

# Awareness, knowledge, and attitude toward adverse drug reaction (ADR) reporting among healthcare professionals in Ghana

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## Abstract

**Background:** Spontaneous reporting systems are the commonest means of reporting adverse drug reactions (ADRs) worldwide. Under-reporting remains a challenge particularly in developing countries among healthcare professionals (HCPs) who are considered the primary stakeholders in the reporting of ADRs. The challenge with studies in countries such as Ghana is that the focus has been on a single professional group or health facility. This study examines the rate of reporting as well as awareness, knowledge, and attitudes toward ADR reporting across professional groups (doctors, nurses, and pharmacist) and selected health facilities (ownership types: government, quasi-government, and private; hierarchy: district, regional, and teaching) in Ghana.

**Method:** A cross-sectional survey was conducted to select and interview 424 healthcare professionals (HCPs) from 8 hospitals in the Greater Accra and Eastern regions of Ghana on issues of ADR reporting, awareness, knowledge, and attitudes toward ADR reporting. Valid responses from 378 HCPs were obtained and analyzed using frequencies and percentages.

**Findings:** The results suggest that about 82.8% of the HCPs interviewed have come across an ADR incidence, but only 52.6% of them have reported such incidence, with pharmacist (66.7%) being the most likely to report. The results further suggest that about 85.8% of HCPs are aware of ADR reporting procedures and display positive attitudes toward same. In addition, the knowledge of HCPs on ADR reporting is low with training being a major area of need.

**Conclusion:** There is the need for healthcare managers and the regulator to pay attention to existing gaps in awareness, attitudes, and most importantly knowledge of HCPs on structures and modalities for ADR reporting.

## Plain Language Summary

### Awareness, knowledge, and attitude toward adverse drug reaction (ADR) reporting among healthcare professionals in Ghana

Reporting of unpleasant reactions related to the use of medicinal products has been very low in less developed countries. Studies conducted in Ghana to examine the reporting of unpleasant reactions associated with the use of medicinal products have focused mainly on one health facility or health care provider group. This article examines the level of awareness, knowledge, and attitudes toward the reporting of unpleasant reactions to the use of medicinal products.

The authors used a quantitative method to examine the level of awareness, knowledge, and attitude toward reporting of unpleasant reactions to medicinal products. The study was conducted in eight hospitals in Greater Accra and Eastern regions of Ghana using a structured questionnaire. Only 378 out of 424 healthcare providers returned the completed questionnaire.

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The findings of the study show that 213 of the healthcare providers have encountered at least one patient with an unpleasant reaction to the use of medicinal products, although only 112 reported the unpleasant reactions. Pharmacists were found to be more likely to report unpleasant reactions as 12 out of 18 pharmacists who responded to the questionnaire indicated that they report the unpleasant reactions seen.

In addition, 321 of the healthcare providers knew of the reporting procedures for unpleasant reactions to a medicinal product in Ghana. Only 219 healthcare providers knew of the reporting procedures in the facilities in which they worked, however. Furthermore, the knowledge of healthcare providers on the method of reporting is low.

**Keywords:** adverse drug reaction, attitude, drug safety, healthcare professionals, pharmacovigilance

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### Introduction

An adverse drug reaction (ADR) is defined as any harmful and unexpected effects of a medicinal product, occurring at doses normally used for prophylaxis, diagnosis, or treatment of a disease and can arise from the use of the product within or outside the terms of the marketing authorization.<sup>1,2</sup> ADRs are among the most common reasons for fatalities in developed countries and deemed to be of major global concern,<sup>3</sup> affecting both adults and children, in differing degrees and magnitude with potentially fatal outcomes.<sup>4</sup> In addition, ADRs result in increased costs as huge amounts of financial resources are required in treating drug complications, many of which are preventable.<sup>5,6</sup>

In 1961, about 10,000 children in different parts of the world suffered from birth defects as a result of the administration of thalidomide to pregnant mothers for nausea and vomiting.<sup>7</sup> As a result of this, the World Health Organization (WHO) instituted a system for International Drug Monitoring (Pharmacovigilance) which is targeted at collaborative monitoring, reporting, and preventing avertible ADRs between member states.<sup>8</sup>

