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RESEARCH ARTICLE

Knowledge, awareness, perception and reporting of experienced adverse drug reactions among outpatients in Nigeria

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Abstract

Background Higher incidence of adverse drug reactions (ADRs) remain a major cause of morbidity and mortality. Most targeted ADR reporting activities are mainly professional-centered with less attention to patients' knowledge, perception and selfreporting of experienced ADRs. *Objectives* To comprehensively evaluate patients' knowledge, awareness, perception and reporting of experienced ADRs. *Setting* Three public healthcare facilities in Ibadan, southwestern Nigeria. *Method* A questionnaire-guided cross-sectional interview of 1190 consented ambulatory adult patients consecutively recruited from various clinics of the selected hospitals between February and June 2018. The 32-item pretested questionnaire comprised open- and closed-ended questions, as well as open-ended questions with relevant prompts. Data were summarised using descriptive statistics, while Chi square was used to investigate association between relevant categorical variables at $p < 0.05$. *Main outcome measure* Knowledge, awareness, perception and reporting of experienced ADRs among patients. *Results* Response rate was 99.1%. Mean age was 40.6 ± 14.9 years. Forty-nine (4.1%) patients were aware of pharmacovigilance. A total of 964 (81.0%) correctly understood what can be regarded as serious adverse drug reactions (ADRs), 444 (37.3%) had previously experienced ADRs, while 77 (6.5%) experienced reactions with current medication(s). Of this, 64 (83.1%) made a report largely to physician (52; 81.3%). Summarily, reported reactions were more with antimalarials (214; 49.1%), with itching (168; 78.5%) constituting the most frequently occurring reaction. Use of text message (276; 27.2%) and filling of ADR report form (248; 24.4%) were topmost on the list of suggested methods for ADR reporting. There was a significant association between patient's age and awareness of pharmacovigilance ($p = 0.015$), while educational qualification ($p = 0.001$) significantly influenced tendency to make a report of experienced ADRs. *Conclusion* Approximately four percent of patients were aware of pharmacovigilance, while more than three-quarters correctly understood the concept of serious adverse drug reactions. A little above one-quarter had previously experienced one form of reaction or the other, with majority reporting such reactions to physician. Continuous education of stakeholders in pharmacovigilance activities is advocated, while patient's active involvement in spontaneous reporting of ADRs should be carefully considered.

Keywords Adverse drug reaction · Awareness · Ambulatory patients · Experienced reactions and reporting · Knowledge · Nigeria

Impacts on practice

- Stakeholders should be conscious of the useful contribution of patients' self-reported reactions to pharmacovigilance activities in general, while deficiency in patients' reported reactions should be envisaged and carefully considered in the overall decision to establish causality between suspect drug and the reported reactions.
- Improved awareness of pharmacovigilance and ADR reporting among patients could be achieved with increased enlightenment by major stakeholders, as well

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as ensuring a broad-range and proactive counseling approach by healthcare providers especially physician and pharmacist at every provider-patient encounters.
- Exploration of methods for public education to increased awareness on ADR reporting is needed.

Introduction

Globally, adverse drug events remain a major cause of morbidity and mortality [1–3]. Higher incidence of adverse drug reactions (ADRs) have been reported in many developed and developing countries [1–4] with resultant consequences of increased hospitalisation and high economic burden to both patient and society [5–8]. The World Health Organisation defines "an adverse drug reaction" as any response to a drug, which is noxious, unintended and occurs at doses normally used in man for prophylaxis, diagnosis or treatment of disease [9]. The key to reducing the consequences of ADRs, notably morbidity, mortality and cost relies on the timely identification and reporting of ADRs to the relevant authorities [9–11].

Several countries have initiated pharmacovigilance programme for effective reporting of ADRs [9], with spontaneous reporting being widely adopted by many nations as the cornerstone of pharmacovigilance [9, 10, 12, 13]. Spontaneous reporting system (SRS) is a system in which a healthcare provider or patient sends an unsolicited communication to competent authorities or pharmaceutical companies describing one or more ADRs [14]. Thus, the necessity for active involvement of responsible stakeholders including the healthcare professionals, patients, regulatory authorities and industry in SRS [9, 13]. However, among the various stakeholders involved in pharmacovigilance, patients' role cannot be underestimated [9, 15, 16]. According to the WHO "Only a patient knows the actual benefit and harm of a medicine taken". The observations and reports made by a healthcare professional will be an interpretation of the subjective description provided by the patient and the objective assessments [9]. A review of patient reporting of ADRs in 50 countries with varying income levels found that the average ratio of reports from patients to healthcare providers was around 1:10 in majority of the countries [17]. The extensive self-medication practice, as well as proliferation of fake and adulterated medicines in developing countries reinforced the importance of consumers' participation in fostering effective pharmacovigilance activities [18, 19]. Thus, the exclusion of patients from a reporting strategy, especially in developing countries where drugs are often self-administered with no medical supervision may lead to underestimating significant data [20, 21]. However, in spite of the usefulness of ADR reporting by patients, its value to produce quality information on ADRs still remains controversial [22, 23], largely because of possible bias [24], confusion and most importantly, misattribution of symptoms as side effects or adverse reactions [13, 25]. Notwithstanding, evidence points to the complementary roles of patient reports with healthcare providers' reporting as adding more detailed description on previously known ADRs [26, 27] and enabling to establish stronger causality [13, 23, 27]. Previous studies on pharmacovigilance and ADR reporting activities in Nigeria and some other countries largely target healthcare professionals with less attention paid to patients' knowledge, perception and self-reporting of experienced ADRs [17, 28–34].

