

Knowledge, Attitude and Practice of Pharmacovigilance among Health Care Professionals in Jos University Teaching Hospital, Nigeria

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ABSTRACT

Background: Pharmacovigilance is a post-marketing surveillance of medicine use. Studies show that adverse drug reactions lead to acute hospitalizations. We noticed a decline in pharmacovigilance activities in our Centre, thus we aim to determine the knowledge, attitude and practice of pharmacovigilance in Jos University Teaching Hospital (JUTH).

Method: It was a cross-sectional questionnaire-based study design using stratified sampling method in administering 183 questionnaires to Pharmacists, Doctors and Nurses in JUTH from May to June, 2019. Results were presented in proportions and a p value of <0.05 was considered statistically significant.

Result: The modal age of respondents was 26-35 years. On sources of information on pharmacovigilance, 39.9% got information from Journal texts, 3.3% through television/Radio set, 29.5% from combination of Journals, Television/Radio, Colleagues, Seminars and lectures. The overall good knowledge of pharmacovigilance was 62.3%, majority (84.7%) had good attitude while most (63.4%) had poor practice of Pharmacovigilance. There were statistical significant differences in knowledge, attitude and practice of Pharmacovigilance in relation to the three professions (p=0.000).

Conclusion: This study shows that health care professionals in Jos university teaching hospital had good knowledge and attitude towards pharmacovigilance but had very poor practice.

Key words: Knowledge; Attitude; Practice; Pharmacovigilance; Adverse drug reaction; Jos; Nigeria

INTRODUCTION

Pharmacovigilance can be defined as the science and activities relating to the detection, assessment, understanding and prevention of adverse effect or any other drug-related problem [1]. Medicines help us to treat many diseases but adverse drug reactions (ADRs) cause serious health problems. Studies have indicated that, adverse drug reactions account for approximately 5% of all acute hospitalizations. About half of these hospitalizations could have been prevented by more effective drug therapy monitoring, timely recognition of the symptoms; and knowledge about certain risk factors for the occurrence of these adverse drug reactions [2]. Of the adverse drug events reported in two separate studies, 63.9% and 52.2% occurred among patients admitted into the medical wards respectively [2-4]. Sufficient knowledge of ADR and skill about the safety use of drugs in clinical practice is important but most healthcare professionals have limited pharmacovigilance competencies, thereby need more education and training to enhance pharmacovigilance activities [5-6].

It is an important and integral aspect of clinical research as it continues to play a major role in meeting the challenges posed by the increasing number of medicines in clinical practice and it is well known that, no drug is completely free from adverse effects [7]. According to Tanzania Food & Drugs Authority (TFDA), adverse drug reactions are inevitable consequences of pharmacotherapy. It is well known that all drugs carry the potential to produce both the desirable and undesirable effects. No drug is absolutely safe under all circumstances of use or in all patient and ADRs may occur even if a drug is correctly selected and dosed [8].

Adverse drug reactions are also of concern to patients and this may affect adherence to medications negatively or cause harm.

Following the tragedy from the use of thalidomide in the 1960s, post-marketing surveillance of medicines is necessary in all populations including the patients in special fields like children, pregnant women and the elderly. Being an important step (phase 5 of drug development and use), pharmacovigilance as a continued

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surveillance of drug safety should be encouraged among healthcare practitioners, hence, there is need for continuous assessment of the knowledge, attitude, and practice of pharmacovigilance among health professionals. There is little record of adverse effects of medicines use in Nigeria and in Jos, hence the need to determine the knowledge, attitude and practice of pharmacovigilance in this environment so as to inform training where necessary and promote pharmacovigilance activities and ultimately enhancing patient safety.

The pharmacovigilance centre in our study site has been involved in education and training of health care professionals (HCP) since 2004, but have noticed a recent decline in consult to the Centre probably due to the presence of many new HCP in JUTH. Hence, we aim to determine the knowledge, attitude and practice of pharmacovigilance in Jos University Teaching Hospital, so as to inform training where necessary and promote pharmacovigilance activities and ultimately enhancing patient safety.

METHOD

The research was conducted at Jos university teaching hospital (JUTH) in North central part of Nigeria during the month of May to June 2019. JUTH is one of the major tertiary health facilities among tertiary hospitals in the six geo-political zones of the country. It is a 600 bed capacity hospital that provides medical services to about eight (8) states within the region and other geo-political zones. Plateau state is located in Nigeria's middle belt with a population of about three million people within an area of 26,899 square kilometers. It is located between latitude 80°24'N and longitude 80°32' and 100°38' east.

