The role of pharmacists in diabetes management in Zanzibar and Dar es Salaam regions, Tanzania

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A cross sectional descriptive study was conducted in public diabetes clinics, hospital and community pharmacies in vicinity of diabetes clinics in Dar es Salaam and Zanzibar to investigate the role of pharmacists in management of diabetes and diabetic patients' care. Face to face interviews were conducted with patients, health workers and pharmacists. A total of 191 subjects were interviewed. Of those, 115 were patients, 18 health workers at the diabetes clinics and 58 pharmacists. Out of 18 health workers, none was pharmacist, and of those 13 (72.2%) were also involved in dispensing medicines. Majority (71%) of the interviewed patients were able to describe their medications, knew about the appropriate storage conditions and how to use them. Seventy-six percent (n=87) of the patients were aware of risks associated with non-adherence to medication regimen and symptoms of their disease conditions. Diabetes-associated complications and mitigation of the same were familiar to 64% and 72% of the patients, respectively. Pharmacists were not directly involved in diabetes patient care in clinics. Diabetic patients were managed by doctors and nurses. Procurement and storage of anti-diabetics were the main roles of hospital pharmacists. On the contrary, of 58 pharmacists, 51 (88%) community pharmacists were involved in counseling patients on storage and use of medicines. Based on these results, patients could not appreciate the roles of pharmacist in diabetes care. Therefore, pharmacists need to update their knowledge on diabetes through seminars and continuing education and professional development and thus be able to actively participate in the diabetes management and diabetes patient care.

Key words: Pharmacists, diabetes, patients, pharmacies, anti-diabetic drugs

INTRODUCTION

Pharmacists are "experts on medicines" and play an active role in the use of medicines in the society. They are trained as medicine specialists and are educated in the treatment for specific diseases. Therefore one of the main responsibilities of pharmacists is to provide information to both patients and physicians on rational use of medicines and thus to avoid drug interactions and preventable side effects [1-3]. Other roles of pharmacists include to design, prepare and formulate medications to suit different patients' needs. Occasionally pharmacists assume a role of prescriber and refer patients to hospitals whenever they recognize some disease symptoms that require urgent interventions. By assuming these roles, the pharmacist, creates a niche in the health care delivery system in the management of patients with diabetes. Several people living with diabetes are unaware of their disease conditions. Thus the pharmacist may increase public awareness on the risk factors of diabetes and become very resourceful in provision of quality diabetes health care [1-2].

Currently, diabetes affects approximately 246 million people worldwide [4] and has become a major threat to global public health [5]. In Africa, the prevalence of diabetes has increased significantly and the International Diabetes Federation (IDF) Atlas 2006 reports an overall prevalence of diabetes at 3.1%, affecting a total population of 10.4 million people between 20-79 years old [6]. The prevalence in urban versus rural Tanzania is 5.8% and 1.7%, respectively [7]. Diabetes in Africa is often perceived as predominantly affecting the affluent or those moving up the socioeconomic ladder and until relatively recently, diabetes in Africa were considered rare [4, 8]. Tanzanians have been witnessing a rapid rise in chronic diseases such as diabetes. For instance, the incidence of type 2-diabetes has risen from among the lowest in the world to an estimated 909,600 out of Tanzania's approximately 41 million people and prevalence is expected to increase by 50% within the next 20 years [8, 9]. Diabetes affects almost every aspect of a patient's life and without proper treatment, complications of the disease can be as devastating as the disease itself [10-12]. The incidence of heart disease, stroke, high blood pressure, blindness, kidney disease, amputations, and dental diseases are two to four times higher in diabetes patients than in the general population [10, 13]. Thus diabetic patients are likely to be receiving multiple drug therapy for several health problems from complications associated with the disease and thus have complex pharmaceutical needs [14, 15], which require pharmacists' expertise. The services provided by a pharmacist during the dispensing process have the potential to provide a valuable contribution to health care. The dispensing process does include a check on the safety and efficacy of each prescribed medication [3, 4].

