



Hospital Pharmacists' Participation in Multidisciplinary Ward Rounds: Physicians' Perceptions and Attitudes

Roland Nnaemeka Okoro^{1*} and Mohammed Adamu Auwal²

¹*Department of Clinical Pharmacy and Pharmacy Administration, Faculty of Pharmacy, University of Maiduguri, Borno State, Nigeria.*

²*Department of Pharmaceutical Services, Specialist Hospital, Gombe, Gombe State, Nigeria.*

Authors' contributions

This work was carried out in collaboration between the authors. Author RNO designed the study, performed the data analyses and wrote the first draft of the manuscript. Author MAA managed the literature searches and data collection. Author MAA read and approved the final manuscript.

Article Information

DOI: 10.9734/BJPR/2015/12849

Editor(s):

(1) Jinyong Peng, College of Pharmacy, Dalian Medical University, China.

Reviewers:

(1) Anonymous, USA.

(2) Albert Wertheimer, Temple University School of Pharmacy Philadelphia, USA.

(3) Anonymous, Iran.

Complete Peer review History: <http://www.sciencedomain.org/review-history.php?iid=883&id=14&aid=7853>

Original Research Article

Received 21st July 2014
Accepted 2nd January 2015
Published 22nd January 2015

ABSTRACT

Aims: To survey the physicians' perceptions and attitudes towards pharmacists' participation in multidisciplinary ward rounds (MDWRs) and to ascertain their acceptance of such practice in the University of Maiduguri Teaching Hospital (UMTH).

Methods: This study was conducted at the UMTH, between September and October, 2011 using a validated questionnaire. The self-administered questionnaire was distributed to consented physicians out of the 246 physicians in the active service of UMTH as at the time of this study. The questionnaire was composed of three parts investigating the physicians' perceptions and attitudes towards pharmacists' participation in MDWRs. Data analyses were done using descriptive statistics and student's t test with $p < .05$ significant difference.

Results: A total of 151 questionnaires were completed and retrieved (response rate = 88.8%). Nearly one-half (49.6%) of the target physicians which translates to most participated physicians that perceived that drug related morbidity and mortality are often preventable and pharmaceutical

*Corresponding author: Email: orolandn@gmail.com;

services can reduce the number of Adverse Drug Reactions (ADRs), and the length of hospital stay of a patient. A little above one-half (50.4%) of the population agreed that pharmacists' participation in MDWRs enables pharmacists provide educational services on drug related issues to other members of health care team, while 49.2% agreed that it enables pharmacists function and serve as integral members of the health care team. Nearly one-half (49.2%) of the target physicians disagreed that pharmacists' participation in MDWRs diminishes the responsibilities of physicians prescribing for patients. More than one-half (56.5%) of the target physicians reported that they consult pharmacists when confronted with drug related problems. The indices of physicians showing how they perceived pharmacists' participation in MDWRs and their attitudes towards it were 42.1% and 48.7% respectively. The mean of physicians' attitude index and that of year of experience in practice showed significant difference ($p < .05$) when paired, it was revealed that physicians with lower year of practice experience exhibited more positive attitudes than their older colleagues.

Conclusion: Physicians at the study area had positive perceptions and attitudes towards pharmacists' participation in MDWRs. Therefore, they were of the opinion that they would welcome such practice in the UMTH.

Keywords: Healthcare; multidisciplinary ward rounds; participation; pharmacists; physicians.

1. INTRODUCTION

Pharmacists are knowledgeable drug experts with traditional responsibilities of compounding and dispensing drugs. With the introduction of clinical pharmacy, the roles of pharmacists extended to direct patient care. A better interaction between physicians and pharmacists has led to safer, more effective, and less costly drug therapies [1,2]. Multidisciplinary ward rounds (MDWRs) is an avenue where such interaction can occur and become effective and beneficial to patients.

MDWRs is a structured round where key health care providers involved in the patient's care meet together to discuss the patient's care and the coordination of that care. In other words, it is an avenue where dialogue and feedback occurs in relation to the needs of the patient and provides the multidisciplinary team an opportunity to plan and evaluate the patient's treatment and transfer of care together. Moreover, it is patient centered and is based on the needs of the patient. However, in 2012, Royal College of Physicians and Royal College of Nursing jointly published a guidance which calls for multidisciplinary team of physicians, nurses, pharmacists, therapist and allied health professionals to be given dedicated time to participate, with clarity about individual roles and responsibilities during and after MDWRs [3].

