 diabetes in north Khartoum. The aim of the study was to assess the prevalence, patterns and predictors of herbal medicine used among patients with type 2 diabetes. The results found that from total respondents 600 patients 58% of them used herbal medicine for diabetes treatment. That means that the prevalence use of herbal medicine in diabetic patients was high. The most commonly herbs used was fenugreek, black seeds, cinnamon and olive. The study also found lack of knowledge among doctors about herbs, so proposed integration of herbal medicine into the current medical curriculum.

Also (Maha, et al, 2015) studied the anti-diabetic plants in western Sudan. In the case of acute treatment, aqueous extracts of *Tinosporabakis*(*T. bakis*), *Nauclea latifolia* (*N. latifolia*) and *Randianilotica*(*R. nilotica*) at 400 mg/kg significantly lowered (P <0.05) blood glucose levels in diabetic rats whereas, chronic treatment of diabetic rats with 400 mg/kg of *T. bakis, N. latifolia, R. nilotica*and *Mitragynainremis*proved to have significant (P <0.05) anti-hyperglycemic effect and have the capacity to correct the metabolic disturbances associated with diabetes. Histopathological studies showed that the aqueous extracts of these four plantsreinforced the healing of liver. However, *Striga hermonthica*aqueous extract did not exert any anti hyperglycemic effect to diabetic rats.

Education and traditional healers

Education is the basis for development and empowerment for every nation. It plays a vital role in understanding and participating in day to day activities of today's world. It builds one's character and plays a significant role in transmitting one's culture, belief and values to others in society. During recent years, the important role of education regarding Diabetes mellitus management has been demonstrated by numerous studies, globally. The American Diabetes Association 2015 Standards for Care as well as the American Association of Clinical Endocrinologists recognize diabetes management self education as an integral aspect of the care for people with diabetes. The National Standards for Diabetes Management Education and Support define diabetes management education as" a collaborative and ongoing process intended to facilitate the development of knowledge, skills, and abilities that are required for successful management of diabetes" (Carole, 2016). The education and training of traditional medicine providers differs between countries.

WHO give permeating to traditional healers in education or training, according to their government officially recognize. In 2012, 63 countriesin WHO reported the availability of some form of traditional and complementary medicine education. Of these, 41provided traditional and complementary medicine education at university level, and 36 provided non university training programs that were officially recognized by the government, at non university programs such as education programs on hygiene, anatomy, herbs conservation, data collection and management, training herbalists, agriculture techniques and farm workers (WHO, 2019). Some countries reported official involvement in traditional and complementary medicine education. For example,since 2010, the Department of Traditional Medicine in Mali has participated in the supervision andexamination of doctoral theses of African PhD students from Benin, Burkina Faso, Congo, Cote d'Ivoire,Guinea and Mali.In some countries, some traditional medicine practices have become established and practitioners are required to complete an official education and training programme. In many European countries and in North America, chiropractic, naturopathic, herbal and osteopathy practitioners must be educated in university-level programmes. Similarly, in China, the Republic of Korea, India and Vietnam, doctors practicing specific types of traditional medicine must graduate from university. In addition to education and training, many countries have drawn up regulations for traditional medicine practitioners. India is one of the countries had experiment in traditional medicine education which was all six traditional systems of medicine with official recognition (Ayurveda, Yoga, Naturopathy, Unani

Medicine, Siddha and Homeopathy) have institutionalized education systems. India has 508 colleges with an annual admission capacity of 25,586 undergraduate students, 117 of thesecolleges also admitting 2493 postgraduate students. Colleges can only be established with the permission of central government and the prior approval of their infrastructure, syllabi and course curricula. Annual and surprise inspections ensure that educational and infrastructural standards are met. Central Government has the power to recognize or rescind any qualification and college. Studies reported that 80% of people in developing countries depend on traditional medicines as the primary remedy for various ailments (Rose, 2017).

