Pharmacists' Knowledge, Attitude and Practice of Pharmaceutical Care for Diabetes Mellitus Patients in a Teaching Hospital

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Research Article

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Abstract

This study was carried out in the University of Maiduguri Teaching Hospital Nigeria with the objective of assessing pharmacists` knowledge, attitude and practice of pharmaceutical care for diabetes mellitus patients. A cross-sectional study of the total population of pharmacists (30) involved in diabetes mellitus management in the Hospital was carried out using a structured questionnaire. Nineteen (65.5%) of respondents had satisfactory / acceptable knowledge about pharmaceutical care (χ^2 = 71.32; p = 0.00; df = 2). Twenty Eight (96.6%) had positive attitude towards pharmaceutical care for diabetes mellitus patients based on interest to know more and seeing the need and willingness to incorporate pharmaceutical care into practice (χ^2 = 172.98; p= 0.00; df = 1). Twenty Two (75.9%) of the pharmacists had good practice of pharmacetical care in identification of prescriptions errors (χ^2 = 23.24; p= 0.00; df =2) and identification of 1-5 prescription errors per week (χ^2 =52.02; p = 0.00; df=1). However, there was no significant difference in the proportion of pharmacists that had good and poor practice of pharmaceutical care in the area of monitoring medications and improvement in the health of diabetes patients (χ^2 = 1.62; p = 0.203; df =1). The pharmacists' level of pharmaceutical care practice needs to be improved upon in the area of monitoring medications and improvement in heath of diabetes patients.

Keywords: *Knowledge, attitude, practice, pharmaceutical care, pharmacists, diabetes mellitus.*

Introduction

Before the 1990s, diabetes mellitus was considered a rare medical condition in Africa. Epidemiological studies carried out in that decade, however provided evidence of a trend toward increased incidence and prevalence of diabetes mellitus in African population [1]. Indeed, Africa is experiencing the most rapid demographic and epidemiological transition in world history of diabetes mellitus [2]. It has the highest burden in non communicable diseases (NCDs), underlined by the increasing environmental and lifestyle changes, resulting from urbanization and westernization. The region would experience two to three folds by the year 2010 [3].

Current estimate revealed that there were at least 150 million people living with diabetes mellitus worldwide of which two-third is from developing countries [4]. The total number of diabetic patients is predicted to rise to approximately 300 million by 2025 [5]. Thus, pharmacists worldwide need to have good knowledge, right attitude towards and good practice of pharmaceutical for diabetes mellitus patients in order to alleviate symptoms, prevent complications and improve quality of life of diabetes mellitus patients. This study seeks to assess the knowledge, attitude and practice of pharmaceutical care for diabetes mellitus patients by pharmacists in University of Maiduguri Teaching Hospital (UMTH), Nigeria in 2011.

Material and Method

The study was conducted in UMTH, Maiduguri north eastern Nigeria. The Hospital runs a medical out-patient department comprising of a general out-patient and specialist medical out- patient clinics. Diabetes Clinic is one of the specialist out-patient clinics and it runs every Thursday. The study was a cross-sectional study, involving the use of self administered questionnaire among all pharmacists that were involved in diabetes mellitus management. Total population (30) of pharmacists working in UMTH were involved in diabetes mellitus patients management and constituted sample size for this study.

Literature was reviewed on the expected knowledge, attitude and practice of pharmaceutical care by pharmacists in improving/ enhancing the quality of life of patients with diabetes mellitus and framed into a questionnaire. The developed questionnaire (Appendix I) was reviewed by a pharmaceutical care experts in academia for face validity. It was also assessed for content validity in terms of content, scope, depth and appropriateness of each item of the questionnaire.

The questionnaire was pre-tested by administering to pharmacists (n=6) involved in diabetes mellitus management in a different Specialist Hospital within the city of Maiduguri. Appropriate corrections were made based on analysis of the pre-tested questionnaire. It was also assessed for reliability using split halves method, with cronbach alpha value of 0.532. This was self-administered to the 30 pharmacists, all of whom were involved in diabetes mellitus management in UMTH. The criteria in Appendix II were used for assessing acceptability of the definitions of pharmaceutical care given by the respondents.