These key health care professionals are required to work closely together, in order to develop and evaluate the patient's integrated plan of care. To provide seamless patient care, health care teams

must move from a mindset of independence to one of interdependence [4]. An effective MDWRs present a valuable opportunity for both key health care professionals and the patient/career to share information, problem solve and plan treatment as an interdependent team [4]. When health care providers collaborate and work together, outcomes (clinical, humanistic, and economic) improve [5], and lack of representation for certain healthcare professional groups, including pharmacists may adversely affect the range of opinions and therapies for patient [6].

On MDWRs, the pharmacist assists and helps the physician in prescribing a drug to the patient. By doing so, pharmacists contribute to patient care through the provision of drug information and promotion of rational drug therapy. The goals of pharmacists' participation in MDWRs are to gain an improved understanding of the patient's clinical details, planned investigations and therapeutic goals; provide drug information; and optimize drug treatment by influencing therapy selection, implementation and monitoring [7]. They provide ample opportunities for pharmacist to assimilate additional information about the patient which may be relevant to their drug therapy, influence prescribing during decision making, detect adverse drug reactions and interactions, and participate in discharge planning. At the completion of the MDWRs, the pharmacists follow up outstanding drug related issues.

A study had shown that there is an increase in the incidence of hospitalization and death caused

by the inappropriate use of prescription drugs [8]. For every health care dollar spent on purchasing drugs, an additional dollar may be spent to deal with misuse of drugs [9]. These constitute a major public health problem. Therefore, fully utilization of pharmacists in both hospitals and communities would ensure that all the patients' drug therapy is appropriately indicated, effective, safe, convenient, and affordable [10]. The pharmacists' potential for saving and improvement of life of patients and reduction of health care cost is great.

A similar study that evaluated the attitude and perceptions of healthcare providers and medical students towards clinical pharmacy services in United Arab Emirates was conducted by Abu-Gharbieh et al. [11]. Another similar study investigated the physicians' perceptions and expectations of their experiences with the pharmacists in Qatar [12]. Currently, there are no published studies that surveyed the physicians' perceptions and attitudes towards pharmacists' participation in MDWRs in Nigeria. However, this study was embarked on, due to a lack of representation of pharmacists in the MDWRs in Nigerian hospitals. The aims of this study were to survey the perceptions and attitudes of physicians towards incorporating pharmacists in MDWRs and their perceived acceptance of such practice in the University of Maiduguri Teaching Hospital, Maiduguri in the north eastern Nigeria.

2. METHODS

2.1 Study Area

The design is a uni-centre prospective survey conducted at the University of Maiduguri Teaching Hospital (UMTH). UMTH is about 530 bed tertiary health care facility spread over 17 wards, serving a population of over 20 million people in the north-east geopolitical region of Nigeria comprising six states (Borno, Yobe, Adamawa, Taraba, Bauchi and Gombe). As at the period of this study, UMTH has a total number of 246 active physicians including House officers.

2.2 Target Population

Two hundred and forty six (246) physicians in the active employment of UMTH.

2.3 Data Collection

Data were collected between September and October, 2011. The developed questionnaire was

reviewed by a pharmacist in the hospital practice for face validity of questions. It was also assessed for content validity in terms of content, scope, depth and appropriateness of each item. The questionnaire was pre-tested and appropriate corrections were made based on analysis of the pre-tested questionnaire. It was also assessed for reliability (Cronbach alpha value = .675). The questionnaire had three sections- A and B were aimed at collecting demographics, and participants' perceptions respectively, while section C gathers information on participants' attitudes. The questionnaire was self-administered to the respondents by hand. Data from the questionnaires were extracted into the data collecting forms.

2.4 Data Analyses

Items on the questionnaire were self-reported on a three-point Likert scale (disagree, no response, and agree) and numerically coded as -1, 0, and 1 for perception items respectively whereas, items on attitude were coded vice versa for calculating the perception and attitude indices by adding all items for each individual respectively to show the overall impact of all the items on their perceptions and attitudes. Descriptive statistics were calculated for all the variables included in the study. Student's *t*-test was applied to obtain the significant difference in mean level of indices and year of working experience as a physician. A *p* value < .05 (two-tailed) was considered as statistically significant.

3. RESULTS

Out of the 170 questionnaires that were administered, 151 were completed and retrieved thereby giving response rates of 88.8%.