In Sudan, there no governmental institution to educate or train of traditional healers. In the recent years the traditional research department cares about traditional healers' awareness formed different educational programs. Traditional medicine research department was established in 1983 to be responsible for research on traditional medicine in Sudan; it became institute at 2008 with objectives:

- To draw a national policy to stimulate, organized and direct multi disciplinary research on traditional medicine in Sudan.
- To evaluate traditional medicine in the light of modern science as to maximize useful and effective practices and discharge harmful ones.
- To promote the integration of our local valuable knowledge attitudes and skills in traditional medicine into modern medicine and the existing health delivery system using appropriate technologies.
- To relate the programmes of research to the general policy of the country and its socio cultural needs.
- To build the capacities of different categories of traditional healers.

They hold many training courses to building the capacity of traditional healers in different specialization of traditional medicine which were:

Name of Workshop	Organized Institute	Type of Workshop	Time	Number of Trainee
First workshop on medicinal and aromatic plants	Medicinal &aromatic plants institute	Herbal medicine	1998	20 traditional healer
First workshop in Quranic treatment	Medicinal &aromatic plants institute	Quranic treatment	2000	20 traditional healer
Workshop in poisonous plants	Traditional medicine institute	Poisonous plants	2007	65 traditional healer
Aids and traditional	Traditional medicine institute	Fighting Aids	2009	40 traditional

healers				healer
2th workshop in medicinal plants	Traditional medicine institute & Medicinal &aromatic plants institute	Medicinal and aromatic plants	2010	60 traditional healer
Herbal treatment & primary health care	Traditional medicine institute & Medicinal &aromatic plants institute & ministry of health	Herbal treatment	2010	45 traditional healer
First workshop on bone setting	Traditional medicine institute & Medicinal &aromatic plants institute	Bone setting bone fractures	2013	41 bone setter
Role of traditional healers in psychotic disease	Traditional medicine institute & Medicinal &aromatic plants institute	Psychotic disease	2014	42 faith healer

Source; (Enaam, 2016)

Education and diabetes

The word education comes from the latin word- *e-ducere*, mean to" lead out", it is difficult to define education. During recent years, the important role of education regarding Diabetes mellitus management has been demonstrated by numerous studies.The American Diabetes Association 2015 Standards for Care as well as the American Association of Clinical Endocrinologists recognize diabetes management self education as an integral aspect of the care for people with diabetes(Carole, 2016). Some countries used diabetes education as tool in diabetes management protocol, globally and especially in Africa many studies have been carried out on the role ofeducation in control of diabetes mellitus. In Cameron study held by George N. etal in (2010), a pilot project to train traditional healers to provide health education and appropriate health care practices for diabetic patients.They trained 106 healers in a range of topics and practices relating to diabetes prevention and care. Eight months later they carried out a field evaluation of 36 of them using in-depth semi-structured interviews and direct observation methods to find out if they remembered and applied the learning from the training. Most healers recalled and were applying some of the lessons learnt, including referral of patients for blood glucose tests at biomedical health facilities, desisting from scarifying patients with diabetes, and educating their patients, peers and other people in their communities about diabetes. Healers were enthusiastic about collaboration with the diabetes control program, though some wanted additional responsibilities. They conclude that healers could learn prevention strategies of diabetes relatively rapidly and collaborate in health promotion.

In Ghana (2017) a national diabetes care and education program, they trained of team consisted of physicians, dietitians and nurse at two tertiary institutional levels (teaching hospitals). In three years all regional and about 63% of sub-regional/district health facilities had trained diabetes health care teams, run diabetes services and had diabetes registers at these institutions. Additionally a set of guidelines for diabetes care and education was produced. All program objectives with the exception of one (deployment of diabetes kits) were met. Distances to be travelled by persons with diabetes to receive diabetes care had been reduced considerably. The success of the project has given an impetus to the collaborators to extend the program to the primary health care level.