Data analysis

The collected data were analyzed using EPI- INFO software version 3.4.1 2007. Data were presented as frequency distribution tables. Chi-Square Analysis was used to compare proportions and test hypothesis. P-values ≤ 0.05 were

at seminars/conferences; four (13.8%) read in pharmaceutical journals and one (3.4%) from other sources such as television. There was a statistically significant difference in this distribution. Nineteen (65.5%) of the respondent gave an acceptable definition of pharmaceutical care while 6 (20.7%) gave a partially acceptable definition of pharmaceutical care and 4 (13.8%) gave an unacceptable definition. There was a statistically significant difference in this distribution. Nineteen (65.5%) of the respondent said they did not subscribe to pharmacy journals in which pharmaceutical care was mentioned while 9 (31.0%) said they subscribed and 1(3.4%) did not respond. There was a statistically significant difference in this distribution.

Knowledge of pharmaceutical care (pc) for diabetes mellitus (dm) patients

Table 1: Distribution of Pharmacists according to Sources of Information on PC for DM patients, Understanding of PC, Use of Pharmacy Journals having emphasis on PC for DM patients and frequency of subscription to Pharmacy Journals having emphasis on PC for DM patients.
*Pharmacists significantly differ in their knowledge

	Sources of information	Understanding of PC	Use of pharmacy journals	Frequency of subscription to journals
	Pharmacy School 16 (55.2%)	Satisfactory/acceptable definition 19 (65.5%)	Yes 9 (31.0%)	Weekly 2 (6.9%)
	seminars/ conferences 8 (27.6%)	Partially acceptable definition 6 (20.7%)	No 19 (65.5%)	Monthly 1 (3.4%)
	Journals 4 (13.8%)	Unacceptable definition 4 (13.8%)	No Response 1 (3.4%)	Quarterly 4 (13.8%)
	Others 1 (3.4%)			Yearly 2 (6.9%)
				No Response 20 (69.0%)
Total	29 (100.0%)	29 (100.0%)	29 (100.0%)	29 (100.0%)
Test Statistics	*χ^2=80.8; p=0.0; df=3	*χ^2=71.3;p=0.0;df=2	*χ^2=23.1; p=0.0;df=1	*χ^2=191;p=0.0;df=4

considered significant.

Results

Out of the 30 pharmacists whose consents were sought to participate, 29 agreed to answer the self administered questionnaire, giving a response rate of 96.7%. The results were presented in tables 1 to 3.

On knowledge issues, sixteen of the respondents heard about pharmaceutical care in pharmacy school (55.2%), eight (27.6%)

of PC in the area of sources of information, understanding, use of pharmacy journals having emphasis on PC for DM patients and frequency of subscription to pharmacy journals having emphasis on PC for DM patients.

Twenty (69.9%) of the respondent did not respond to the question on pharmacists' frequency of subscription to Pharmacy Journals having emphasis

on pharmaceutical care. Of the nine pharmacists that responded, four (13.8%), two (6.9%), two (6.9%) and one (3.4%) subscribed to quarterly, weekly, yearly and monthly Pharmacy Journals respectively. There was a statistically significant difference in this distribution.

Pharmacists' attitude towards pharmaceutical care (PC) for diabetes mellitus patients
Table 2: Distribution of Pharmacists according to seing the need/willingness/interest to incorporate PC for DM Patients into pharmacy practice, attendance of MCPD program, interest to know more about PC for DM Patients

	Seeing the Need to Incorporate	Willingness to Incorporate	Interest to Incorporate	Attendance of MCPD program	Interest to know more About PC for DM
	Yes 28 (96.6%) No Responce 1 (3.4%)	Yes 28 (96.6%) No Responce 1 (3.4%)	Highly Interested 23 (79.3%) Interested 5 (17.2%) No Response 1 (3.4%)	Yes 18 (62.1%) No 9 (31.0%) No Response 2 (6.9%)	Yes 28 (96.6%) No Responce 1 (3.4%)
Total	29 (100.0%)	29 (100.0%)	29 (100.0%)	29 (100.0%)	29 (100.0%)
Test Statistics	$*\chi^2$=172.9; p=0.0;df=1	$*\chi^2$=172.9; p=0.0;df=1	$*\chi^2$=147.9; p=0.0;df=2	$*\chi^2$=68.4; p=0.0;df=2	$*\chi^2$=172.9; p=0.0;df=3

*Pharmacists significantly differ in their attitude towards PC in the area of to seing the need/willingness/interest to incorporate PC for DM Patients into pharmacy practice, attendance of MCPD program and interest to know more about PC for DM patients.