Study design: The study was a Cross-sectional questionnaire-based study design.

Sample size: Sample size was calculated using the formula

$$n = \frac{Z^2 pq}{e^2}$$

Where 'n' is the sample size, e is the desire level of precision (the margin of error) = 0.05; p is the (estimated) proportion of the population which has the attribute in question (knowledge, attitude and practice) = 13.86% = 0.1386. q is 1-p = (1 - 0.1386) = 0.8614 and Z is the standard normal variate (at 5% error (e=0.05)) and is found in Z table to be 1.96.

Therefore, n = 183.44 \cong 183

This implies that, 183 health care professionals (medical doctors, pharmacists, and nurses) were randomly selected and allowed to respond to a self-administered questionnaire. The questionnaires were divided into three (3) equal parts such that each health care profession (doctors, Pharmacists and Nurses) were administered sixty-one (61) questionnaires each.

Sample method: The sampling method was stratified random sampling.

Study population: The study population is the healthcare professionals comprising of registered Pharmacists, Medical doctors, and Nurses in Jos university teaching hospital (JUTH).

Inclusion criteria: All the registered Pharmacists, doctors and nurses in JUTH who were present at the time of the questionnaire administration and who gave their consent to participate in the study.

Exclusion criteria: All the registered Pharmacists, doctors and nurses in JUTH that were not present at the time of questionnaire

administration and who did not give consent to participate in the study were excluded.

DATA COLLECTION AND TOOL

Data was collected using 183 validated self-administered questionnaires which was a thirty-eight (38) point pre-designed and validated questionnaire with both open and closed ended questions. Testing through a pilot study of 60 questionnaires, adjustments were made where necessary until standardized using the cronbach alpha for reliability of questionnaire. They were equally distributed among health care professionals during their clinical activities and a time frame of one week was allowed for the collection of the filled questionnaire. It was designed to capture demographic data, knowledge, attitude, and practice of pharmacovigilance by the health care professionals (Medical doctors, Pharmacists and nurses) working in different departments of the hospital. An ethical clearance was obtained from Jos university teaching hospital ethical committee. Questionnaires were distributed to the participants, which consist of sixty-one medical doctors, sixty-one Pharmacists and sixty-one nurses servicing the needs of patients that visit the teaching hospital, from different clinical specialties.

DATA ANALYSIS

The data collected from the filled questionnaires were coded and entered into Microsoft Excel software and analyzed using the statistical package of social sciences (SPSS) version 22. The results were expressed in tabular form and bar chart as frequency and proportions. The relationship between knowledge, attitude and practice of pharmacovigilance were determined using inferential statistics (chi square). A p value of 0.05 was used to determine the significance of any association between variables.

RESULTS

Response rate: One hundred and eighty-three (183) questionnaires were distributed and retrieved as follows: Doctors 61, Nurses 61 and Pharmacist 61. The response rate was 100% (Table 1). The study population constitute 92 (50.3%) females. Ages were grouped into 16-25 years, 26-35 years, 36-45 years, 46-55 years, and above 55 years respectively. Age group 26-35 dominated the study with 37.7%. Years of service was grouped into <1-5 years, 6-10 years, 11-15 years and 15 years and above. Majority of the study participants (55.7%) had <1-5 years practicing experience (Table 2). On of knowledge of pharmacovigilance, 32(17.5%) of the respondents defined pharmacovigilance as the science of monitoring adverse drug reaction happening in a hospital, 18(9.8%) define pharmacovigilance as the process of improving the safety of drugs, 74(40.4%) defined pharmacovigilance as the detection, assessment, understanding and prevention of ADR, 8(4.4%) defined pharmacovigilance as the science of monitoring ADR and process of improving the safety of drugs in a hospital, 7(3.8%) defined pharmacovigilance as science of monitoring ADR and the detection, assessment, understanding and prevention of adverse effect, while 24(13.1%) accepted all the above definitions (Table 3). On participants with general knowledge of the definition of pharmacovigilance, Pharmacists were 17 (70.8%), followed by doctors 7(29.2) and 0 (0%) of nurses (Table 3).