In Sudan the problem of diabetes include the lack of efficient diabetes care centers, lack of specially trained personnel, the high cost of anti-diabetic treatments, poor compliance with therapy or diet, ignorance and wrong beliefs, food and dietary factors and gender-related problems. The goal of efficient diabetes care can be achieved through implementing a national diabetes program. This program should be responsible for personnel training, establishing model care centers, patients' education, availability and affordability of insulin, scientific and clinical research and primary prevention (Awad Mohamed, 2001). The Federal Ministry of Health in Khartoum (Sudan) has endorsed a 5-year strategic plan to improve the existing health delivery system in Sudan including addressing the burden of diabetes and other non communicable diseases, have helped build diabetes care capacity to help the Ministry fulfills its plans. The aim of this project is to improve the access to quality care in Sudan by training health professionals in diabetes education and management to lead mini diabetes clinics in Sudan (https://www.worlddiabetesfoundation).

Many of studies about diabetes education were held to health workers, nurse and diabetic patients but to the traditional healers were very rare or not found. Study by Fathia and others in (2010) they focusing in training and implementing an educational program for health workers in diabetic health centers in Khartoum State.[36] Health workers included in the program. The results showed that there was significant statistical difference (p=0.001) between of pre and post concerning knowledge of diabetes health educators.

In Wad Madeni city in central Sudan study held by Albadwi and others, the aim of the study to assess the knowledge and attitudes and practices (KAP) of type 2 diabetic patients in Algalaa health center. The result showed that there was a significant improvement was found in the tested group of diabetic patients in terms of their KAP, and also there was an

improvement in their glycemic control compared to control group. It was found that lectures and brochures together were the most effective for the counseling and education of type 2 diabetic patients.

Balla and others (2016) study the perception of the educators in health centers. The aim of the study was to determine the perception of educators about the quality of education services provided to diabetic patients at the health centers in Khartoum state. The result showed that all educators were holders of university degree with different basic disciplines. The working duration of them was from 3-25 years. Few educators were trained on diabetes education. Most of them agreed on the lack of diabetes education materials and specific education programme. Most of educators educate individual rather than group. The majority was not satisfied with the education services at the health centers and most of educators reflected the poor knowledge and negative behavior of the diabetic patients. The authors concluded that diabetes education services at the primary health care centers were insufficient. Most of educators were not certified educators. Education services lack team work and strategic plans. Diabetic patients have poor knowledge and behavior regarding diabetes management.

A community based cross sectional study among individuals with type 2 diabetes in Khartoum state in four diabetic health centers which were Omer Ibn Alkhatab, in Ibrahim Malik hospital, Abdalla Khalil center (in Omdurman), Alkhatamia (in Bahri) and Shambat health center. The aim of the study was to determine the knowledge and self care activities among Sudanese individuals with diabetes. The study found that the total number of diabetic patients attending the four centers was (1.010) patients per month. 124 (43.4%) of the respondents had history of hospital admission due to diabetes, and 78 (27.3%) of respondent had the experience of attending diabetes education courses. Physicians were the main sources of information, and most of respondents were meeting the health care providers regularly. The participant in the study were asked general questions to estimate their knowledge about diabetes the results showed that 51.4% of respondent had sufficient knowledge about diabetes and its complications, while 48.6 % were considered had insufficient knowledge about the disease (Osama Altahir, 2018).

METHODOLOGY

The study area was Khartoum state, is located roughly in the centre of the country, at the junction of the blue and white Nile. Khartoum State is one of the 17 States of Sudan. It has an area of 22,124 (square kilo meters), it lays between latitudes' 8.45 degree and 23.8 degrees

north and longitudes 21.29 degrees to38.24 degrees east, with the population distribution was female 3,609,775 and male 4,077,772 (2018, https:www.city population.de/en/Sudan). Khartoum State was chosen to be the studied area because it is of different cultural interaction and various kinds of traditional treatments and healing methods for diabetes. The target populations were traditional healers whom attend to diabetes course, from different parts of Khartoum state, the study size were (70) traditional healers. The study sample was purposive, andthey divided into two groups each of them 35 traditional healer, group A subjected to lectures and booklet about diabetes, and group B have only booklet. The healers were invited to diabetes course through the Sudanese unity for herbalists association, which is national association. It was constructed in October 2009.They recorded about (2074) traditional healers most of them were herbalists, faith healers or faki and hijjamin (cupping healers) also healers who works as cosmetics. The selection of the study was purposive, through the Sudanese unity for herbalists' association.