Aims of the study

This study aimed to comprehensively evaluate knowledge, awareness, perception and reporting of experienced ADRs among patients attending three ambulatory healthcare facilities in Ibadan, southwestern Nigeria. Association between relevant patient's characteristics and key pharmacovigilance indicators with respect to awareness and ADR reporting were also explored.

Ethics approval

Ethics approval was obtained from the Research Ethical Review Committee, Ministry of Health, Oyo State with approval number AD 13/479/673.

Method

Study site

Three ambulatory healthcare facilities in Ibadan namely Adeoyo Maternity Teaching Hospital (AMTH), Ring Road State Hospital (RRSH) and Jericho Specialist Hospital (JSH). These hospitals have facilities for outpatient, inpatient and other specialised services with quite a large number of healthcare professionals of different categories and cadres. They also serve as referral centres for other hospitals and private clinics within and outside the region.

Study population

Patients attending the different clinics in the three selected hospitals including general outpatient, antenatal, obstetrics and gynaecology, medical outpatient and family planning among others.

Study design

A questionnaire-guided, cross-sectional study among consented patients enrolled from different clinics of the

hospitals between February and June, 2018. Patients were recruited all through the week (Monday to Friday) depending on the clinic days of the hospitals.

Inclusion and exclusion criteria

Consented ambulatory patients who are 18 years and above, attending the various clinics of the selected hospitals were included, while those who declined participation were excluded.

Sample size determination

Information in the record department of selected hospitals showed the following patients' population per month: AMTH = 5500; RRSH = 4500; and JSH = 2000. Based on the estimated population at 95% confidence level and 5% margin of error, a representative target sample size of 1190 (AMTH = 413, RRSH = 407, JSH = 370) was obtained using Raosoft® sample size calculator [35], with the incorporation of 10% attrition rate. This was rounded off to a total target population of 1200 to guide participants' enrolment.

Data collection procedure and sampling technique

Patients were approached for participation while waiting to see the physician on every clinic day. Objectives of the study were explained to every participant, after which consent for participation was obtained verbally from individual participant. Only the consented patients were consecutively enrolled and administered the questionnaire by the principal investigator and three research assistants who are postgraduate students in clinical pharmacy, purposely trained in data collection process to ensure uniformity and consistency. The questionnaire which took an average of between 20 and 25 min to complete, was interviewer-administered to participants. Translation of questionnaire into Yoruba, the local language, was done for those who do not understand English. Back-translation was subsequently done to ensure response consistency. Participants were assured of the anonymity and confidentiality of responses.

Data collection instrument

The data collection tool was a semi-structured questionnaire comprising open-ended and closed-ended questions, as well as open-ended questions with relevant prompts. The questionnaire consisted of four sections. Section A captured socio-demographic characteristics, residential location and the hospital attended by participants. Section B assessed patients' knowledge and awareness of ADRs and pharmacovigilance, while section C evaluated patients' perception and reporting of experienced ADRs. Section D explored patients' opinion of pharmacist's medication counseling role with respect to the possibility of ADR detection and monitoring, as well as suggestions on ways to improve public education on ADRs, and feasible methods of making ADR reports.

Pretest and validation of the instrument

The questionnaire was assessed for content validity by two scholars from the academia, while pretest was carried out among ten randomly selected patients from the general outpatient clinic of RRSH, who were not part of the main study. The feedback led to minor modifications in the questionnaire especially the open-ended questions which were subsequently rephrased with guided prompts to stimulate patient's response and ensure clarification of intention.

Data analysis

The data were sorted, coded and analysed using SPSS version 23.0. Descriptive statistics were used to summarise the data. Chi square was used to investigate associations between relevant patients' characteristics and awareness of pharmacovigilance, knowledge of ADR reporting through the short message service (SMS) short code, as well as making a report of experienced ADRs, at $p < 0.05$ level of statistical significance.