About the importance of pharmacovigilance, 59(32.2%) said that the importance of pharmacovigilance is to monitor safety of drugs and prevent occurrence of ADR, 1(0.5%) said it's to calculate incidence of ADR, 4(2.2%) said it's to identify unrecognized ADR while majority 119(65.0%) said all the aforementioned are the

Table 1: Response Rate.

Questionnaire	Doctors	Pharmacists	Nurses	Total
Distributed	61(33.3)	61(33.3)	61(33.3)	183(100.0)
Returned	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 2: Demographic characteristics of Respondents (n = 183).

Gender	F	%
Male	91	49.7
Female	92	50.3
Age (in years)		
16-25	25	13.7
26-35	69	37.7
36-45	59	32.2
46-55	28	15.3
>55	2	1.1
Profession		
Doctor	61	33.3
Pharmacist	61	33.3
Nurse	61	33.3
Years of service		
<1-5	90	49.2
6-10	45	24.6
11-15	26	14.2
15+	22	12.0
How long have you been practicing as a health professional		
<1-5	102	55.7
6-10	34	18.6
11-15	23	12.6
15+	24	13.1
Total	183	100.0

Table 3: General knowledge of Pharmacovigilance.

What is Pharmacovigilance	Profession			Total
	Doctor	Pharmacist	Nurse	
The science of monitoring adverse drug reaction (ADR) happening in a hospital	4(12.5)	7(21.9)	21(65.6)	32(100.0)
The process of improving the safety of drugs	9(50.0)	1(5.6)	8(44.4)	18(100.0)
The detection, assessment, understanding & prevention of adverse effects	33(44.6)	21(28.4)	20(27.0)	74(100.0)
The science detecting the type & incidence of adverse drug reaction after drug is marketed	0(0.0)	12(60.0)	8(40.0)	20(100.0)
The science of monitoring adverse drug reaction and the process of improving the safety of drugs in a hospital	4(50.0)	0(0.0)	4(50.0)	8(100.0)
Science of monitoring adverse drug reaction & the detection, assessment, understanding & prevention of adverse effects	4(57.1)	3(42.9)	0(0.0)	7(100.0)
All of the above	7(29.2)	17(70.8)	0(0.0)	24(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

important purpose of pharmacovigilance (Table 4). Majority of the respondents (92.9%) agreed that ADR reporting is a professional obligation while 7.1% were not sure (Table 5) and 127 representing 69.4% said reporting ADR is the responsibility of the Doctors, Nurses and Pharmacist (Table 6), while 164(89.6%) agreed, and 18 (9.8%) partially agreed that post marketing surveillance studies is a method commonly employed to monitor ADR once a drug is launched in the market and available for use (Table 7).

One hundred and forty participants representing 76.5% understood that the body that is responsible for monitoring of ADR in Nigeria is National Agency for Food Drugs Administration and Control (NAFDAC) (Table 8).

Most of the respondents were aware of the existence of National pharmacovigilance Centre out of which 65(60.2%) were aware that the Centre in Nigeria is located in National Agency for Food Drugs Administration and Control (NAFDAC) Headquarters.

Table 4: Important purpose of Pharmacovigilance.

Important purpose of Pharmacovigilance	Profession			
	Doctor	Pharmacist	Nurse	Total
To monitor safety of drugs and prevent occurrence of adverse drug reaction	9(15.3)	17(28.8)	33(55.9)	59(100.0)
To calculate incidence of adverse drug reaction	0(0.0)	1(100.0)	0(0.0)	1(100.0)
To identify unrecognized adverse drug reaction	2(50.0)	2(50.0)	0(0.0)	4(100.0)
All of the above	50(42.0)	41(34.5)	28(23.5)	119(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 5: ADR reporting as a professional obligation.

Do you think ADR reporting is a professional obligation to you	Profession			
	Doctor	Pharmacist	Nurse	Total
Yes	61(35.9)	60(35.3)	49(28.8)	170(100.0)
May be	0(0.0)	1(20.0)	4(80.0)	5(100.0)
Can't say	0(0.0)	0(0.0)	8(100.0)	8(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 6: Responsibility to report ADRs.

Whose responsibility is it to report adverse drug reactions (ADR)	Profession			
	Doctor	Pharmacist	Nurse	Total
Doctor	3(23.1)	6(46.2)	4(30.8)	13(100.0)
Nurse	2(50.0)	2(50.0)	0(0.0)	4(100.0)
Pharmacist	2(5.1)	13(33.3)	24(61.5)	39(100.0)
All of the above	54(42.5)	40(31.5)	33(26.0)	127(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 7: Post marketing surveillance.