Data collection from group A

The data were collected through; pre-test and post-test questionnaire, the questionnaire was administeredto all traditional healers who attended the trainingworkshops.The objective of the pre-test exercise was to assess the healers' knowledge about diabetes before the diabetescourse andposttest to evaluatethe immediate impact of the training program.The questionnaire distributed at the beginning and at the end of the course. The workshop took three days.

Day one: according to time table of the course the first day contain two lectures on diabetes. Definition, causes, symptoms of diabetes, also the lecturer told the trainees about the insulin action. The questionnaire contains:

About the questionnaire, it contains three sections. Descriptive or Personal data about traditional healers such as education, age, specialty, experience, type of disease which treat it. Second section about the knowledge and practices of traditional healers towards diabetes mellitus such as nature of diabetes, causes, symptoms, how to differentiate between hypoglycemia and hyperglycemia, complications of diabetes and problem of diabetic foot. Section three contain professional data which include diagnosis of diabetes, type of treatment, record and follow up of diabetic patient, training, cooperation with doctors.

Day two: about management and complications of diabetes. The second lecture on the nutrition in control of diabetes, definition of nutrition, standard measurements for foods, food pyramid.

Day three: about herbs, method of plants preparations, examples of some studied plants and doses …etc.

The questionnaire distributed at the beginning and at the end of the diabetic course.

Data collection from group B

The data were collected through questionnaires and interviews carried out during field work to the healers clinics in different parts in Khartoum state. The interview collects demographic information, knowledge about definition of diabetes, symptoms, and complications and how to manage the hypoglycemia if it is occurred. Group B was received booklets about the diabetes which contain (definition of diabetes disease, signs and symptoms, different types, complications that occurred as the result of hyperglycemia, treatment of diabetes in type one or type 2, also introduction to nutrition and they learned basic component of food elements, how to prepare or plan diabetic meal, the use of available standard measurement like use hand or finger, the palm of the hand), also the booklet contain the role of exercise and how to live with diabetes, some herbs which was scientifically subjected in controlling hyperglycemia. Then after 2 month collect post data using the same questionnaire.

Statistical analysis

The data entered and analyzed were done using SPSS (Social Package for Statistical Science) version 21. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and cross tabulation to detect any differences found between two groups. Also scaling method wasused in data analysis.

RESULTS

Socio- demographic characteristic of the participants.

variable	Class	Pre(A)		Pre(B)	
		Freq	Per %	Freq	Per %
Sex	Male	30	85.7%	28	80.0%
	Female	5	14.3%	7	20.0%
Total		35	100.0%	35	100.0%
Age	20-40	8	22.8%	6	17.2%
	41-50	12	34.3%	7	20.0%
	51-60	11	31.4%	12	34.3%

	more 61	4	11.4%	10	28.6%
Total		35	100.0%	34	97.1%
Education	Higher +under higher	20	57.2%	19	54.3%
	University	15	42.9%	16	45.7%
Total		35	100.0%	35	100.0%
Experience	Less than 5yrs	7	20.0%	2	5.7%
	6-10yrs	3	8.6%	4	11.4%
	More than 10yrs	25	71.4%	29	82.9%
Total		35	100.0%	35	100.0%
Specialty	Herbalists+herb vender	22	62.9%	15	42.9%
	Cubbing healer	2	5.7%	2	5.7%
	Herbalist+ faith healer	9	25.7%	17	48.6%
	Herbalist+faith+basier	2	5.8%	0	0.0%
Total		35	100.0%	35	100.0%