National Pharmacovigilance Centres (NPvCs) were set up by countries with approval from WHO to serve as a repository for reported adverse reactions submitted by healthcare professionals (HCPs) and patients, and subsequently forwarded to global safety data managed by the Uppsala Monitoring Centre (UMC) for signal

generation and appropriate communication of safety.<sup>8</sup>

One method that has contributed significantly to improved levels of pharmacovigilance in several countries is spontaneous reporting of ADRs.<sup>9,10</sup> Even though spontaneous reporting systems have been rolled out in several countries by regulatory authorities to motivate reporting by Healthcare Practitioners, ADR reporting rates are still low.<sup>11-13</sup> The low rates of reporting restricts and delay initiatives that could have been taken to reduce and prevent the noxious effects of medications, thus posing a health threat to both individuals and the society.<sup>14</sup> Moreover, failing to report harmful effects of a drug after encountering it does not only put the next user of the same medication at risk<sup>15</sup> but also imposes unnecessary economic burden through the use of limited resources to combat its adverse effect.<sup>16,17</sup>

ADR reporting in developing countries is particularly troubling, given that developing countries account for about 80% of the global burden of diseases but are responsible for less than 1% of the cumulative global figure (11,824,804) of ADR reports.<sup>18</sup> The low rate of reporting of ADR incidence in developing countries such as Ghana cannot be explained by the mere absence of laws, given that in countries such as Sweden, in which reporting of ADRs is mandatory, under-reporting still persists.<sup>19</sup> The low ADR reporting rate has been attributed to several factors such as lack of awareness, uncertainty about who should report, difficulties with reporting procedures, and lack of

feedback on submitted reports.<sup>20,21</sup> In addition, the knowledge and attitudes of HCPs have been found to be strongly correlated with ADRs report.<sup>22</sup>

In Ghana, the ADR reporting rate stands at 75 reports per million population as of 2019, which is below the WHO benchmark of 200 reports per million population.<sup>23</sup> A review of the DrugLens for the years 2015 to 2017 showed low reporting by nurses, and most importantly, no significant increase in ADR reporting by nurses.<sup>24–26</sup> In 2019, however, nurses reported ADRs more than doctors with pharmacists having the highest number of ADR reports.<sup>23</sup> The consequential effect of this high level of under-reporting is the possibility that safety lapses in medicine use in Ghana will go unnoticed and can negatively affect the country's effort to deliver quality healthcare.

Several strategies including the training of HCPs in health facilities nationwide and the inclusion of PV as part of the Ghana Health Service (GHS) peer review for public health facilities and in the curriculum of healthcare training institutions have been implemented by the Food and Drug Administration (FDA) to promote spontaneous reporting in Ghana. In addition, other initiatives such as Patient Safety Centres (PSCs), the SafetyWatch System (an online reporting platform), and the Med Safety App (a mobile reporting application) have been launched to facilitate real-time reporting.<sup>24–28</sup> To improve ADR reporting and therefore quality of care, several authors have studied the phenomenon in Ghana. For example, Sabblah *et al.*<sup>29</sup> examined knowledge levels and attitudes toward ADR reporting by doctors in the Greater Accra region of Ghana. On the contrary, Amedome and Dadson<sup>30</sup> sampled doctors, nurses, and pharmacist in the Volta Regional Hospital to examine the effect of knowledge and attitude on ADR reporting.

A major challenge with the existing Ghanaian literature as per the examples given is that they focus on a single profession or health facility, and therefore making it difficult to rely on the results for policy purposes. This study uses a descriptive quantitative approach to:

1. Examine the rate of ADR reporting among HCPs in selected healthcare facilities in the Greater Accra and Eastern regions of Ghana.

2. Examine awareness, knowledge, and attitude toward ADR reporting among HCPs in selected healthcare facilities in the Greater Accra and Eastern regions of Ghana.

## Method

### Study design

A cross-sectional quantitative survey was conducted across eight<sup>8</sup> health facilities in the Greater Accra and Eastern regions of Ghana.