On attitude issues, twenty eight (96.6%) of respondents see the need for incorporation of pharmaceutical care in the practice of their profession while 1(3.4%) did not respond. There was a statistically significant difference in this distribution. Twenty eight (96.6%) of the respondent said they will be willing to incorporate pharmaceutical care into their practices while 1 (3.4%) did not respond. There was a statistically significant difference in this distribution. Twenty three (79.3%) of the respondent were highly interested in the incorporation of pharmaceutical care into their practice while five (17.2%) were interested and one (3.4%) did not respond. There was a statistically significant difference in this distribution. Eighteen (62.1%) of the respondents said they have attended mandatory continue professional development (MCPD) program on pharmaceutical care of diabetes mellitus patients while three (31.1%) said no and two (6.9%) did not respond. There was a statistically significant difference in this distribution. Twenty eight (96.6%) of the respondents said they wish to know more about pharmaceutical care of diabetes mellitus patients while one (3.4%) did not respond. There is a statistically significant difference in this distribution. On practice issues, 6 (20.7%), 4 (13.8%), 2 (6.9%) and 11 (37.9) of the respondents gave weekly estimate of anti-diabetic prescription filled by them as 1-5, 6-10, 11-15 and more than

15 respectively. Six (20.7%) of them did not respondent. There was a statistically significant difference in this distribution.

Thirteen (44.83%) of the respondents said they monitor the medications and improvement in the health of the diabetics that come to their pharmacy while 16 (55.2%) said no. There was no statistically significant difference in this distribution. Nine (31.0%) of the respondents said they monitored medication and improvement in the health of their patient through direct interviews of the patient while 4 (13.8%) said through fasting blood sugar. More than half of the pharmacists, 16 (55.2%) did not respond. There was a statistically significant difference in this distribution. Twenty two (75.9%) said they have identified errors in the prescription for diabetic patient which they fill while 4 (13.79%) said no and 3 (10.34%) did not respond.

There was a statistically significant difference in this distribution. Twenty two (75.86%) of the respondents said they identified about 1-5 prescription errors weekly while 7(24.14%) did not respond. There was a statistically significant difference in this distribution. Ten (34.5%), 9 (31.0%), 2 (6.9), and 1 (3.4%) of the respondent said they identified drug interaction, over dosage, contra-indication as errors in prescription respectively. Seven (24.1%) did not respond to the question. There was a statistically significant difference in this distribution. Eleven (37.9%) of respondents referred patients to doctor for correction as form of intervention to resolve errors in prescription while 10(34.5%) discussed with the doctor for correction, one (3.4%) advised patients to stop drug then correct errors as a form of intervention to prescription error and 7(24.1%) did not respond. There was a statistically significant difference in this distribution.

Discussion

The finding in this study that a significant proportion of the respondents have a satisfactory/acceptable knowledge of pharmaceutical care is in line with the finding in a study [6] that pharmaceutical care focuses on drug-related issues as a pharmacist has the broadest knowledge of the drugs and offers such knowledge to other persons involved in diabetes patient care. Wermeille [7] reported that a knowledgeable pharmacist is effective and well accepted by general practitioner and patient. Although, pharmacists have a good or acceptable knowledge of pharmaceutical care but do not subscribe to pharmacy journals in which pharmaceutical care was mentioned in the current study. This could be improved upon because subscription to pharmacy journals in which pharmaceutical care is mentioned can aid in broadening pharmacists' knowledge of pharmaceutical care as well as increase or enhance their acceptability by general practitioners and patients [7].

Pharmacists' practice of pharmaceutical care for diabetes mellitus patients

Table 3: Distribution of Pharmacists according to estimated number of prescriptions filled weekly, monitoring of medication and improvement in the health, Identification of errors in prescriptions for DM patients and type of intervention offered for correction with regard to spotted errors on prescription.

The positive attitude of pharmacists regarding interest to know more and seeing the need for incorporation of pharmaceutical care in the practice of their profession as observed in this study is consistent with the finding in a study [8] that pharmacists should strongly consider incorporation of pharmaceutical care program into disease management so as to achieve positive clinical outcomes as well as improving the quality of life of patients. Implementation of pharmaceutical care has resulted in better glycemic control and reduced risk score in type II diabetes mellitus [9]. The positive attitude found in this study is commendable as it would enhance knowledge/information about pharmaceutical care among pharmacists which is expected to result in positive practice that could lead to improved quality of life of patients. However, it has been observed that the physical and human barriers as exist in the hospital pharmacy could be an impediment to the realization of optimum pharmaceutical care. The Hospital Pharmacy has been structured in such a way that pharmacist-patient direct contact for counseling is minimal and generally there were few pharmacists attending to