Table No (1) shows distributed of sample according toPersonal Information in pre test in group (A) and group (B). The majority of the participants (85.7%) n= 30 in group (A), and (80%) n= 28 in group (B) were males. Most (34.3%) of the respondents'in group (A) their age between (41-50 years), while in group (B) the majority (34.3%)of the respondents' their age between (51-60 years). From the table the experience of the respondents most of them (more than 10 years in group A (71.4%) and group B (74.3%). The majority (42.9%) of the participants in group (A) were herbalists while in group (B) most of them (48.6%) their specialty were (herbalists +faith+basir).

Table (2) General Practice of the healers

(2-1) Diagnosis of Diabetes mellitus cross tab

Variable	Diagnosis of DM			Total
	Laboratory	symptoms	Others	
Pre A	29 82.9%	0 0.00	6 17.1%	35 100%
Post A	31 88.6%	2 5.7%	2 5.7%	35 100%
Pre B	32 91.4%	1 3.1%	2 5.7%	35 100%
Post B	32 91.4%	1 3.%	2 5.7%	35 100%

From the table above (2-1) most of the respondents (88.6%) in group (A) they depend on laboratory examination in diagnosis of diabetes, while (91.4%) of the respondents in group (B) depends on laboratory test in diabetes diagnosis. (17.1%) of the respondents in group (A) depends on other methods to diagnose diabetes such as rogia or symptoms or (complain of the patients). There no significant differences from each other at level.05

(2-2) Record of patients

Variable	Record of patients			Total
	Yes	No	Sometimes	
Group (A)	19 54.3%	7 20%	9 25.7%	35 100%
Group (B)	18 51.4%	9 25.7%	8 22.9%	35 100
Variable	Follow up of patients			Total
	Yes	No		
Group (A)	19 54.3%	16 45.7%		35 100%
Group (B)	22 62.9%	13 37.1%		35 100%
Variable	Treatments			Total
	herbs	Herbs+ other	Others	
Post (A)	25 71.4%	4 11.4%	6 17.1%	35
Post (B)	23 65.7%	12 34.3%	0	35 100%

Table (2-2) describes the practices towards patients' records. The respondents in group (A) (54.3%) of them records their patients and (25.7%) of the respondents' sometimes record their patients. While most (51.4%) of respondents in control group record their patients. The majority of the respondents (54.3%, 62.9%) in group (A&B) follow their patients respectively. About the treatment most of the respondents used herbs only or in combination, herbs with oil or honey. (17.1%) of the respondents in group (A) used part of animal or oil brings from outside Sudan.

(2-3) Effects of herbs

Variable	Effects of herbs			Total
	Yes	No	Didn't know	
Pre (A)	12 34.3%	12 34.3%	11 31.4%	35
Post (A)	12 34.3%	12 34.3%	11 31.4%	35
Post (B)	17 48.6%	16 45.7%	2 5.7%	35 100%
Post (B)	17 48.6%	16 45.7%	2 5.7%	35 100%

Table (2-3) shows the effect of treatment or herbs. The majority (34.3%) of healers stated that herbs had side effect, while (34.3%) stated that herbs had no side effect. most (31.4%) of the

respondents ignored the effect of herb. Most of respondents (48.6%) in group (B) stated that herbs had side effects, and (45.7%) had no side effects.

Table (3): Do you received any workshop about diabetes.

Variable	Do you received any workshop about diabetes		total
	Yes	No	
Pre A	6 17.1%	29 82.9%	35 100%
Post A	35 100%	0	35 100%
Pre B	9 25.7%	26 72.3%	35 100%
Post B	9 25.7%	26 72.3%	35 100%

From the table the majority (82.9%) of the participants group A have not received any training before about diabetes mellitus. While in group B (72.3%) have not received any courses about diabetes mellitus.