Post marketing surveillance (PMS) studies is a method commonly employed to monitor ADRs once a drug is launched in the market and available for use	Profession			
	Doctor	Pharmacist	Nurse	Total
Agree	59(36.0)	57(34.8)	48(29.3)	164(89.6%)
Partially agree	2(11.1)	3(16.7)	13(72.2)	18(9.8%)
Disagree	0(0.0)	1(100.0)	0(0.0)	1(0.5%)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

On the knowledge of the International Centre, majority of the respondents 50(46.3%) don't know where the international Centre is located, however, 43(39.8%) were aware that it is located in Sweden. Majority of the Pharmacist were aware of the presence of pharmacovigilance Centre in JUTH. However, majority of the Nurses and the Doctors were not aware of the presence of pharmacovigilance Centre in JUTH (Table 9).

The study revealed that those responsible for monitoring ADR in JUTH were Doctors, Pharmacists and Nurses. Furthermore, the study revealed that 112(61.2%) understood that pharmacovigilance was for monitoring Drug related problems (Table 10). Table 11 showed that Responsibility of Pharmacovigilance .Awareness on medico-legal problem in pharmacovigilance revealed that 28(48.3%) Doctors, 22(37.9%) Pharmacists and 8(13.8%) Nurses were aware of medico-legal problem in pharmacovigilance (Table 12). Table 13 showed that 53(35.5%) Doctors, 53(35.5%) Pharmacists and 44(29.3%) Nurses were aware that ADR is an unwanted, usually harmful reaction following use of drugs.

On sources of information on pharmacovigilance, 73(39.9%) got their information through Journal text, 6(3.3%) got their information through television and Radio set, 54(29.5%) got their

information through Journals, Television and Radio, Colleagues, Seminar and lectures (Table 14).

General attitude on pharmacovigilance: On attitude toward Pharmacovigilance, 61(33.3%) Doctors, 60(33.0%) Pharmacist and 61(33.5%) Nurses agreed that reporting of ADR is necessary. Majority 168(91.8%) strongly agreed that discussion on ADR during clinical round is very important in monitoring drug related problems (Table 15).

General practice of pharmacovigilance: The study revealed that 155 respondents which constituted 57(36.8%) Doctors, 50(32.3%) Pharmacists and 48(31.0%) Nurses had in their professional practice once observed ADRs in their patients. Respondents (149) constituting 55(36.9%) Doctors, 58(38.9%) Pharmacists and 36(24.2%) Nurses knew what to do when they see an ADR. Also, 106 respondents, being 43(40.6%) Doctors, 47(44.3%) Pharmacists and 16(15.1%) Nurses know how to reports ADR. It was further discovered that 23(29.9%) Doctors, 34(44.2%) Pharmacists and 20(26.0%) Nurses had filled an ADR form before (Table 16).

On the overall knowledge of Pharmacovigilance, majority of the respondents constituting 62.3% had good knowledge on Pharmacovigilance while 69(37.7%) had poor knowledge (Table 17).

Table 8: Body responsible for monitoring ADR.

In Nigeria, which body is responsible for monitoring of adverse drug reaction	Profession			Total
	Doctor	Pharmacist	Nurse	
Nigerian Medical Association	4(100.0)	0(0.0)	0(0.0)	4(100.0)
Pharmaceutical Society of Nigeria	14(37.8%)	7(18.9)	16(43.2)	37(100.0)
Standard Organization of Nigeria	2(100.0)	0(0.0)	0(0.0)	2(100.0)
National Agency for Food Drugs Administration and Control	41(29.3)	54(38.6)	45(32.1)	140(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 9: Awareness on the existence of Pharmacovigilance Centre..