Results

Response rate from this study was 99.1%. Participants from each hospital included 413 (34.7%) from AMTH, 408 (34.3%) from RRSH and 369 (31.0%) from JSH. Patients were recruited mostly from the general outpatient clinic (446; 37.5%), followed by antenatal (336; 28.2%), medical outpatient (116; 9.7%), surgical outpatient (56; 4.7%), obstetrics and gynaecology (40; 3.4%), family planning (36; 3.0%), eye (30; 2.5%), antiretroviral (29; 2.4%), physiotherapy (28; 2.4%), psychiatry (19; 1.6%), dental (16; 1.3%), ear, nose and throat (13; 1.1%), haematology (13; 1.1%) and orthopaedic clinic (12; 1.0%). Overall mean age was 40.6 ± 14.9 years, with majority (710; 59.7%) in the age range of ≥ 18–40 years. Female participants were 874 (73.4%), and majority were traders (611; 51.3%), mostly with secondary education (500; 42.0%) Table 1.

Forty-nine (4.1%) participants had heard of pharmacovigilance, of this, most (12; 24.5%) became aware of pharmacovigilance through the social media, and 9 (18.4%) each from radio and television. Forty-six (3.9%) had the prior knowledge of ADR reporting through SMS short code, and 1144 (96.1%) had not. A total of 964 (81.0%) correctly understood what can be regarded as a serious ADR.

Table 1 Characteristics of participants (n = 1190)

Variables	Response	Frequency (%)
Gender	Male	316 (26.6)
	Female	874 (73.4)
Age in years	≥ 18–40	710 (59.7)
	41–60	325 (27.3)
	> 60	155 (13.0)
Education level	No formal education	71 (6.0)
	Primary	141 (11.8)
	Secondary	500 (42.0)
	Tertiary	478 (40.2)
Occupation	Trading	611 (51.3)
	No active employment	241 (20.3)
	Civil servant (public and private)	206 (17.3)
	Artisan	132 (11.1)
Marital status	Single	193 (16.2)
	Married	956 (80.3)
	Widowed	40 (3.4)
	Divorced	1 (0.1)
Residential location	Rural	307 (25.8)
	Urban	883 (74.2)
Hospital attended	AMTH	413 (34.7)
	RRSH	408 (34.3)
	JSH	369 (31.0)

RRSH Ring Road Specialist Hospital, *JSH* Jericho Specialist Hospital, *AMTH* Adeoyo Maternity Teaching Hospital

Consulting a physician (1126; 94.6%) and immediate stoppage of the suspect drug (1070; 89.9%) topped the list of patient's suggestions on likely measures to take in case of experienced ADRs (Table 2).

A total of 444 (37.3%) patients had previously experienced one form of ADR or the other, while 77 (6.5%) experience reactions with the current medication(s). Of those who currently experienced reactions, 64 (83.1%) made a report, largely to physician (52; 81.3%). Majority, 1156 (97.1%) believed it is important to make a report about experienced ADR(s) after taking medicine(s). Reasons cited include prevention of harm to oneself (1134; 98.1%), as well as ensuring that healthcare providers are aware of what the drug has caused (1087; 94.0%). Those who do not make a report (13; 16.9%) cited different reasons (Table 3).

Summarily, the experienced reactions among patients were more with the antimalarials (214; 49.1%), with itching (168; 78.5%) constituting the most frequently occurring reaction; followed by non-steroidal anti-inflammatory drugs/analgesic (60; 13.7%). Details of experienced reactions, suspect drugs and the therapeutic classes are shown in Table 4. Measures reportedly taken by patients to establish causal relationship between the suspect drug and experienced reactions included discontinuation of the suspect drug and the reaction stopped (339; 81.7%), conviction that it was the only drug taken (28; 6.7%) among others (Table 5). Mean numerical rating score for the 386 (88.5%) patients who indicated their perceived assurance for attributing experienced reactions to the suspect drugs was 9.3 ± 1.6. Six patients (1.6%) had a score of 1–3 suggesting 'absolutely unsure', 21 (5.4%) had score of 4–7 indicating 'not quite sure', while 359 (93.0%) pooled a score of 8–10 signifying 'absolutely sure'. Various actions took by patients during the time of experienced reactions included reduction in the dose of suspect drug from one tablet to half (13; 38.2%), as well as intake of another drug to suppress the reaction (6; .6%) Table 5.