Table No (4): Knowledge about diabetes.

Variable	Definition of diabetes			Total
	Poor	Middle	Good	
Pre A	14 40%	17 48.5%	4 11.4 %	35
Post A	4 11.4%	19 54.3%	12 34.3%	35
Pre B	14 40%	6 17.1%	15 42.9	35
Post B	14 40%	6 17.1%	15 42.9%	35
Variable	**Causes of diabetes**			**Total**
	Poor	Middle	Good	
Pre A	12 34.3%	15 42.9%	8 22.9%	35
Post A	3 8.9%	19 55.9%	13 35.3%	35
Pre B	4 11.4%	14 40%	17 48.6	35
Post B	2 5.7%	14 40%	19 54.3%	35
Variable	**Symptoms of diabetes**	**Total**		
	Poor	Middle	Good	
Pre A	11 31.4%	15 42.9%	9 25.7%	35
Post A	3 8.6%	19 52.3%	13 37.1%	35

Pre B	4 11.4%	14 40 %	17 48.6%	35
Post B	4 11.4%	14 40 %	17 48.6%	35
Variable	**Hypoglycemia**	**Total**		
	Poor	Middle	Good	
Pre A	13 31.1%	15 42.9%	7 20%	35
Post A	3 9.1%	19 52.6%	13 33.3%	35
Pre B	12 34.3%	15 42.9%	8 22.9%	35
Post B	12 34.3%	15 42.9%	8 22.9%	35

Variable	**Complications of diabetes**							**Total**
	Ophthalmic problem	**Foot problem**	**Renal problem**	**Neuro-pathy**	**Other**	**hypoglycemia**	**Don't know**	
Pre A	5 14.3%	2 5.7%	5 14.3%	3 8.6%	8 22.9%	0	12 34.3%	35 100%
Post A	6 17.1%	1 2.9%	6 17.1%	5 14.3%	6 17.1%	8 22.9%	3 8.6%	35 100%
Pre B	6 17.1%	3 8.6%	3 8.6%	9 25.7%%	6 17.1%	6 17.1%	2 5.7%	35 100%
Post B	6 17.1%	4 11.4%	3 8.6%	9 25.7%	5 14.3%	4 11.4%	4 11.4%	35 100%

Table No (3) describe the knowledge of participants towards diabetes (definition, causes, symptoms and their behavior in hypoglycemia occurred). Most of the participants in group (A) (68%) in pre test had middle knowledge about definition of diabetes, while (16%) had poor and good knowledge. From the table post (A) most of the participants (51.7%) had good level while (41.4%) had middle level.

The participants in group (A&B) stated a number of complications such as ophthalmic problem (14.3%, 17.1%), foot problem (2.9%, 11.4%) renal problem (17.1%, 8.6%) etc….

Table (5): Is diabetes can be cured.

Variable	**Is diabetes can cured?**			**total**
	Yes	**No**	**Don't know**	
Post A	18 54.4%	9 25.7%	8 22.9%	35 100
Post B	15 42.9%	15 42.9%	5 14.3%	35 100%

Table no (4) from the table the majority of (54.4%) stated that diabetes can be cured and (22.9%) didn't know if it is cured or not in group A, while (42.9%) of the participants group B stated that diabetes can be cured.

Table No (6): Is there any herb to protect against diabetes.

Variables	Is there any herb to protect against diabetes?		Total
	Yes	No	
Post A	30 85.7%	5 14.3%	35
Post B	25 71.4%	10 28.6%	35

Table (5) describes the herbs that protect against herbs. The majority (85.7%) of the respondents' stated that many herbs can protect against diabetes such as(maharaib, tabeldi, gerfa, and gest alhidy) in group A, and (71.4%) of the participants of group B stated that many herbs protect against diabetes.

Table No (7): Herbs or remedy increase immunity.