Consequently, there are financial implications in terms of care and management of diabetes for both individuals and the health care system. The WHO estimates that 4-5% of health budgets are spent on diabetes-related illnesses [16]. A person with diabetes incurs medical costs that are two to five times higher than those of person without diabetes [12, 17-18]. Proper pharmaceutical management and patient counseling may greatly alleviate the patients' burden. The present study intended to look into the role of pharmacists in management of the disease through patients care and proper use of medicines and thus assist in reducing the diabetes-related complications.

METHODOLOGY

Study area and population

The study was a descriptive cross sectional one carried out in diabetes clinics of Mnazi Mmoja Hospital (MMH), Kivunge and Makunduchi in Zanzibar, Muhimbili National Hospital (MNH), Amana, Temeke and Mwananyamala District Hospitals in Dar es Salaam region. Retail pharmacies in the proximity to the above mentioned clinics and hospital pharmacies were included in the study. The study population included all diabetic patients attending the clinics and all health workers working in diabetic clinics, retail and hospital pharmaceutical personnel.

Sample size and Sampling technique

A total of 191 subjects were recruited for this study. Of those, 18 (9.4%) were health workers, 115 (60.2%) diabetic patients and 51 (26.7%) community pharmacists and 7 (3.7%) hospital pharmacists. Purposive sampling method was used for this purpose.

Ethical clearance

Ethical clearance was sought from the relevant authorities at MUHAS, District Medical officers and owners of each visited community pharmacy. Each respondent voluntarily participated in the study following both verbal and written consent.

Prior to commencement of each interview, participants were clearly explained as to the objective of the study and sufficient time was given to decide whether to participate or not.

Data collection and tools

Face-to-face interviews guided by different questionnaire for each group of the study subjects were conducted. The interviews focused on the following key aspects: knowledge of pharmacists on diabetes and antidiabetic agents, as well as role of pharmacists with regard to the patient's disease conditions and medication.

Statistical data analysis

The questionnaires were assigned serial numbers and coded before entering into a database. Each questionnaire was assessed for relevance of the information prior to data entry. Data was analysed using Epi info 6 software (CDC, Atlanta, USA).

RESULTS

Socio-demographic characteristics of the study population

A total of 191 interviewees were involved in the present study. Of those, 115 were diabetic patients of whom 38 (33%) were on insulin and 77 (67%) on oral antidiabetic agents. The remaining proportion of respondents was constituted by 18 health workers of diabetic clinics and 58 pharmacists. Of the 58 pharmacists, 51 were from the community pharmacies and 7 hospital pharmacies. Distribution of the interviewed patients and health care workers per visited diabetic clinic is shown in Table 1. The patients' ages ranged between 10 and 80 years while majority were between 45 and 54 years old (Figure 1). Female patients were relatively more than male counterparts, 68 (59.1%) and 47 (40.9%), respectively. Forty three percent (n= 49) of the interviewed patients had primary school education, 44 (38%) secondary school education and 22 (19%) had no formal education.

Patients' knowledge on diabetes mellitus and its management

The knowledge of patients about diabetes mellitus and manifestation of acute and chronic complications showed that 73 (63.5%) were aware of symptoms of the disease. Majority (76%, n=87) of the patients recognized that non-adherence to anti-diabetic treatment regimens would lead to either hypoglycaemia and/or hyperglycaemia as well as other diabetes related-symptoms. The most frequently mentioned symptoms include dehydration (83.9%), frequent urination (34.5%), high pulse rate (23%) and warm dry skin (10.3%) (Table 2). But only 44 (38.3%) said they knew what to do when they experienced hypoglycaemia. They mentioned taking a drink containing sugar (50.0%) and eating food (34.1%). Two main types of approaches were used in management of diabetes by the respondents namely oral hypogylcaemics (61.7%, n=71) and insulin injection (31%, n=36). Only 8 (7%) were using diet to control blood sugar.