### Study site and population

The eight<sup>8</sup> health facilities comprised of two hospitals each from government, quasi-government, Christian Health Association of Ghana(CHAG)/faith-based, and private health facilities from the two regions. Greater Accra is the second most populous (4,943,075) region of Ghana,<sup>31</sup> has about 437 health facilities (HeFRA, 2020), 16 administrative districts, and accounts for 39% of doctors, 31% of pharmacists, and 15% of nurses in clinical practice in Ghana.<sup>32</sup> As interventions made by the Food and Drugs Authority are usually piloted from Greater Accra and rolled out to the other regions, it was assumed that HCPs in the Greater Accra region would have more knowledge about pharmacovigilance and drug safety-related issues compared with other regions. The selection of the Eastern region is based on the fact that it is close to the Greater Accra region and has a considerable number of government, quasi, faith-based, and private facilities from which a representative sample can be selected to augment the sample from the Greater Accra region. The target population for the study included doctors, pharmacists, and nurses who are in clinical practice and have worked within their respective health facilities for at least 1 year at the time of the study.

### Sampling

The study focused on only hospitals. Eight<sup>8</sup> hospitals in Greater Accra and the Eastern regions were purposively selected based on the assessment of staff strength as well as the hospital bed capacity. Convenience sampling was then used to enroll study participants who were chosen based on their availability and willingness to participate in the study.

The eight<sup>8</sup> selected hospitals had a total of 3092 clinical staff at the time of the study. A sample size of 385 was calculated and 10% of the sample size was added to the initial sample to make up for non-respondents. The sample size calculation is based on Cochran (1963:75) formula as cited by Israel.<sup>33</sup> It states that

$$n_o = \frac{z^2 pq}{e^2}$$

where  $n_o$  is the sample size,  $z^2$  is the abscissa of the normal curve that cuts off an area and at the tail ( $1 - \alpha$  equals the desired confidence level at 95%),  $e$  is the desired level of precision,  $p$  is the estimated proportion of an attribute that is present in a population, and  $q$  is  $1 - p$ . The value for  $z$  is found in statistical tables that contain the area under the normal curve. Consider  $P=0.5$  (maximum variability) and  $e=0.05$  (desired level of precision). The sample size

$$\begin{aligned} n_o &= \frac{z^2 pq}{e^2} \\ n_o &= \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} \\ &= 385 \end{aligned}$$

The specific number of the different category of clinical staff (doctors, nurses, and pharmacist) selected, was done in a manner proportional to size of each category in the selected health facilities. Out of the 378 respondents, 17% were doctors, 5% were pharmacists, and 78% were nurses.

#### Data collection

Data were collected over 4 months. A structured anonymous questionnaire was shared through a web survey link to clinical staff at the chosen hospitals, with hard copies of the questionnaire made available to respondents when requested. The decision to add hard copies of the web questionnaire was mainly to ensure that participants who were not comfortable to work with the web survey due to low technology skills were able to complete the questionnaire. It is important although to emphasize that adequate quality control systems were put in place to ensure that respondents who asked for a hard copy version of the questionnaire did not fill the web version.

The questionnaire covered issues on demographic characteristics of respondents (see Table 1),<sup>2</sup>

reporting of ADRs<sup>3</sup> awareness and knowledge on ADR reporting, which covered issues on the existence of an ADR reporting system in Ghana and its hospitals, training on ADR reporting, who should report and what kinds of ADRs should be reported, how to access ADR reporting forms and how ADRs are to be reported, and channels of reporting ADRs in a health facility and who should receive the final report.<sup>4</sup> Attitudes toward ADR reporting were captured by specific questions on financial incentives, insecurities and legal issues, complacency, diffidence, indifference, ignorance, and lethargy<sup>34</sup> and measured on a 5-point Likert-type scale.

The questionnaire used for the study was developed from the previous literature sources.<sup>29,35-37</sup> The questionnaire was pretested on clinical staff in two health facilities not included in the final sample that was used for the data collection. After pretesting, some of the questions were modified to eliminate ambiguity.

A point of contact (POC) was established in each facility to facilitate distribution, follow-ups for completion, especially in the case of the paper questionnaire. The first follow-up took place 5 days after distribution of the questionnaire, with respondents declared unwilling to participate in the study after 3 weeks of follow-up without filling the questionnaire.