Variable	Herbs or remedy increase immunity		Total
	Herbs	Other	
Pre A	26 74.3%	9 27.7%	35 100
Post B	22 62.9%	13 37.1%	35 100

Table (6) shows that herbs or remedies increase the immunity. The majority (74.3%) of the respondent in group A stated that manyherbs increased immunity such as (leafs, onion, bardagosh, termis,…etc), while most (27.7%) of participants in group A stated that honey, oil, white honey and bee nutrients increase the immunity. (62.9%) of the respondents in group B herbs that gives immunity against diabetes like (mango seeds, alhrgel, algestalhindy…), while there is other remedies such as (olive oil, alkaline water (maa galwe)kordala, honey, some animal parts).

DISCUSSION

1- Socio demographic characteristic

These study focus on training and raising capacities' of traditional healers to mange or control diabetes. The study found that the majority of the respondents' in group (A) and group (B) were male (85.7%) (n= 30) (80%) (n=28) respectively, while (14.3%) (n= 5) (20%) (n=7) female. This finding was similar to study done by (George, 2010) in Cameroon. The

study found that the majority (34.3%) of respondents in group (A) in middle age between (41-50 years), while in group (B) the majority (34.3%) of the respondents' their age group were (51-60 years). The study found that the level of education was not differing between two groups. Most of the respondents had university degree, but their knowledge about diabetes not deferring in the pre test while in post questionnaire group (A) become better than group (B) in the sign and symptoms about diabetes that means that formal training or education increase the awareness of the healers.

The study found that (65.6%) of the respondents were pure herbalists (n=23), and (22.9%) were herbalists beside faith healers (n=8).

The study found that the majority (71.4%) (n=25) of the respondents' their experiences more than 10 yrs.This result was similar to study done by (Ondo, 2019) in South Africa. The years you spend in practice the more experience you gain as a trainee.

The study found that the respondents' experiences acquired from their relatives' (54.3%) (n=19), and other healers who achieve their experience from other healer were (25.7%) (n=9). These finding was similar to those obtained by (Tumelo, 2018) in Zambia. The traditional healers acquired their knowledge on traditional medicine from members of the family mainly grandparents and parents.

The study found that the majority (74.3%) of the respondents' traditional medicine their main job. From the study most of the respondents' (48.6%) (n=17) had cooperation with doctors, while (37.1%) (n= 13) sometimes may request the help of doctors. Also, the study found (60%) of the respondents' were treated diabetes, while (22%) treated other diseases such as cancer, hypertension and infertility. As known that all traditional healers were treat all age groups and all problems.

1- General practice of the healers

From the study the majority (8.6%) n= 24 of the respondents they depend on the symptoms of the patients in diagnosis of disease. In diabetes diagnosis (82.9%) of the respondents depends on laboratory examination. These findings were similar to those obtained by Huyssteen (2004) in South Africa. The study found that (45.7%) of the respondents' records their patients and (57.1%) of the respondents' followed their patients.

The study found that (51.4%) n=18 of the respondents their treatment for diabetes as combination of herbs, and (25.7%) of the participants used one herb, and (11.4%) n=4 used cubing in diabetes management. Many studies had carry out the use of herbs in diabetes management in Zambia (Tumelo, 2018) collected and identified 26 plant species used in diabetes treatment, and in Sudan may studies had carried out the use of herbs and medicinal plants and its effects in controlling of blood glucose, for example (Mujahid, 2006) studied the hypoglycemic effect of *P.anisum* on adult male Wister albino rats. Also(Karar and Nicolai, 2017) were studied 48 medicinal plants in Sudan used as food and drug such as Capsicum *Frutescens* (chili pepper), *Ziziphus SpinaChristi* (nabbag or sidr), *Grewia tenax* (guddaim).

The use of cupping or hijjama is a procedure used from thousand years ago in many countries such as Greece, Iran, China, India and Arabic countries. This result is similar to study done by (Azza, etal, 2018) in the effect of cupping in blood glucose level.