Are you aware of the existence of National Pharmacovigilance Centre	Profession			Total
	Doctor	Pharmacist	Nurse	
Yes	41(38.0)	51(47.2)	16(14.8)	108(100.0)
No	20(26.7)	10(13.3)	45(60.0)	75(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)
If yes, where is the National Centre Located				
National Hospital Abuja	12(70.6)	5(29.4)	0(0.0)	17(100.0)
National Agency for Food and Drug Administration and Control (NAFDAC)	23(35.4)	34(52.3)	8(12.3)	65(100.0)
National Institute for Pharmaceutical Research and Development, Abuja	6(42.9)	4(28.6)	4(28.6)	14(100.0)
I don't know	0(0.0)	8(66.7)	4(33.3)	12(100.0)
Total	41(38.0)	51(47.2)	16(14.8)	108(100.0)
Where is the International Pharmacovigilance Centre located				
UK	0(0.0)	3(100.0)	0(0.0)	3(100.0)
USA	6(50.0)	6(50.0)	0(0.0)	12(100.0)
Sweden	22(51.2)	17(39.5)	4(9.3)	43(100.0)
I don't know	13(26.0)	25(50.0)	12(24.0)	50(100.0)
Total	41(38.0)	51(47.2)	16(14.8)	108(100.0)
Do you know of the presence of Pharmacovigilance Centre in JUTH				
Yes	19(25.3)	52(69.3)	4(5.3)	75(100.0)
No	42(38.9)	9(8.3)	57(52.8)	108(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)
if yes where is it located				
Not applicable	42(38.9)	9(8.3)	57(52.8)	108(100.0)
Pharmacy	19(25.3)	52(69.3)	4(5.3)	75(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 10: Those responsible for monitoring ADR in JUTH.

Who are those responsible for monitoring ADR in JUTH	Profession			Total
	Doctor	Pharmacist	Nurse	
Doctor	3(42.9)	4(57.1)	0(0.0)	7(100.0)
Nurse	18(20.5)	34(38.6)	36(40.9)	88(100.0)
Pharmacist	2(66.7)	1(33.3)	0(0.0)	3(100.0)
All of the above	38(44.7)	22(25.9)	25(29.4)	85(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 11: Responsibility of Pharmacovigilance.

Pharmacovigilance is responsible for monitoring	Profession			Total
	Doctor	Pharmacist	Nurse	
Drug related problem	33(29.5)	35(31.1)	44(39.3)	112(100.0)
Blood related products	2(33.3)	4(66.7)	0(0.0)	6(100.0)
Drug related problem & Blood related products	0(0.0)	0(0.0)	5(100.0)	5(100.0)
All of the above	26(43.3)	22(36.7)	12(20.0)	60(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 12: Awareness on medico-legal problem in pharmacovigilance.

Are you aware of medico-legal problem in pharmacovigilance	Profession			
	Doctor	Pharmacist	Nurse	Total
Yes	28(48.3)	22(37.9)	8(13.8)	58(100.0)
No	17(23.0)	28(37.8)	29(39.2)	74(100.0)
I can't say	16(31.4)	11(21.6)	24(47.1)	51(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 13: Knowledge on Adverse drug reaction.

Adverse drug reaction	Profession			
	Doctor	Pharmacist	Nurse	Total
Is the same thing as side effect	6(31.6)	5(26.3)	8(42.1)	19(100.0)
Unwanted, usually harmful reaction following used of drugs	53(35.3)	53(35.3)	44(29.3)	150(100.0)
Harmful effect of drug encountered only at high doses	2(0.0)	1(14.3)	4(57.1)	7(100.0)
I don't know	0(0.0)	2(28.6)	5(71.4)	7(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 14: Source of information on pharmacovigilance.

What is your source of your information on Pharmacovigilance	Profession			
	Doctor	Pharmacist	Nurse	Total
Journal text	18(24.7)	32(43.8)	23(31.5)	73(100.0)
Television and radio	1(16.7)	1(16.7)	4(66.7)	6(100.0)
Colleague	6(54.5)	4(36.4)	1(9.1)	11(100.0)
Seminars and lectures	1(33.3)	1(33.3)	1(33.3)	3(100.0)
Internet	0(0.0)	2(28.6)	5(71.4)	7(100.0)
Others	0(0.0)	2(100.0)	0(0.0)	2(100.0)
Colleague, Seminars and lectures	5(62.5)	3(37.5)	0(0.0)	8(100.0)
Journal, Colleague & Internet	4(21.1)	1(5.3)	14(73.7)	19(100.0)
All of the above	26(48.1)	15(27.8)	13(24.1)	54(100.0)
Total	61(33.3)	61(33.3)	61(33.3)	183(100.0)

Table 15: Attitude towards pharmacovigilance (n = 183).