#### Analysis of data

Questionnaires received from respondents were checked for completeness and organized appropriately for analysis. Out of the 424 HCPs targeted across the 8 hospitals, a total of 378 valid responses were obtained, giving a response rate of 89%. Data were analyzed using SPSS Analytical software version 20. The results were presented using frequencies and percentages for the rate of ADR reporting, demographic characteristics, awareness, knowledge, and attitudes toward ADR reporting. Values on the rate of ADR reporting were cross-tabulated with the demographic characteristics of respondents as well as their awareness, knowledge, and attitudes toward ADR reporting.

## Results

#### Socio-demographic of HCPs

As per the results in Table 1, more than half (69%) of the respondents were females. About

**Table 1.** Demographic characteristics of HCPs.

Indicator	Frequency	Percentage (%)
Gender		
Male	116	30.7
Female	262	69.3
Age groups		
30 years or less	141	39.6
31–40 years	165	46.4
41–50 years	37	10.3
51–60 years	10	2.9
Above 60 years	3	0.8
Educational level		
Certificate	36	9.8
Diploma	95	25.9
Degree	172	46.9
Post-graduate	64	17.4
Profession		
Doctor	59	15.6
Pharmacist	35	9.3
Nurse	284	75.1
Facility ownership		
Government	107	28.3
Quasi	168	44.4
Faith-based	61	16.1
Private	42	11.1
Level of facility		
District hospital	193	51.1
Regional hospital	56	14.8
Teaching hospital	129	34.1
Average age (years)	33.7 (SD = 7.6)	
Average years of experience	8.5 (SD = 7.5)	
Average working hours per week	40.7 (SD = 13.3)	
Average number of patients attended to per day	84.3 (SD = 420.21)	
HCP, healthcare professional; SD, standard deviation.		

46.4% of the respondents were between the ages of 31 and 40 years, followed by those aged 30 years or less (39.6%) with the average age of the respondents being 34 years.

Less than half (46.9%) of the respondents had a degree, while 26% were holders of a diploma. The majority (75.1%) of the respondents were nurses. The average years of work experience were 8.5 (SD=7.5) and about 42.4% of them had practiced for up to 5 years. Respondents from quasi-government and government healthcare facilities had the highest representation of about 44.4% and 28.3%, respectively, with the remaining working in CHAG (16.1%) and private (11.1%) hospitals. The respondents were from district hospitals (51.1%), regional hospitals (14.8%), and teaching hospitals (34.1%). Private hospitals were placed at the district level as the facilities were not up to the regional and tertiary levels. The average working hours within a week were 40.7h (SD=13.3). On the average, HCPs attended to about 84 patients (SD=420.21) per day in the past year with a quarter (25.5%) of the HCPs working more than 40h per week (see Table 1).

#### Rate of ADR reporting among HCPs

The first objective of the study is to examine the rate of ADR reporting among health professionals in the two regions studied. As per the results in Table 2, 213 (56.3%) of the 378 HCPs surveyed had come across a patient with an ADR while on duty within the last 12 months. This included doctors (67.8%), pharmacists (51.4%), and nurses (54.6%).

The results in Table 3 indicate an overall ADR reporting rate of 52.6% among HCPs, with pharmacists having the highest reporting rate of 66.7%, followed by nurses (55.5%), and doctors (35%). The results (not shown) equally suggest that CHAG hospitals had the highest reporting rate of 61.2%.

#### Awareness on ADR reporting

The results of the study (see Table 4) suggest that there is a high level of awareness (86%) of the existence of a national ADR reporting and monitoring system (NPvC) among HCPs. This level of awareness was independent of the experience of the HCPs, health facility ownership, or the hierarchy of the health facility (i.e. district, regional, or

**Table 2.** Percentage of HCPs who had encountered at least one patient with an ADR.

	Sample of	≥ADR	Percentage (%)
Doctors	59	40	67.8
Pharmacist	35	18	51.4
Nurse	284	155	54.6
Overall responses by HCPs (N)	378	213	56.3

Source: Authors' calculation.  
ADR, adverse drug reaction; HCP, healthcare professional.