Table 1: Distribution of study participants in each facility

Variable	Diabetes clinic						
	MNH	**Temek**	**M'nyamala**	**Amana**	**MMH**	**Kivunnge**	**Makunduchi**
Patients	17	14	14	14	26	14	16
Healthworkers	4	3	2	3	4	1	1
Total	**21**	**17**	**16**	**17**	**30**	**15**	**17**

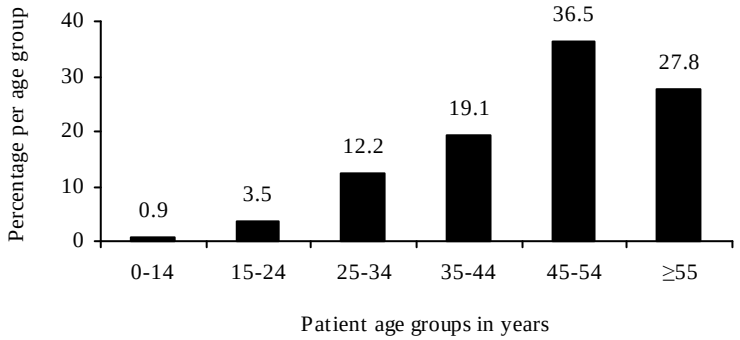


Figure 1: Distribution of patients by ages

Table 2: Responses of patients on the most common symptoms in diabetes mellitus.

No. of respondents [n=58 (%)]	Stated symptoms
34 (58.8%)	Polyphagia (excessive eating)
49 (84.3%)	Polydipsia (chronic excessive thirst)
48 (82.4%)	Polyuria (excessive urine output)
26 (45.1%)	Weakness
2 (3.9%).	Blurred vision

Seventy four patients (64.3%) were also familiar with diabetes-associated complications and pointed them out as those related to problems of the eyes, heart and kidneys. About 72% (n=83) of the diabetic patients were able to tell some measures that could improve their health. The measures cited include: adherence to special diets, weight loss, physical activity, stopping smoking and control of hypertension.

Regarding knowledge of the diabetic patients on management/treatment of their disease conditions; it was revealed that of 38 (33%) patients who were on insulin, 37 (97.3%) knew names of their medication and 32 (84%) were knowledgeable about the required dose (units of insulin) and safe storage. Similarly, out of 77 (67%) patients who were taking oral hypoglucaemics, 71 (92.2%) knew the dosage of their medication. Unfortunately, out of 115 patients, only 2 (1.7%) admitted to have acquired information regarding the symptoms and complications associated with diabetes from pharmacists.

Knowledge of pharmacists on diabetes mellitus

The pharmacist's knowledge on diabetes was self-evaluated on a scale of poor designated as (1), moderate (2), good (3) and very good (4). Out of 58 pharmacists interviewed, only 3 (5.2%) rated themselves as having very good knowledge on diabetes, 24 (41.4%) good while more than half (53.4%, n=31) rated themselves as having moderated knowledge. Results also revealed that only a few pharmacists (10.3%, n=6) had attended on job-post graduate training on diabetes of at least one month. The post graduate training centered on antidiabetic drugs, management of diabetes, diabetes complications and other related issues.

When asked to mention types of diabetes, 49 (84.5%) pharmacists were able to mention 2 major types of diabetes (type 1 and type 2),

while 4 (5.8%) went further to state the other types including gestational diabetes (3) and one pharmacist mentioned the maturity onset diabetes of the young (MODY).

Moreover, when asked to suggest treatment of the major types of diabetes mellitus; they mentioned the oral antidiabetic agents for type 2 (80.4%, n=47) and insulin for type 1 (92.2%, n=53). To further investigate the knowledge of pharmacists on diabetes mellitus, they were asked to state the primary body system that was severely affected in diabetic individuals. Majority (60.8%, n=35) said the endocrine system, 8 (13.7%) said they could not remember and other responses are summarized in Figure 2

Out of the 58 pharmacists interviewed, 49 (84.3%) and 56 (94.1%) knew which gland and hormone respectively that is affected in diabetes mellitus.

Majority (78%, n=45) of the interviewed pharmacists were able to state common risk factors for diabetes, which included obesity, sedentary life style, high blood pressure, family history and aging while 54%, (n=31) of the pharmacists knew complications of diabetes mellitus in the order of magnitude as cardiovascular (70.6%, n=23), infections (60.8%, n=19), retinopathy (56.9%, n=18), neuropathy (47.1%, n=15), nephropathy (31.4%, n=10) and impotence (27.5%, n=8).