1- Knowledge about diabetes

3-1 knowledge about definition of diabetes

The study revealed that group A appeared statistically improvement after the course of diabetes, this result agrees with (Nagwa, 2018) stated that implementing of intervention protocol had a great effect in the improvement of knowledge, while group B have the same result.

3-2 knowledge about symptoms of diabetes

The majority (44.1%) of the participants group A in pre test revealed that have middle knowledge about the diabetes symptoms, and (23.5%) have good knowledge, and after the diabetes course there was an improvement appeared in their knowledge they became (55.9%) middle knowledge and (35.3%) good knowledge. This result agrees with Nagwa (2018) study which stated that the knowledge about symptoms improved after the course. On the other hand the result of group B stable because most of participants (94.3%) didn't read the booklet which distributed to them.

3-3 knowledge about hypoglycemia

The study found that most 20% of participants in group A have poor knowledge about the sign of hypoglycemia if it occurred in pre test and after the course become 33.3%.

3-4 Knowledge about complications of diabetes

About the complication of diabetes the participants in tow groups stated many complications related to diabetes mellitus which was very similar to those known in conventional medicine.

The study found that many participated traditional healers in this study they didn't received any training course about diabetes, many countries reported that they have some form of traditional and complementary education; some of them provided education at university level and other counties provided non-university training programs and officially recognized by the government, at non- university level they exists officially recognized training programs and advanced certificate in traditional medicine such as education programs on hygiene, anatomy, herb conversation, data collection and management, training of herbalists, agricultural technicians and farm workers, pharmacognocy and pharmacy colleges (WHO, 2019). Since 2010 the department of traditional medicine in Mali has participated in the supervision and examination of doctoral thesis of African PhD students from Benin, Burkina Faso, Congo and Mali.

CONCLUSION

The study found that traditional healers who participated in diabetes course have acceptable knowledge about diabetes, and desire to increase knowledge and raise their capabilities by participating in training courses in governmental agencies or private centers. The study revealed that traditional healers after attending diabetes training course greatly improved their information related to diabetes disease such as the definition of diabetes its causes, symptoms and complications.

The study found that participant's traditional healers attended many different courses related to herbal medicine, poisonous plants, quranic treatment, and bone setting and about Aids, therefore this course considered as the first in the field of diabetes mellitus.

The study found that participants traditional healers have aware enough about life style changes that are appropriate for diabetes mellitus and this is evident in guiding their patients to follow a healthy diet that suitable for diabetic patients and recommending them to practicing exercise daily and follow up blood glucose level regularly.

In conclusion, traditional healers or herbalists are within the community and family member believe that herbs cure diabetes, and the traditional healers provide an important role in health

care system, the high cost of biomedical medicine, increase prevalence of diabetes for these reasons the government should providing attention and care for them and implementation of structured training programs.

The participants agree that traditional medicine has a lot to learn from modern medicine. Therefore, it is indisputable to extend this programme throughout other practitioners and other disease and topic.

RECOMMENDATIONS

1- In coming traditional healers training or raise up their awareness concern to use suitable tool that serve them to improve their capacity i.e. lecture is successful method in training.
2- Consider the content of the course to cover all aspects that related to diabetes mellitus.
3- Consider the time of course that suitable for traditional healers to ensure major of them to participate.
4- There should national or governmental umbrella responsible for traditional healers to organize their work and establish laws that protect them and the users of traditional remedies.
5- There should be a governmental policy for training of traditional healers to help them improve their knowledge about diseases and the herbal medicines they use.
6- There should be diabetes manual for training of traditional healers.
7- Further studies concerning the effectiveness of medicinal plants used for treating diabetes are urgently need, dose and standardization investigations were as well very important to be carried out.
8- To develop assessment tools for diabetes care and follow up system in traditional healers' clinic.
9- There should be educational intervention with regard to herbal medicine towards diabetes in terms of training of physician.

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