Do you think reporting of ADR is necessary	Profession			
	Doctor	Pharmacist	Nurse	Total
Yes	61(33.5)	60(33.0)	61(33.5)	182(100.0)
No	0(0.0)	1(100.0)	0(0.0)	1(100.0)
Discussion on ADRs during clinical round is very important in monitoring drug related problem				
Strongly agree	54(32.1)	57(33.9)	57(33.9)	168(100.0)
Partially agree	5(41.7)	3(25.0)	4(33.3)	12(100.0)
Partially disagree	2(100.0)	0(0.0)	0(0.0)	2(100.0)
Strongly disagree	0(0.0)	1(100.0)	0(0.0)	1(100.0)

Result of overall attitude on Pharmacovigilance: majority of the respondents (84.7%) had good attitude towards Pharmacovigilance while 15.3% had poor attitude (Table 18).

Findings on the overall practice of Pharmacovigilance revealed that only few, 69(36.6%) had good practice of Pharmacovigilance. Majority (63.4%) had poor practice of Pharmacovigilance. This indicates that practice of Pharmacovigilance in Jos University teaching Hospital was poor (Table 19).

Relationship between professionals and knowledge of pharmacovigilance: The finding revealed that majority of the Doctors (43.9%) and Pharmacist (42.1) had good knowledge of

Pharmacovigilance while Majority of the Nurses (65.2%) had poor knowledge of Pharmacovigilance. There was a statistical significant difference in knowledge of Pharmacovigilance in relation to the three professions ($\chi^2 = 50.810$, $p=0.000$) (Table 20).

Relationship between professionals and attitude on pharmacovigilance: The finding further revealed that Majority of the Doctors (36.8%) and the Pharmacist (36.7%) had good attitude on Pharmacovigilance compared to the Nurses (26.5%). There was also a strong statistical significant difference between the profession and the Attitude on Pharmacovigilance in JUTH ($\chi^2 = 21.589$, $p=0.000$) (Table 21).

Table 16: Practice of Pharmacovigilance (n = 183).

In your professional practice, have you once observed ADRs in your patient	Profession			
	Doctor	Pharmacist	Nurse	Total
Yes	57(36.8)	50(32.3)	48(31.0)	155(100.0)
No	4(19.0)	8(38.1)	9(42.9)	21(100.0)
I don't know	0(0.0)	1(100.0)	0(0.0)	1(100.0)
may be	0(0.0)	2(33.3)	4(66.7)	6(100.0)
Do you know what to do when you see an ADR				
Yes	55(36.9)	58(38.9)	36(24.2)	149(100.0)
No	6(17.6)	3(8.8)	25(73.5)	34(100.0)

Table 17: Overall Knowledge of Pharmacovigilance.

Knowledge (Good/Poor)	Frequency (f)	Percentage (%)
Good Knowledge	114	62.3
Poor Knowledge	69	37.7
Total	183	100.0

Table 18: Overall Attitude toward Pharmacovigilance.

Attitude Score (Good/Poor)	Frequency (f)	Percentage (%)
Good Attitude	155	84.7
Poor Attitude	28	15.3
Total	183	100.0

Table 19: Overall Practice of Pharmacovigilance.

Practice Score (Good/Poor)	Frequency (f)	Percentage (%)
Good Practice	67	36.6
Poor Practice	116	63.4
Total	183	100.0

Table 20: Relationship between Knowledge and Profession.

Profession	Knowledge (Good/Poor)						Chi-square	P-value
	Good		Poor		Total			
	F	%	F	%	F	%		
Doctor	50	43.9	11	15.9	61	33.3	50.810	0.000
Pharmacist	48	42.1	13	18.8	61	33.3		
Nurse	16	14.0	45	65.2	61	33.3		
Total	114	100.0	69	100.0	183	100.0		

Table 21: Relationship between Attitude and Profession.

Profession	Attitude (Good/Poor)						Chi-square	P-value
	Good		Poor		Total			
	F	%	F	%	F	%		
Doctor	57	36.8	4	14.3	61	33.3	21.589	0.000
Pharmacist	57	36.8	4	14.3	61	33.3		
Nurse	41	26.5	20	71.4	61	33.3		
Total	155	100.0	28	100.0	183	100.0		

Relationship between professionals and practice of pharmacovigilance: Among the three professionals, Pharmacists (50.7%) had good practice of pharmacovigilance compared to the Doctors (31.3%) and the Nurses (17.9%). There was a strong statistical significant difference in practice among the three professionals in JUTH ($\chi^2 = 17.283$, $p=0.000$) (Table 22).