Patients' perception and opinion of medication counseling role of pharmacists in respect of ADR detection, monitoring and reporting is shown in Table 6. Majority, 1108 (93.1%) cited pharmacist's counseling to focus on questions and clarifications on direction for medicine use, while 872 (73.3%) were of the opinion that the emphasis was on indication for the medication(s) Table 6. Pharmacist's consultation (305; 25.6%) was topmost on the list of suggested ways of public education to increase awareness about ADRs, while the use of text message (276; 27.2%) and filling of ADR report form (248; 24.4%) were the most suggested methods for reporting ADRs (Table 7). There were significant associations between patient's age and awareness of pharmacovigilance ($p = 0.015$), as well as knowledge of ADR reporting through the SMS short code ($p = 0.032$) Table 8.

Discussion

In this study, approximately 4% of the participants were aware of pharmacovigilance, largely through the social media as well as the news media, most especially radio and television. Previous studies have also identified low level of awareness and knowledge of pharmacovigilance among the healthcare professionals [36–39], while the role of news and social media in spreading information on side effect expectation quickly to a large and diverse audience has been acknowledged [40–42]. The low level of awareness of pharmacovigilance may not be as crucial as the need for patients' factual and genuine understanding of the contextual meaning of what pharmacovigilance entails in terms of detection, assessment, monitoring and reporting of ADRs. Interestingly, more than 80% correctly understood what can be regarded as a serious ADR, while approximately 95% and nearly 90%, respectively suggest consulting a physician and immediate stoppage of the suspect medicine(s) as appropriate measures to take when facing the challenge of serious ADRs. These findings perhaps indicate that, even though patients might not be conversant with the word

Table 2 Patients' knowledge and awareness of pharmacovigilance and adverse drug reactions

Question/statement	Response; N (%)	
Have you heard of pharmacovigilance?	Yes; 49 (4.1)	No; 1141 (95.9)
If yes, what is your source of awareness of pharmacovigilance?		
Social media	12 (24.5)	
Television	9 (18.4)	
Radio	9 (18.4)	
Internet	5 (10.2)	
Others (newspaper, University studies, health professional, NAFDAC website)	4 (8.2)	
Can't remember	10 (20.4)	
What is your understanding of a serious adverse drug reaction (SADR)?		Frequency (%)
Reaction that requires medical emergency and can cause death[a]		554 (46.6)
Reaction that is bad enough to interfere with daily activities[a]		149 (12.5)
Reaction that is life-threatening[a]		136 (11.4)
Reaction that results in hospitalisation or prolongs hospitalisation[a]		125 (10.5)
Reaction that is uncomfortable but does not stop you from daily activities		115 (9.7)
Reaction that is mild or slightly uncomfortable		98 (8.2)
I don't know		13 (1.1)
Likely action/measure to take in case of SADR	Yes	No	I don't know
Consult a physician	1126 (94.6)	40 (3.4)	24 (2.0)
Stop taking the drug immediately	1070 (89.9)	88 (7.4)	32 (2.7)
Consult a pharmacist	584 (49.1)	565 (47.5)	41 (3.4)
Consult a nurse	291 (24.5)	851 (71.5)	48 (4.0)
Consult other healthcare practitioner	131 (11.0)	1010 (84.9)	49 (4.1)
Take another drug to combat symptoms	116 (9.7)	988 (83.0)	86 (7.2)
Continue taking the drug and see if symptoms resolve	60 (5.0)	1093 (91.8)	37 (3.1)

N number, *NAFDAC* national agency for food and drug administration and control

[a]Correct response with respect to the meaning of a serious adverse reaction (SADR)

'pharmacovigilance' which may be considered as a technical term, they knew the context of what constitute a serious ADR as defined by the WHO [9], and the appropriate measures to be taken when it occurs. Thus, all responsible stakeholders need to intensify efforts in ensuring widespread sensitization, as well as providing continuous education in accessible languages, stressing the importance of prompt reporting of any suspected drug reactions to the nearest healthcare provider or directly to the National Pharmacovigilance Centre (NPC). In 2012, Nigeria implemented a mobile phone alert system, an initiative referred to as Pharmacovigilance Rapid Alert System for Consumer Reporting (PRASCOR), to enable consumers to text information on suspected ADRs directly to the NPC [43, 44]. However, it is noted that less than 4% of the patients had the knowledge of ADR reporting through the SMS short code. Ogar et al. in their study also reported that, PRASCOR contributed to only 3.9% of reports from 2012 to 2018 [45]. Extensive dissemination of the PRASCOR initiative among the general public is therefore essential, so that the goals can be largely achieved.