Regarding the kind of advices they could offer to patients in order to reduce the risks of developing diabetes complications; 90.2% (n=52) of them said they would advice the patients to do physical exercise, 88.2% (n=51) adhere to appropriate diet, 72.8% (n=42) control/lose weight, and 43.1%, (n=25) to stop smoking while 13.7% (n=8) thought control of hypertension may reduce risk of diabetes.

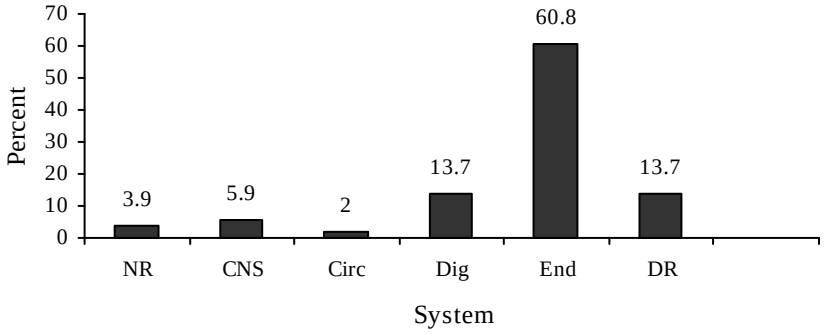
Management of diabetes and custody of anti-diabetic agents

Results indicate that 5 out of 7 clinics were involved in dispensing anti-diabetic drugs by non-pharmaceutical personnel. However, the main sources of anti-diabetic drugs for the visited clinics were hospital pharmacies (88.9%), donation from various organizations (66.7%) and the Medical Stores Department (55.6%). About 60% of the patients admitted to have gone to community pharmacies to purchase drugs when they were unavailable in the respective clinics.

In order to investigate the role of each health care cadre in management of diabetic patients; patients were asked what were the main source of information pertaining to their disease conditions and medication. Majority (65%, n=75) of patients said doctors were an important source of information regarding symptoms, complications associated with diabetes, use of drugs and precautions. Nurses and pharmacists were perceived to have a minor role in educating patients on the use and storage of anti-diabetics as claimed by 25% of the interviewees. Only about 6 (5%) appreciated the role of relatives, media and laboratory technicians who informed them on issues in respect of diabetes mellitus.

Nevertheless, it also came to light that oral anti-diabetics were readily available in all the community pharmacies visited. The most frequently encountered antidiabetics were glibenclamide (84.3%) and metformin (80.4%). Slightly more than half (63%, n=32) pharmacies stocked the recently introduced antidiabetic drugs such as glimepiride (2.0%) and thiazolidiones (2.0%) though majority of them (78.1%) had insulin in stock.

Out of the 18 health care workers interviewed who were non-pharmaceutical staff in all clinics, about 13 (72.2%) were involved in dispensing medicines. It was also found that 5 out of 7 clinics were directly involved in dispensing anti-diabetic drugs while the other two referred patients to pharmacies.



NR: No response, CNS: central nervous system, Circ: circulatory system, Dig: digestive system, End: endocrine system, DR: Do not remember.

Figure 3: Responses on the primary system that is affected in a diabetic patient

DISCUSSION

Team spirit among health care professionals is of paramount importance in the provision of healthcare services [2, 3]. Therefore the observed lack of full participation and thus minor role of pharmacists in management of diabetes is one of the drawbacks in improving the health care services rendered to our communities. Among the several defects revealed in the present study, inadequate knowledge of pharmacists on diabetes mellitus could negatively influence on patients' care and handling of the antidiabetics. Having been knowledgeable on diabetes mellitus, among other things pharmacists would perform the following tasks: screening patients at high risk for diabetes, assessing patient health status and adherence to standards of care, educating patients to empower them to care for themselves, referring patients to other health care professionals as appropriate, and monitoring outcomes [1-2,18]. Similarly pharmacists can play an important role in diabetes care by being a good source of information on the medicine-related issue like side effects, drugs interactions to both patients and other health personnel [3, 17].

Our findings showed that all duties and services at diabetes outpatient clinics were always performed by doctors and nurses. Only in case of unavailability of medicines in the clinics do the patients get referred to pharmacy to collect their medicines. It was also found that, none of these clinics had pharmaceutical personnel. Doctors and nurses were involved in all kind of health care including medicines dispensing. This finding is inline with a previous study by Ewald who also could not find any pharmacist in the diabetic clinic and that antidiabetics were in the custody of either nurses or doctors [17].