**Table 3.** Percentage of HCPs reporting an ADR seen.

Profession	Number of respondings	Number of reportings	ADR reporting rate (%)
Doctors	40	14	35.0
Pharmacist	18	12	66.7
Nurse	155	86	55.5
Total respondents (N)	213	112	52.6

Source: Authors' calculation.  
ADR, adverse drug reaction; HCP, healthcare professional.

teaching). While about 11% of the HCPs from district and teaching hospitals, respectively, had no idea of the existence of an ADR reporting and monitoring system in Ghana, 35% of HCPs from regional hospitals indicated no awareness of a national pharmacovigilance system in Ghana. The results of the test of independence suggested some level of association between the level/hierarchy of a health facility and general awareness of the existence of a national level ADR reporting system.

On the contrary, the level of awareness of the existence of an ADR reporting system at the health facility level (59.5%) was low compared with the national level (86%; see Table 4). The level of awareness was independent of the educational background of the HCPs ( $\chi^2=2.02$ ,  $p=0.58$ ), the level of the facility ( $\chi^2=2.2$ ,  $p=0.33$ ), and the HCPs' years of working

**Table 4.** Awareness on ADR reporting and monitoring system across facility levels.

	Percentage responses (number of HCPs)			
	District hospital	Regional hospital	Teaching hospital	Overall total
Awareness of the ADR reporting and monitoring system (NPvC) in Ghana				
Yes	89.5% (171)	65.5% (36)	89.1% (114)	85.8% (321)
No	10.5% (20)	34.5% (19)	10.9% (14)	14.2% (53)
Total respondents	191	55	128	374
Awareness of ADR reporting system within the facility				
Yes	63.1% (118)	58.2% (32)	54.8% (69)	59.5% (219)
No	36.9% (69)	41.8% (23)	45.2% (57)	40.5% (149)
Total respondents	187	55	126	368
Average percentage awareness on ADR reporting				72.6%
Source: Authors' calculation. ADR, adverse drug reaction; HCP, healthcare professional; NPvC, National Pharmacovigilance Centre.				

**Table 5.** Awareness of ADR reporting and system in health facilities across professions.

	Percentage responses (number of HCPs)			
	Doctor	Pharmacist	Nurse	Overall
Awareness of ADR reporting system within the facility				
Yes	54.2% (32)	77.1% (27)	58.4% (160)	59.5% (219)
No	45.8% (27)	22.9% (8)	41.6% (114)	40.5% (149)
Total respondents	59	35	274	368
Source: Authors' calculation. ADR, adverse drug reaction; HCP, healthcare professional.				

experience ( $\chi^2=7.63$ ,  $p=0.11$ ). The overall level of awareness among the HCPs was found to be 72.6% and rated very good.

The results, however, showed loose association between awareness of the existence of an ADR reporting system at the health facility level and profession of the HCPs ( $\chi^2=5.34$ ,  $p=0.069$ ). Generally, the proportion of pharmacists (77.1%) aware of the existence of an ADR reporting system at their health facility was higher than nurses (58.4%) and doctors (54.2%; see Table 5).

About 46% of the HCPs were unaware of any working colleague designated by management as the lead coordinator of PV activities within their health facility. Those who knew of such a person in their facilities were 40.9%. The remaining 13% responded negative to having anyone coordinating PV activities in their facility.

Furthermore, the results show a fairly strong level of association between awareness and health facility ownership ( $\chi^2=11.70$ ,  $p=0.009$ ). A greater proportion of HCPs from faith-based (75.4%) and government (64.5%) hospitals

**Table 6.** Awareness of ADR reporting system in health facilities across facility ownerships.

	Percentage responses (number of HCPs)				
	Government	Quasi-government	Faith-based/CHAG	Private	Overall
Awareness of ADR reporting system within the facility					
Yes	63.5% (66)	51.2% (83)	75.4% (46)	58.5% (24)	59.5% (219)
No	36.5% (38)	48.8% (79)	24.6% (15)	41.5% (17)	40.5% (149)
Total respondents	104	162	61	41	368
Source: Authors' calculation. ADR, adverse drug reaction; HCP, healthcare professional.					