Use of text message and filling of ADR report form were topmost on the list of suggested methods for reporting experienced ADRs by patients. Perhaps this underscores a need to look into the possibility of employing a combination of approach, rather than focusing only on the report form in garnering ADR information. Studies have indicated the unavailability of ADR report form in many facilities, and when available, the complexity in filling the form constitutes a challenge [20, 46]. Concerned stakeholders, especially the National Agency for Food and Drug Administration and Control in the case of Nigeria, may possibly explore these arrays of suggested methods in a bid to ameliorate reporting rates. It is noteworthy to mention that, young adults up to 40 years were largely aware of pharmacovigilance and had significantly better knowledge of ADR reporting through the SMS short code compared to the older adults. This may be expected in many societies, since younger adults probably

Table 3 Patients' experience and perception about adverse drug reactions and reporting

Questions/statements	Yes; n (%)	No; n (%)	Don't know; n (%)
1. Have you previously experienced any adverse reactions/effects after taking medicine(s)?	444 (37.3)	746 (62.7)	0 (0.0)
2. Do you think one should make reports about adverse effects/reactions experienced after medicine(s) is/are taken?	1154 (97.0)	23 (1.9)	13 (1.1)
3. Do you think it is important/necessary to make a report about adverse effects/reactions experienced after taking medicine(s)?	1156 (97.1)	19 (1.6)	15 (1.3)
If yes to 3, why do you think it is important?			
To prevent harm to oneself	1134 (98.1)	13 (1.1)	9 (0.8)
To make the healthcare professionals aware of what the drug has caused	1087 (94.0)	36 (3.1)	33 (2.9)
To make sure the drug is not fake	904 (78.2)	157 (13.6)	95 (8.2)
To prevent a recurrence of the reaction in other people	879 (76.0)	209 (18.1)	68 (5.9)
To make sure the report get to the manufacturer of the drug	685 (59.3)	199 (17.2)	272 (23.5)

	Yes	No
Have you experience any adverse drug reaction with the drug you are currently taken?	77 (6.5)	1113 (93.5)
Did you make a report to anyone?	64 (83.1)	13 (16.9)
If yes, to whom do you make the report?		
Physician	52 (81.3)	
Pharmacist	6 (9.4)	
Nurse	5 (7.8)	
Other healthcare workers	1 (1.6)	
If no, why don't you make a report?		
Belief that all drugs have side effects	3 (23.1)	
Assumed that effect will stop as soon as dose is completed	2 (15.4)	
Stopped taking the drug and reaction stopped, thus, no need to report	2 (15.4)	
Read that the experienced effect/reaction was a side effect	1 (7.7)	
It is not yet my appointment date to see the doctor	1 (7.7)	
I am presently in the hospital for the purpose of making the report to the doctor	1 (7.7)	
No reason	3 (23.1)	

n number

constitute the population who engaged more in the use of social media than the older adults [24].

Nearly 38% of the patients had previously experienced one form of ADR or the other, and about 7% actually experienced adverse reactions with the current medication(s). More than three-quarters of those who had reactions with current medication(s) made a report of the reactions mostly to a physician, and largely because of their belief in the importance of reporting any adverse reaction to a drug, so as to prevent harm to oneself, as well as ensuring healthcare providers' awareness of such reactions. This conviction among patients who report the experienced reactions is commendable and further underscores the need for proactive counselling of patients to reinforce their beliefs and confidence in ADR reporting and monitoring. Healthcare provider therefore need to continually educate the patients and equip them with a prior knowledge of possible or expected adverse effects, as well as highlighting the appropriate measures to take when such reaction is encountered. A substantial number of participants who do not report the experienced reactions believed that all drugs usually have side effects, while some assumed that the effect(s) will stop after the completion of the dosage regimen. All these further emphasize the need for consistent education of patients, stressing their core obligations and role as far as pharmacovigilance activities in general and ADR reporting in particular is concerned.

Antimalarials constitute the therapeutic class of drug with highest prevalent of reported reactions, with itching as the most frequently occurring reaction. Considering the malaria-endemic nature of the country, it may not be out of place that antimalarials were possibly in higher consumption among the participants either as a prescription from a qualified physician or as self-medication for presumptive treatment of malaria. However, perusing the other reactions reported by patients, it can be deduced that many of the reactions cited were probably related to the disease symptoms. Misattribution of symptoms as side effect or adverse reaction has been identified as a major drawback with direct patient reporting system of ADRs [47, 48]. Thus, the reason

Table 4 Summary of reported adverse reactions, suspect drugs, and the therapeutic class among patients