In the clinics, procurement/acquisition of medicines and ensuring their easy availability for other cadres to handle and dispense are the sole functions of pharmacists. Patient-pharmacist interaction also entails interpreting and evaluating prescriptions, consultation with prescribers regarding patient and/or a prescription in case of any problems. Usually, instruction of patients with the pharmacists during dispensing assists in reinforcing the directions given to patients by doctors or nurses [3, 18].

Moreover, there was poor availability of antidiabetics at MNH in Dar es Salaam and MMH in Zanzibar, since the Diabetes Association of Tanzania (DAT) was the sole organ that facilitated procurement, storage and dispensing of the medicines. Even in these clinics, medicines were not in the custody of pharmacists who were confined

to pharmacies. Therefore, dispensing medicines and giving necessary instructions to patients concerning their medication was done by doctors and nurses in the clinics. This practice can be considered as deficiency in provision of quality health care to patients [3, 18].

According to the National Health Policy on management of chronic diseases, medicines for treatment of the same should be provided free of charge [19, 20]. Although at hospital pharmacies at Zanzibar and MNH medicines were issued free of charge; in some district diabetes clinics, Dar es Salaam inclusive, cost sharing policy was applied to a number of oral antidiabetics, human insulin and some antihypertensive medicines (lisinopril, losartan). This may have impeded the diabetes patients' care because of financial constraints for those who cannot afford to buy the medicines [20]. In addition, in these medicines in these clinics were not managed by pharmacists, thus lacking necessary information regarding use and storage among other things for the patients.

From this study, it has been revealed that the main sources of medicines for the diabetes clinics are hospital pharmacies, whereby pharmacists play an indirect role in the management of diabetes. This observation implies that although pharmacists were not dispensing medicines to patients, they were responsible for making sure the right medicines with right quantity were delivered at right time to the clinics.

Majority (97.3%) of patients on insulin knew the brand names of insulin they were using while those on oral antidiabetics only 42.3% were able to mention the names of the medicines that they were using. One previous study reported a similar finding regarding the knowledge of diabetic patients on oral antidiabetic drugs, of which majority are Type 2 diabetes patients [18]. The few number of patients who were able to mention names of their medication could also be because of frequent change of oral antidiabetic agents as compared to insulin users [14, 21]. The fact that most (91.8%) of the patients on insulin stored the medicine correctly and 83.7% of them knew how much of the drugs should be used; reflects the importance of pharmacist's instructions given to patients. Pharmacists and patients interacted during re-fills of insulin either at hospital or community pharmacies. This could be another avenue where pharmacists are indirectly involved in diabetic patient care as it was also previously reported in Dar es Salaam and Zanzibar [10].

This study revealed that patients perceived a pharmacist as only a medicine specialist, thus consulting them only on matters pertaining to medicines. One previous study [18] had a similar observation, whereby doctors were considered as the most useful source of information on diabetes and its treatment (antidiabetic agents). This partly explains why most patients did not consider advice from pharmacists to be useful. Although there was an indirect interaction between pharmacists and patients particularly in diabetes clinics, pharmacists were still directly involved in patients care in the community pharmacies where patients obtained most of their medicines whenever they were unavailable in the respective clinics.

CONCLUSION

Pharmacists were not directly involved in diabetes patient's care in all the visited diabetes clinics. Antidiabetic medicines were managed by doctors and nurses only in all clinics. Procurement and storage of antidiabetics were the main roles of hospital pharmacists. In contrary, community pharmacists had a role of instructing patients on storage and use of medicines. Based on these results, patients could not appreciate the direct roles of pharmacist in the diabetes care in clinics.

Majority of the interviewed pharmacists had not attended continuing education and

professional development upon completion of undergraduate studies. It is therefore recommended that more active participation of pharmacists in diabetic patients care and management of anti-diabetic agents could be only achieved by equipping pharmacists with necessary knowledge on diabetes for betterment of patient care and holistic health care system in the country at large.

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