The mean age of the study participants is 34.6±6.4 years with a range between 23 - 52 years. Of the population, 37.0% and 22.8% were males and females respectively. The Summary of the respondents demographic data are shown in Table 1.

On evaluation of the respondents ranks in order to ascertain their reported year of experience in practice, it was found that majority of the respondents were 7(2.9%) Consultants with 11 - 15 years experience, 17(6.9%) Senior registrars with 6 - 10 years experience, 26(10.6%) Junior registrars with 1 - 5 years experience, and 19(7.8%) Medical officers with 1 - 5 years experience. The details are shown in Table 2.

Table 1. Respondents' demographic data (N = 246)

Variable	Category	n(%)
Age-group (Years)	20-29	38(15.4)
	30-39	83(33.7)
	40-49	25(10.2)
	≥50	5(2.0)
Gender	No response	4(1.6)
	Male	91(37.0)
	Female	56(22.8)
Rank	Consultant	21(8.5)
	Senior registrar	27(11.0)
	Junior registrar	46(18.7)
	Medical officer	28(11.4)
	House officer	29(11.8)
Year of experience in practice (Years)	No response	2(0.8)
	< 1	29(11.8)
	1-5	51(20.7)
	6-10	47(19.1)
	11-15	11(4.5)
	16-20	8(3.3)
	21-25	2(0.8)
26-30	1(0.4)	

Physicians' perceptions of pharmacists' participation in MDWRs is explained in Table 3. In general, physicians had high perceptions towards pharmacists' involvement in MDWRs.

On evaluation of physicians' attitudes, this study revealed that an appreciable number (121, and 113) of physicians disagreed that pharmacist's presence during MDWRs diminishes the responsibilities of physicians prescribing for patients, and pharmacists making decisions about diagnosis respectively. Ninety physicians also disagreed that multidisciplinary ward rounds affords pharmacists the opportunity to learn the secret of medical practice. One hundred and thirteen (113) physicians disagreed that pharmacists are asking for too much to be part of MDWRs. Lastly, 139 physicians agreed that they consult pharmacists when confronted with drug related problems. These findings are illustrated in Table 4.

Out of 114 of the physicians that reported that they would welcome pharmacists' participation in MDWRs, 23 were with less than one year experience in practice, 41 were between 1 – 5 years, 34 were between 6 – 10 years, 7 were between 11 – 15 years, 6 were between 16 – 20 years, 1 between 21 – 25 years and 26 - 30 years respectively as shown in Table 5.

Out of the target physicians, 42.1%, and 48.7% physicians had perception and attitude indices greater than one respectively. Detailed results are shown in Table 6.

On comparing the mean of the indices and year of experience in practice, statistical difference was found between attitude index and year of experience in practice ($p < .05$) as shown in Table 7.

4. DISCUSSION

Practitioners from each key discipline of the MDWRs team can use their specialized training and skills to make significant contributions to patient care. In other words, treatment of patients is in most cases, a combined effort of several health care professionals and it is recognized that the outcome of a procedure is optimal when the professionals do indeed work together as a team. Obviously, pharmacists are part of treatment teams in healthcare establishments. With expertise of product and processes, they improve the therapeutic outcome and the quality of work flow. Although it seems obvious that pharmacists form part of a team, do we know the exact added value of their contributions [13]?

This study revealed that majority of the participated physicians was aware of the importance of incorporating pharmacists as members of the MDWRs team. This revelation is consistent with the philosophy of pharmaceutical care which is a patient centered collaborative care in which pharmacists partner with other key health care professionals and patient in designing, implementing, and monitoring a care plan aimed at preventing and resolving drug related problems [14]. Nearly one-half of the target physicians which translates to more than three quarter of the participated physicians agreed that drug related morbidity and mortality are often preventable and pharmaceutical care services can reduce the number of Adverse Drug Reactions (ADRs), and the length of hospital stay of a patient. Length of hospital stay is one of the measures used to study the impact of MDWRs on clinical outcomes. The finding of this study has been proved with that of a randomized, controlled trial conducted in a large, acute care tertiary hospital, where it was found that replacing traditional once-a-week rounds with daily MDWRs reduced length of patients' hospital stay [15].