Therapeutic class	Individual suspect drugs	Reported adverse reactions	N (%)
Antimalarials	Artesunate-amodiaquine, chloroquine, quinine, amodiaquine, artemeter-lumefantrine, sulphadoxine-pyrimethamine	Itching (168), weakness (21), headache (9), dizziness (3), tinnitus (3), rash (2), abdominal pain (1), insomnia (1), body swelling (1), vomiting (1), nausea (1), back pain (1), bleeding (1), restlessness (1)	214 (49.1)
NSAIDS/analgesic	Phenylbutazone, diclofenac, diclofenac + misoprostol, diclofenac + paracetamol, aspirin, ibuprofen + caffeine	Abdominal pain (18), insomnia (10), burning sensation (3), swollen ankle (2), dizziness (1), excessive urination (1), skin discoloration (1), light headedness (1), fainting (1)	38 (8.7)
	Paracetamol, paracetamol + caffeine	Insomnia (9), Dizziness (5), Back pain (3), Vomiting (2), Body swelling (1), Nausea (1), Sweating (1)	22 (5.0)
Antibacterial	Azithromycin, ampicillin-cloxacillin, erythromycin, chloramphenicol, co-trimoxazole, metronidazole, ciprofloxacin	Metallic taste (9), itching (7), weakness (5), abdominal pain (2), vomiting (2), eye redness (2), dizziness (1), body swelling (1), rash (1), difficulty in breathing (1), lip blisters (1), skin discoloration (1)	33 (7.6)
Cold remedies	Triprolidine-pseudoephedrine (Actifed®)	Drowsiness (24), deafness (1), somnolence (1)	26 (6.0)
Opioids	Tramadol, pentazocine, dihydrocodeine	Nausea (4), insomnia (3), difficulty in breathing (3), drowsiness (1)	11 (2.5)
Antihypertensives	Prazosin, hydrochlorothiazide, and clonidine (Miniplus®), nifedipine, amlodipine, lisinopril, enalapril, methyldopa	Headache (3), hypotension (2), cough (1), impotence (1), feeling of heaviness (1), weakness (1), palpitation (1)	10 (2.3)
Beta-2-agonist	Salbutamol	Tremor (8)	8 (1.8)
Antihistamines	Cyproheptadine, chlorpheniramine	Itching (4), drowsiness (1),	5 (1.1)
Haematinics	Vitamin BCO, folic acid, ferrous sulphate	Hunger (2), weakness (1), insomnia (1)	4 (0.9)
Contraceptives	COC, norethisterone, levonorgestrel	Headache (2), bleeding (1), suspected infertility (1)	4 (0.9)
Antivirals	ZDV/3TC/NVP, ZDV/3TC/EFV	Headache (1), dizziness (1), rash (1), cough (1)	4 (0.9)
Antifungals	Fluconazole, griseofulvin	Itching (1), headache (1), skin discolouration (1) hypermennorrhea (1)	4 (0.9)
Stimulants	Caffeine	Insomnia (2), increased body temperature (1), abdominal pain (1)	4 (0.9)
Antipsychotics	Chlorpromazine + benzhexol	Somnolence (2), insomnia (1)	3 (0.7)
Diuretics	Hydrochlorthiazide/amiloride, spironolactone	Excessive urination (2)	2 (0.5)
Antidiabetics	Metformin, metformin + glibenclamide	Body swelling (1), hypoglycaemia (1),	2 (0.5)
Anticonvulsants	Pregabalin	Heartburn (1), body swelling (1)	2 (0.5)
Anti-gout	Allopurinol	Itching (1)	1 (0.2)
Drug X	Unknown constituents	Abdominal pain (6), dizziness (4), palpitation (4), headache (3), weakness (3), body swelling (3), rash (2), vomiting (2),, excessive urination (2), tremor (2), hypotension (2), itching (2), lip blisters (1), chest pain (1), vomiting blood (1), drowsiness (1)	39 (8.9)

Drug X name of the drug could not be verified/ascertained, *NSAIDS* non-steroidal anti-inflammatory drugs, *ZDV* zidovudine, *3TC* lamivudine, *NVP* nevirapine, *EFV* Efavirenz, *COC* combined oral contraceptive, *N* number

Table 5 Measures and action reportedly taken by patients to establish causal relationship between suspect drug and the reaction experienced

	Frequency (%)
Measure taken to establish causal relationship (n = 415)	
Stopped taking the drug and the reaction stopped	339 (81.7)
It is the only drug I used	28 (6.7)
Stopped taking all my drugs because I did not know which one was causing it	15 (3.6)
Reaction started with the use of the drug	15 (3.6)
It is only when I take the drug that the reaction occurs	4 (1.0)
Physician confirmed it	3 (0.7)
I am aware of the side effect	3 (0.7)
I read it on the drug leaflet	3 (0.7)
Was pre-informed by physician	2 (0.5)
Pharmacist told me	1 (0.2)
People told me	1 (0.2)
Reaction started when the drug was completed	1 (0.2)
Action taken when the adverse drug reaction was experienced (n = 34)	
Reduced the dose of the suspect drug from one tablet to half a tablet	13 (38.2)
Took another drug to suppress the effect/reaction	6 (17.6)
Switched to another drug	4 (11.8)
Reduced frequency of the dose	3 (8.8)
Was hospitalised	3 (8.8)
Continued the drug, but it did not stop	2 (5.9)
Use of herbal medicine for gastric lavage	1 (2.9)
Drank palm oil afterwards	1 (2.9)
No action	1 (2.9)

n number

Table 6 Patients' perception of pharmacists' counseling role in adverse drug reaction detection and monitoring