DISCUSSION

Knowledge, attitude and practice of pharmacovigilance were determined among 183 healthcare professionals (HCP) of knowledge of pharmacovigilance, 32(17.5%) of the respondents defined pharmacovigilance as the science of monitoring adverse drug reaction happening in a hospital, 18(9.8%) define

Table 22: Relationship between Practice and profession.

Profession	Practice (Good/Poor)						Chi-square	P-value
	Good		Poor		Total			
	F	%	F	%	F	%		
Doctor	21	31.3	40	34.5	61	33.3	17.283	0.000
Pharmacist	34	50.7	27	23.3	61	33.3		
Nurse	12	17.9	49	42.2	61	33.3		
Total	67	100.0	116	100.0	183	100.0		

pharmacovigilance as the process of improving the safety of drugs, 74(40.4%) defined pharmacovigilance as the detection, assessment, understanding and prevention of ADR, 8(4.4%) defined pharmacovigilance as the science of monitoring ADR and process of improving the safety of drugs in a hospital, 7(3.8%) defined pharmacovigilance as science of monitoring ADR and the detection, assessment, understanding and prevention of adverse effect, while 24(13.1%) accepted all the above definitions (Table 3). Comparing the knowledge of Pharmacovigilance among the HCPs, our findings revealed that, majority of the Doctors and Pharmacists had good knowledge of pharmacovigilance while most Nurses (65.2%) had poor knowledge. This is similar to a study that was conducted in Ethiopia where, 84.2% of Medical Doctors and 84.2% of Pharmacist were more knowledgeable than 25.7% of Nurses [9]. One hundred and forty participants representing 76.5% understood that the body that is responsible for monitoring of ADR in Nigeria is National Agency for Food and Drug Administration and Control (NAFDAC) (Table 8). From a study in Ethiopia, only 24.0% of HCP understood and agreed to report ADR to drug enforcement authority but only 5.0% have reported ADR[9].

Majority of the respondents were aware of the existence of National pharmacovigilance Centre out of which 65(60.2%) were aware that the Centre in Nigeria is in NAFDAC Headquarters. Interestingly, only 51.5% of the respondents in another study were aware of the existence of national pharmacovigilance Centre (NPC) in Nigeria [10]. On the knowledge of the International Centre, 46.3% do not know where the international Centre is located. However, 39.8% were aware that the Centre is located in Sweden. Majority of the Pharmacist were aware of the presence of pharmacovigilance Centre in JUTH. However, majority of the Nurses and the Doctors were not aware of the presence of pharmacovigilance Centre in JUTH. (Table 9) which may be due to the new recruitment of many doctors and nurses into the hospital. This is contrary to a study in China, which showed 50%-89% of the respondents knew about their reporting Centre [11] and about 44.6% in a study in Northern Nigeria were aware of the hospital pharmacovigilance Centre and committee [12].

Awareness on medico-legal problem in pharmacovigilance revealed that 28(48.3%) Doctors, 22(37.9%) Pharmacists and 8(13.8%) Nurses were aware of medico-legal problem in pharmacovigilance (Table 12). About 36% of Doctors, 35.5% Pharmacists and 29.3% Nurses were aware that ADR is an unwanted, usually harmful reaction following used of drugs (Table 13). On sources of information on pharmacovigilance, 73(39.9%) got their information through Journal text, 6(3.3%) got their information through television and Radio set, 54(29.5%) got their information through Journals, Television and Radio, Colleagues, Seminar and lectures (Table 14).

The overall knowledge of HCP on pharmacovigilance has shown that, the majority of the respondents 114(62,3%) had

good knowledge on pharmacovigilance while 69(37.7) had poor knowledge as shown in table 17. This is in contrast to other studies carried out in Ethiopia [9] whereby only 48.2% of the respondents had good knowledge on pharmacovigilance, 34.2% in Amhara region[13] 23.17% in South-West [2] all in Ethiopia. Another separate study in Saudi Arabia [14] had good knowledge of pharmacovigilance. This is a clear indication that HCP in JUTH had a good knowledge of pharmacovigilance that is relatively high as compared to other studies that was done in Ethiopia and Saudi Arabia. This may be because of the previous trainings of the HCPs in JUTH on pharmacovigilance, conducted free by the key-responsible in the JUTH pharmacovigilance Centre.