Table 2. Physicians' ranks according to year of experience in practice (N = 246)

Year of experience (Years)	Physicians' rank n (%)				
	Consultant	Senior registrar	Junior registrar	Medical officer	House officer
No response	0(0.0)	2(0.8)	0(0.0)	0(0.0)	0(0.0)
< 1	0(0.0)	0(0.0)	0(0.0)	0(0.0)	29(11.8)
1-5	1(0.4)	5(2.0)	26(10.6)	19(7.8)	0(0.0)
6-10	5(2.0)	17(6.9)	17(6.9)	8(3.3)	0(0.0)
11-15	7(2.9)	2(0.8)	2(0.8)	0(0.0)	0(0.0)
16-20	5(2.0)	1(0.4)	1(0.4)	1(0.4)	0(0.0)
21-25	2(0.8)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
26-30	1(0.4)	0(0.0)	0(0.0)	0(0.0)	0(0.0)

Table 3. Physicians' perceptions of hospital pharmacists' participation in multidisciplinary Ward rounds (N = 246)

Physicians' perceptions	n (%)		
	Disagree	No response	Agree
Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improves a patient's quality of life.	20(8.1)	33(13.4)	98(39.8)
To achieve these definite outcomes, pharmacists cooperate with patient and other key health care professionals in designing, implementing and monitoring a care plan aimed at preventing and resolving drug-related problems.	12(4.9)	22(8.9)	117(47.6)
Drug related morbidity and mortality are often preventable and pharmaceutical services can reduce the number of Adverse Drug Reactions (ADRs), and the length of hospital stay of a patient.	20(8.1)	9(3.7)	122(49.6)
Appropriate drug selection and drug therapy monitoring by pharmacists ease the work of the physicians on drug therapy.	39(15.9)	1(0.4)	111(45.1)
Pharmacists' presence enables prescribing to be influenced at the time of decision making.	47(19.1)	5(2.0)	99(40.2)
Pharmacists ensure that patients receive the maximum benefit from drug therapy.	31(12.6)	4(1.6)	116(47.2)
Pharmacists' involvements in direct patient care provide cost-containment initiatives.	36(14.6)	3(1.2)	112(45.5)
Pharmacists provide educational services on drug related issues to other members of Health care team.	24(9.8)	3(1.2)	124(50.4)
Pharmacists play key roles in the development of disease specific drug treatment guidelines.	50(20.3)	5(2.0)	96(39.0)
Pharmacists functioning and serving as integral members of the health care team.	23(9.3)	7(2.8)	121(49.2)
The presence of pharmacists on MDWRs improves the accuracy of drug history documentation.	45(18.3)	7(2.8)	99(40.2)
Medication history of a patient on admission should be taken by pharmacists	65(26.4)	4(1.6)	81(33.3)

Most of the respondents that constituted lower than the average of the target population perceived that pharmacists' participation in MDWRs enables prescribing to be influenced at the time of decision making. This finding lends

credence to the fact that pharmacists are ideally placed to influence prescribing by physicians because they are knowledgeable in therapeutics. Therefore, pharmacists are often the ones who communicate with the treating physician, in order

to offer the best possible treatment for hospitalized patients [16]. Other studies showed similar results [12,17]. This is reassuring that physicians understand that pharmacists as healthcare team members rendering suggestions on drug therapy ease their work on drug therapy. Collaborative care by the healthcare professionals improves patient care, enhances patient safety and reduces workload issues that cause burn out among a particular healthcare professional.

A little below one-half of the target physicians that formed the majority of the participated physicians were of the opinion that pharmacists' participation in the MDWR ensures that patients receive the maximum benefit from drug therapy. Like other healthcare professionals, the main goal of pharmacists within the team is to benefit the patient. The United Arab Emirates study [11] revealed a similar finding, but in this case three quarter of the 3 key healthcare providers (physicians, pharmacists and Nurses) were in agreement. However, a German study provided evidence that the participation of a pharmacist during MDWRs contributed to the optimization of pharmacotherapy [18].

Majority of the participated physicians which translates to less than one-half of the population agreed that hospital pharmacists' participation in the MDWRs provides cost-containment initiatives in patient care. This perception is also in agreement with the finding of other studies [11,19]. This indicates that physicians knew that it is more costly to deal with the problems of inappropriate drug therapy. Studies undertaken in the United Kingdom and America provided proofs that the presence of pharmacists on the MDWRs reduced prescription costs [20,21].