Statement	Response; n (%)		
	Yes	No	Don't know
During prescription refill, does the pharmacist tell you what your medication is used for?	872 (73.3)	296 (24.9)	22 (1.8)
Does the pharmacist make sure you understand the instructions given to you about how to take your drugs?	1108 (93.1)	63 (5.3)	19 (1.6)
Were you asked about other drugs you are taking?	567 (47.6)	581 (48.8)	42 (3.5)
Were you told of the risk involved when you do not take your drugs regularly or if you stop taking your drugs abruptly?	438 (36.8)	700 (58.8)	52 (4.4)
Do pharmacists educate/enlighten you about the possible side effects of your drugs?	487 (40.9)	669 (56.2)	34 (2.9)
Were you told by your pharmacist what to do if the symptoms you experienced do not resolve?	429 (36.1)	711 (59.7)	50 (4.2)
Were you informed about other drugs/supplements you should not take while taking your drugs?	551 (46.3)	600 (50.4)	39 (3.3)
Do pharmacists talk about lifestyle changes to improve your health?	547 (45.9)	596 (50.1)	47 (3.9)
Does your pharmacist inform you about what to do if you forget to take your drug or if you take an over dose?	228 (19.2)	916 (77.0)	46 (3.9)

n number

why patient reporting cannot be solely considered as a valid report without a complementary physician validation of such report through objective assessments [13, 27]. Despite the shortcomings in the patients' reported reactions, our results suggest that most of the reactions were potentially drug-related. A hypothetical measure to ascertain patient's extent of assurance and confidence of the linkage between the suspect drug(s) and reactions reported indicates that a larger percentage (93%) pooled a score of between 8 and 10 signifying 'absolutely sure' of the causal relationship. Nevertheless, the incompleteness and potential inaccuracy of data provided by patients on concomitant therapy and

Table 7 Patients' suggested approach of public education to increase awareness about adverse drug reactions and reporting

	Frequency	Percent
Suggested ways of public education to increase ADR awareness (n = 1190)		
Pharmacist's consultation	305	25.6
Label on medication	191	16.1
Radio jingles	175	14.7
Television advertisements	150	12.6
Newspaper adverts	99	8.3
Consultation with physician	89	7.5
Banners/posters	84	7.1
Social media posts	55	4.6
Healthcare provider's talks in the hospitals	24	2.0
One-on-one conversation	5	0.4
Public awareness through lectures	3	0.3
Text messages from network providers	2	0.2
Going to schools	2	0.2
Community engagement/discussions	2	0.2
Online adverts	1	0.1
Others (Questionnaire administration, visit to markets, other people experience)	3	0.3
Suggested methods for adverse drug reaction reporting (n = 1016)		
Text message	276	27.2
Filling patient ADR reporting form obtained in the hospital/pharmacy	248	24.4
Telephone call	243	23.9
E-mail	178	17.5
Consultation with physician	30	3.0
Physical reporting at the hospital	20	2.0
Radio/television announcement	15	1.5
Community meetings	2	0.2
Social media	2	0.2
Don't believe any method will work	2	0.2

ADR adverse drug reaction, *n* number

diseases may still contribute to the difficulties in attributing symptoms [48]. Of note was a substantial number of patients who reported discontinuation of the suspect drug and the reaction stopped, as a measure taken to establish perceived causality. Patients' engagement in this form of 'dechallenge' approach is quite encouraging and may further imply that if sensitization campaign to the patients on prompt and spontaneous reporting of ADRs is stepped up, there is greater likelihood of achieving the expected improvement in pharmacovigilance activities.

In this study, patients perceived the pharmacist's counseling during medication dispensing to dwell more on direction for medicine use and the purpose of medication, with less attention paid to information that may lead or guide on detection and monitoring of actual or potential ADRs. Studies have indicated the inadequate knowledge and the low level of involvement of healthcare providers including pharmacists in ADR reporting and pharmacovigilance activities in general [49–52]. The deficit in the counseling role of pharmacists with respect to detection, assessment, monitoring and reporting of ADR is an issue that needs to be proactively addressed. Interestingly, pharmacist's consultation topped the list of suggested measures by the patients for public education to ensure increased awareness on issues related to ADRs. Thus, pharmacists may need to seek activities and training that will increase their patient-centered skills to ensure a broad-range counseling approach that may lead to identification and resolution of potential or actual drug therapy problems, of which ADR is a core component.