On attitude towards Pharmacovigilance, 61(33.3%) Doctors, 60(33.0%) Pharmacist and 61(33.5%) Nurses agreed that reporting of ADR is necessary. Majority 168(91.8%) strongly agreed that discussion on ADR during clinical round is very important in monitoring drug related problems (Table 15) just like a report that was obtained from Pulford & Malcolm in 2010 [15]. where about 90% of the respondents felt that they were confident in discussing suspected ADRs with their colleagues. A study by Elkalmi and others in 2014 revealed that, 60% of doctors and 91% of nurses don't discuss ADRs in their routine discussion [16].

The finding further revealed that Majority of the Doctors (36.8%) and the Pharmacist (36.7%) had good attitude on Pharmacovigilance compared to the Nurses (26.5%). There was also a strong statistical significant difference between the profession and the Attitude on Pharmacovigilance in JUTH ($\chi^2 = 21.589$, $p=0.000$) [Table 21]. On overall Attitude on Pharmacovigilance, majority of the respondents (84.7%) had good Attitude on Pharmacovigilance (Table 18).

Considering the general practice, the study revealed that 155 respondents which constituted 57(36.8%) Doctors, 50(32.3%) Pharmacists and 48(31.0%) Nurses had in their professional practice once observed ADRs in their patients; 149 Respondents which constituted 55(36.9%) Doctors, 58(38.9%) Pharmacists and 36(24.2%) Nurses new what to do when they see an ADR (Table 16). There was a strong statistical significant difference in practice among the three healthcare professionals in JUTH studied ($\chi^2 = 17.283$, $p=0.000$) (Table 21). Though, doctors and pharmacists had good knowledge and attitude toward pharmacovigilance than nurses, pharmacists are far better than doctors and nurses in terms of practice of pharmacovigilance because most of them have undergone training, they easily access information from our hospital pharmacovigilance Centre.

Finding on the overall Practice of Pharmacovigilance revealed that only few, 69(36.6%) had good practice of Pharmacovigilance. Majority (63.4%) had poor practice of Pharmacovigilance. This indicates that practice of Pharmacovigilance in Jos University teaching Hospital was poor (Table 19). This is true because most of the newly employed HCPs especially doctors and nurses had not been trained on pharmacovigilance and most of the responses given

may not be true knowledge but through browsing of internet and other sources of information while filling out the questionnaires. A study in Iran also reported poor practice of pharmacovigilance [17]. Looking at these different studies above in relation to our study, there are variations among pharmacists, medical doctors and nurses in respect to the knowledge, attitude and practice of pharmacovigilance. Among the three professionals in our study, Pharmacists (50.7%) had better practice of pharmacovigilance compared to the Doctors (31.3%) and the Nurses (17.9%). Also, from another study, which shows weak practice of pharmacovigilance, Pharmacists (23.1%) are still ahead of other professionals, followed by nurses (8%) and the least are medical doctors (2%) [18].

From the above discussion, HCPs in Jos university teaching hospital had good knowledge and attitude towards pharmacovigilance but with poor practice. This could be due to other variable factors reported in a study such as lack of time, fear of legal implication, feeling that no need to report single ADR, no financial incentives, lack of ADRs reporting forms and so on [19].

Some of the challenges encountered during our study were possible bias in giving information by the respondents since one week was given for questionnaire retrieval.

CONCLUSION

The overall good knowledge of Pharmacovigilance was 62.3% while 37.7% had poor knowledge. On overall Attitude towards Pharmacovigilance, majority of the respondents (84.7%) had good Attitude while most (63.4%) had poor practice of Pharmacovigilance. This study shows that health care professionals in Jos university teaching hospital (JUTH) had good knowledge and attitude towards pharmacovigilance but had a very poor practice. There were statistical significant differences in knowledge, attitude and practice of Pharmacovigilance in relation to the three professions ($p=0.000$).

Recommendations: There is need for the hospital to sponsor the training of newly employed staff on pharmacovigilance. There should be continuous medical education (CME), training and refreshing courses for old staff on pharmacovigilance. Pharmacists should develop positive attitudes toward constant review of patient medication in the ward so as to identify occurrence of adverse drug reactions.

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