In the present study, Nearly one-half of the target population that formed more than three quarter of

the participated physicians agreed that pharmacists' participation in the MDWRs will make hospital pharmacists function and serve as integral members of the health care team. This is in agreement with the finding of another study [11]. This depicts that physicians are aware that pharmacist can only prove himself as a member of healthcare team by participating in MDWRs. Less than one-half of the target physicians that constituted more than one-half of the participated physicians perceived that pharmacists' participation in the MDWRs makes pharmacists play key roles in the development of disease specific drug treatment guidelines. This finding suggests that pharmacists can only make important contributions in the development or review of disease specific drug treatment guidelines if they were involved in the actual drugs use practice in patients which MDWRs is an indispensable avenue.

Majority of the participated physicians which translates to less than one-half of the target physicians opined that the presence of pharmacists on MDWRs improves the accuracy of drug history documentation, therefore perceived that drug history of admitted patients should be obtained by pharmacists. A German study provided evidence to this finding [18].

On evaluation of physicians' attitudes, this study revealed perceived positive attitude towards pharmacists participating in MDWRs. These attitudes were significantly dependent on the year of their experience in practice. These findings shows that physicians especially those with lower year of experience in practice exhibited positive attitudes that pharmacists in the MDWRs team do not in any way encroach on their roles, but collaborate with them to make life more meaningful for the patients.

Table 4. Physicians' attitudes towards hospital pharmacists' participation in multidisciplinary ward rounds (N = 246)

Physicians' attitudes	n(%)		
	Disagree	No response	Agree
Pharmacists' participation in MDWRs diminishes the responsibilities of physician prescribing for patients.	121(49.2)	2(0.8)	28(11.4)
Pharmacists making decision about diagnosis.	113(45.9)	3(1.2)	35(14.2)
It affords pharmacists the opportunity to learn the secret of medical practice.	90(36.6)	9(3.7)	52(21.1)
Pharmacists are asking for too much to be part of MDWRs.	113(45.9)	11(4.5)	27(11.0)
I do not consult pharmacists when confronted with drug related problems.	139(56.5)	2(0.8)	10(4.1)

Table 5. Participants responses on will you welcome pharmacists' participation in multidisciplinary ward rounds in your hospital according to year of experience in practice (N = 246)

Physicians' year of experience in practice (Years)	n(%)		
	No	No response	Yes
No response	0(0.0)	1(0.4)	1(0.4)
< 1	4(1.6)	2(0.8)	23(9.3)
1-5	10(4.1)	0(0.0)	41(16.8)
6-10	9(3.7)	4(1.6)	34(13.9)
11-15	4(1.6)	0(0.0)	7(2.8)
16-20	2(0.8)	0(0.0)	6(2.4)
21-25	1(0.4)	0(0.0)	1(0.4)
26-30	0(0.0)	0(0.0)	1(0.4)

Table 6. Description of perception, and attitude indices of towards pharmacists' participation in multidisciplinary ward rounds (N = 246)

Index	Index level	%	Mean
Perception	≤ 0	14.1	2.70
	0.1 – 1	2.8	
	> 1	42.1	
Attitude	≤ 0	4.8	3.93
	0.1 – 1	7.7	
	> 1	48.7	

Table 7. Student's t-test of mean of indices and year of experience in practice

Pair	Variables	T	df	p
Pair 1	Perception Index - Year of experience in practice	0.497	150	.62
Pair 2	Attitude Index - Year of experience in practice	6.192	150	.00

Physicians knowing the importance of pharmacists in drug therapy, an overwhelming number of participated physicians reported that they consult pharmacists when confronted with drug related issues. In addition, a little more than two third of them were of the opinion that the practice of having pharmacists as members of the MDWRs team would be received and welcomed in the University of Maiduguri hospital. This is so, because they were aware that the absence of pharmacists in the MDWRs team creates a vacuum which no other healthcare practitioners can adequately fill.

4.1 Limitations of the Study

All physicians in the active service of UMTTH did not participate in this study partly due to absence of some of them during the period of the study, whereas others outright declined to participate in the study owing to undisclosed reason(s).

Secondly, there was an unequal distribution of physicians according to year of working experience. Lastly, physicians might have different interpretations of the survey items and definition of pharmaceutical care.

5. CONCLUSION

Physicians opined that inclusion of pharmacists in the MDWRs team poses no threat to their clinical roles to patients, but enables pharmacists collaborate with them to optimize the quality of the patients' pharmacotherapy thereby increase drug-related patient safety. Therefore, physicians at the study area had positive perceptions and attitudes towards pharmacists' participation in MDWRs. Therefore, they were of the opinion that this indispensable practice which is the current hospital practice in most developed countries would be welcomed in the University of Maiduguri hospital.