Despite the useful information from this study with respect to knowledge, awareness, perception and reporting of experienced ADRs, its limitations include the possibility of recall or memory bias, as well as double reporting and incorrect attribution of symptoms to specific drug by the patients which may affect the quality of data reported [13, 25]. Thus, there may be the need for further evaluation of patient-reported data using more rigorous qualitative methods that will enable discrimination between symptoms and genuine adverse effects or reactions. Also, the likelihood of potential variations from researcher-to-researcher in eliciting

Table 8 Associations between patient's characteristics and knowledge of adverse drug reaction awareness and reporting

Variables	Heard of pharmacovigilance		Knowledge of ADR reporting through SMS short code		Report of experienced ADRs to anyone	
Age (year)	Yes	No	Yes	No	Yes	No
≥ 18–40	39 (79.6)	671 (58.8)	36 (78.3)	672 (58.7)	43 (67.2)	667 (59.2)
41–60	7 (14.3)	318 (27.9)	7 (15.2)	319 (27.9)	16 (25.0)	309 (27.4)
> 60	3 (6.1)	152 (13.3)	3 (6.5)	153 (13.4)	5 (7.8)	150 (13.3)
	$X^2 = 8.45$; $p = 0.015$*		$X^2 = 6.89$; $p = 0.032$*		$X^2 = 2.19$; $p = 0.335$	
Gender						
Male	14 (28.6)	302 (26.5)	9 (19.6)	307 (26.9)	25 (39.1)	291 (25.8)
Female	35 (71.4)	839 (73.5)	37 (80.4)	837 (73.2)	39 (60.9)	835 (74.2)
	$X^2 = 0.017$; $p = 0.744$		$X^2 = 1.199$; $p = 0.274$		$X^2 = 5.42$; $p = 0.02$*	
Education						
None	1 (2.0)	70 (6.1)	2 (4.3)	69 (6.0)	0 (0.0)	71 (6.3)
Primary	4 (8.2)	137 (12.0)	3 (6.5)	138 (12.1)	7 (10.9)	134 (11.9)
Secondary	20 (40.8)	480 (42.1)	14 (30.4)	486 (42.5)	17 (26.6)	483 (42.9)
Tertiary	24 (49.0)	454 (39.8)	27 (58.7)	451 (38.4)	40 (62.5)	438 (38.9)
	$X^2 = 2.91$; $p = 0.406$		$X^2 = 6.97$; $p = 0.073$		$X^2 = 16.33$; $p = 0.001$*	
Occupation						
Trading	18 (36.7)	593 (52.0)	16 (34.8)	595 (52.0)	32 (50.0)	579 (51.4)
Civil servant	14 (28.6)	192 (16.8)	8 (17.4)	198 (17.3)	14 (21.9)	192 (17.1)
Artisan	5 (10.2)	127 (11.1)	3 (6.5)	129 (11.3)	1 (1.6)	131 (11.6)
No active employment	12 (24.5)	229 (20.1)	19 (41.3)	222 (19.4)	17 (26.6)	224 (19.9)
	$X^2 = 6.36$; $p = 0.095$		$X^2 = 13.93$; $p = 0.003$*		$X^2 = 7.71$; $p = 0.053$	
Residential location						
Rural	12 (24.5)	295 (25.9)	7 (15.2)	300 (26.2)	22 (34.4)	285 (25.3)
Urban	37 (75.5)	846 (74.1)	39 (84.8)	844 (73.8)	42 (65.6)	841 (74.7)
	$X^2 = 0.046$; $p = 0.831$		$X^2 = 2.798$; $p = 0.094$		$X^2 = 2.599$; $p = 0.107$	

ADR adverse drug reaction, *SMS* short messages service

*Significant difference with p value < 0.05 using Chi square (X^2) test

information from the participants may not be completely excluded, however, the pretest training for research assistants focused largely in ensuring uniformity and consistency in the data collection process. In addition, the relatively large and representative nature of sampled population from the study sites may constitutes a useful strength for our study, caution should however be exercised in making generalisation of the study findings to other patient's population.

Conclusion

It can be concluded that less than one-twentieth of patients were aware of pharmacovigilance, while more than three-quarters correctly understood the concept of serious ADRs. A little above one-quarter had previously experienced one form of reaction or the other, with majority reporting such reactions to physician. More than three-quarters believed that reporting experienced ADRs is necessary, largely to prevent harm. However, approximately ninety-six percent lacked the knowledge of ADR reporting through the SMS alert short code. Continuous enlightenment and education on the core responsibility of every stakeholder in pharmacovigilance activities is therefore advocated, while patient's active involvement in spontaneous reporting of ADRs should be carefully considered. Also, extensive dissemination of PRASCOR initiative among the general public should be intensified in order to improve reporting rates.

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