Estimated number of prescription for diabetics filled weekly	Monitored medication and improvement in health	How they monitored improvement in the health of DM patients	Ever identified errors in prescriptions	Estimate of errors identified on weekly basis	Types of errors identified	Type of intervention offered
1-5 6 (20.7%)	Yes 13 (44.8%)	Direct interview 9 (31.0%)	Yes 22 (75.9%)	1-5 22 (75.9%)	Over dosage 9 (31.0%)	Discussed with doctor 10 (34.5%)
6-10 4 (13.8%)	No 16 (55.2%)	*FBS 4 (13.8%)	No 4 (13.8%)	No Response 7 (24.1%)	Under Dosage 2 (6.9%)	Referred to doctor 11 (37.9%)
11-15 2 (6.9%)		No Response 16 (55.2%)	No response 3 (10.3%)		Drug interaction 10 (34.5%)	Advised patients to stop drug, then, correct 1 (3.4%)
≥15 No Response 11 (20.7%)					No Response 7 (24.1%)	No Response 7 (24.1%)
Total 29 (100.0%)	29 (100.0%)	29(100%)	29(100.0%)	29 (100.0%)	29 (100.0%)	29 (100.0%)
Test statistics **χ^2=32.9; =0.0;df=4	**χ^2=1.6; p=0.20; df=1	**χ^2=38.2; p=0.0;df=2	**χ=23.2; p=0.0;df=2	**χ^2=52.0; p=0.0;df=1	**χ^2=51.3; p=0.0;df=4	**χ^2=41.1; p=0.0;df=3

*Fasting Blood Sugar. ** Pharmacists significantly differ in their practice of PC in the area of estimated number of prescriptions filled weekly, monitoring of medication and improvement in the health, identification of errors in prescriptions for DM patients and types of intervention offered.

large number of patients in Teaching Hospital. Majority of the pharmacists in this study attended MCPD program in which pharmaceutical care for diabetes mellitus patients was mentioned. This is a good attitude towards enhancing pharmaceutical care for diabetes mellitus patients. At Diabetes Care

Seminars, pharmacists are provided with information on becoming Certified Diabetes Educators and other diabetes management related credentialing opportunities as well as making pharmacists understand their important role as drug therapy experts in the diabetes health care team [10].

Although, there was no significant difference in the proportion of pharmacists that had good and poor practice of PC in the area of monitoring medications and improvement in the outcome of anti-diabetic therapy, the finding does not show a positive practice of pharmaceutical care by the respondents in the area of drug therapy monitoring. This is of great concern which requires urgent attention as it could erode the credibility of our health delivery system. Pharmacists need to practice pharmaceutical care appropriately for diabetes patients in the area of monitoring drug therapy so as to optimize outcomes and improve the quality of life of diabetes mellitus patients. Timothy [11] has reported pharmaceutical care as a useful adjunct to conventional diabetes management in primary care. Patients with diabetes mellitus need regular monitoring so as to see if there is a reduction or improvement in HbA1C level. Monitoring drug therapy prevents problems of polypharmacy and adverse drug reactions. It also reduces medication errors and ensures compliance [12].

Majority of the pharmacist in this study identified errors in the prescriptions for diabetes mellitus patients which they filled at an estimated number of 1-5 per week. Christine [13] already reported that 1-4% of prescriptions in pharmacy have problems as detected by pharmacists. The positive practice by pharmacists in the area of prescription errors identification in the current study is commendable. This could prevent avoidable problems associated with over-dosage, under-dosage, drug-interaction and contra-indications and improve economical, clinical and humanistic outcome of anti-diabetic therapy. Arun [14] has reported that the practice of pharmaceutical care by pharmacists is effective in improving the clinical outcomes and health related quality of life of diabetes patients.

Conclusion

Majority of the pharmacists in the present study had satisfactory/acceptable knowledge of PC, positive attitude, good practice in the area of prescription errors identification and interventions but there was no significant difference in the proportion of pharmacists that had good and poor practice of PC in the area of monitoring medications and improvement in the outcome of anti-diabetic therapy.

Recommendations

The following were recommendations for improving PC practice in the area of monitoring medications and improvement in the health of diabetes mellitus patient by pharmacists in University of Maiduguri Teaching Hospital: patient education on lifestyle and dietary modification, development of relationship between pharmacist and diabetes mellitus patient, provision of consultation rooms for pharmacists to enhance practice, improvement of communication skill by pharmacists, incorporation of pharmacists into ward rounds to enhance better choice of

drug in anti-diabetic therapy, counseling and monitoring patient drug therapy on diabetes mellitus, establishment of drug information centre, and improvement of relationship between pharmacists and other healthcare professionals.

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AUTHORS' CONTRIBUTIONS

Authors contributed equally to all aspects of the study.

PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.