CONSENT

Informed consent was obtained from the participants.

ETHICAL APPROVAL

Ethical approval was sought and obtained from the research and ethics committee of the University of Maiduguri Teaching Hospital.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Martin S. In the physician's office: An interview with W. Ray Burns. *Am Pharm.* 1989;NS29(12):17-19.
2. Fortner C. Building cooperation with physicians: An interview with Charles Fortner. Interview by Joyce Leinberger Mitchell. *Am Pharm.* 1990;NS30(2):24-26.
3. Royal college of physicians. *Ward rounds in medicine: Principles for best practice*; 2012. Available: www.rcplondon.ac.uk/resources/wardround
4. Halm M, Gagner S, Goering M, Sabo J, Smith M, Zaccagnini M. 'Interdisciplinary rounds impact on patients families and staff'. *Clinical Nurse Specialist.* 2003;17(3):133-142.
5. Wagner EH, Davis C, Schaefer J, Von Korff M, Austin B. A survey of leading chronic disease management programs: Are they consistent with literature? *Managed care Quarterly.* 1999;7:55-66.
6. Anyika EN, Alade TB. Evaluation of pharmacists' participation in post admission ward rounds in a tertiary hospital in south west Nigerian quarterly. *Journal of Hospital Medicine.* 2009;19:3 [Abstract].
7. Saurabh H. *Ward Round: The ground level of patient care.* Available: <http://www.pharmainfo.net/blog/Himanshu-saurabhV>
8. Johnson JA, Bootman JL. Drug related morbidity and mortality and the economic impact of pharmaceutical care. *Am J Health Syst Pharm.* 1997;54:554-558.
9. Oparah CA. *Essentials of pharmaceutical care.* All Deals Investment Lagos Nigeria 2010;26.
10. Johnson JA, Bootman JL. Drug related morbidity and mortality: A cost of illness Model. *Arch of Intern Med.* 1995;155:1949-1956.
11. Abu-Gharbieh E, Fahmy S, Rasool BA, Abduelkarem A, Basheti I. Attitudes and perceptions of healthcare providers and medical students towards clinical pharmacy services in united Arab Emirates. *Tropical Journal of Pharmaceutical Research.* 2010;9(5):421-430.
12. Zaidan M, Singh R, Wazaify M, Tahaine L. Physicians' perceptions, expectations, and experience with pharmacists at Hamad Medical Corporation in Qatar. *Journal of Multidisciplinary Healthcare.* 2011;4:85-90.
13. Le Brun PP. The role of the pharmacist in a multidisciplinary team. Available: www.The role of the pharmacist in a multidisciplinary team _ Hospital Pharmacy Europe.htm
14. Hepler CD, Strand M. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm.* 1990;47:533-543.
15. Curley C, Melinek M, Speroff T. A firm trial of interdisciplinary rounds on the inpatient medical wards: An intervention designed using continuous quality improvement. *Med Care.* 1998;36(8 Suppl):AS4-AS12.
16. Hug MJ. The role of the pharmacist in a multidisciplinary team. Available: www. The role of the pharmacist in a multidisciplinary team _ Hospital Pharmacy Europe.htm
17. Stemer S, Lemmens-Gruber R. The clinical pharmacist's contributions within the multidisciplinary patient care team of an intern nephrology ward. *International Journal of Clinical Pharmacy.* 2011;33(5):759-762.
18. Langebrake C, Hilgarth H. Clinical pharmacists' interventions in a Germany University Hospital, *Pharm World Sci;* 2010 [Abstract].
19. Vazirani S, Shapiro M, Cowan M. 'Effect of a multidisciplinary intervention on communication and collaboration among

- physicians and nurses'. American Journal of Critical Care. 2005;14(1):71-77.
20. Fertleman M, Barnett N, Patel T. Improving medication management for patients: The effect of a pharmacist on post admission ward rounds. Qual Saf Health Care. 2005;14:207-211.
21. Scarsi K, Fotis M, Noskin G. Pharmacist participation in medical rounds reduces medication errors. Am J Health-Syst Pharm. 2002;59:2089-2092.

© 2015 Okoro and Auwal; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<http://www.sciencedomain.org/review-history.php?iid=883&id=14&aid=7853>