**Table 7.** Training received in drug safety and reporting of ADRs.

Indicator	Number of HCPs	Percentage (%)
HCP trained on drug safety and reporting of ADRs		
Yes	237	62.9
No	140	37.1
Last time HCP received training <sup>a</sup>		
Over 3 years ago	69	29.4
Three years ago	39	16.6
Two years ago	74	31.5
In the past year	53	22.6
Source: Authors' calculation. ADR, adverse drug reaction; HCP, healthcare professional. <sup>a</sup> This is out of 235 HCPs who had received training in the reporting of ADRs.		

confirmed awareness of the existence of an ADR reporting system in their hospitals. For quasi-government and private hospitals, this was reduced to about 51.2% and 58.5%, respectively (see Table 6).

#### *Knowledge on ADR reporting*

The results in Table 7 indicate that about 63% of the HCPs had received some form of training in drug safety and reporting of ADRs. Out of this number, about 22.6% had received training in the past year, while 31.5% had theirs in the past 2 years. The remaining 46% had received training in the past 3 years or more. Pharmacists (74%) were found to be the most trained HCPs.

Two hundred and thirty-seven (62.9%) of the respondents had received training on ADR reporting at least once, through FDA pharmacovigilance sensitization done at the facility, as part of their school curriculum, at annual general meetings of the respective professions, as well as from continuous professional development (CPD) sessions. An additional test was conducted to assess the relationship between awareness (Table 6) and training (Table 7). The results showed associations between HCPs training on reporting of ADRs and awareness of the existence of ADR reporting system in their facilities ( $\chi^2=20.67$ ,  $p=0.00$ ). The results show that 50.3% of those who had never received training on reporting of ADRs were unaware of the existence of an ADR reporting systems in their health facilities. Only 27.1% of HCPs who had received training were also unaware of such a system in their health facility.

With respect to knowledge about ADR reporting, the results show that 83.4% of respondents think that doctors, pharmacists, and nurses are responsible for the reporting of ADRs, with 83.1% responding that ADR reporting must be done for both serious and non-serious reactions (see Table 8).

The results on knowledge of ADR reporting also show that about 21% of the HCPs did not know any of the available ways of reporting an ADR. About 53% of HCPs knew of only one way to report ADRs, whereas 15.4% knew of just two ways. Only 10.8% of HCPs knew three or more ways of reporting an ADR. Knowledge about the different ways of reporting ADRs was significantly associated with the profession of the HCPs ( $\chi^2=48.59$ ,  $p=0.00$ ).



**Table 8.** HCPs involved in ADR reporting and what to report.

Indicator	Number of respondents	Percentage (%)
HCPs required to report ADRs		
Nurses, doctors, and pharmacists	306	83.4
Otherwise	61	16.6
ADRs to be reported		
Both serious and non-serious ADRs	310	83.1
Otherwise	63	16.9

Source: Authors' calculation.  
ADR, adverse drug reaction; HCP, healthcare professional.

While only 2.9% of pharmacists were not aware of any of the reporting options, about 23.7% of doctors and 22.5% of nurses were unaware of any of the reporting tools. Similarly, pharmacists formed a greater proportion of health workers who were aware of three or more reporting tools (29.4%), followed by doctors (22%) and nurses (5.9%).

The results further suggest that the conventional paper ADR reporting form (Blue Form) constituted the most dominant channel for reporting an ADR (67.5%), followed by phone calls to the NPvC (25.6%). Knowledge on the other digital tools for reporting, such as the Safety Watch System, the MedSafety App, and the mobile short code 4015 was not well known by HCPs (see Table 9). The results (not shown) further suggest that only 51.9% of the HCPs knew about the channel for reporting ADRs in their respective health facilities. In addition, only 52.3% of the respondents knew where to get the ADR Blue Form on site. Also, 48% neither knew the channel for reporting nor where to access the Blue Form in their health facilities. Finally, information about FDA's role as the recipient of ADR reports was known by only 51% of the HCPs.

#### *Attitude toward ADR reporting*

Attitude was captured by seven items (financial incentives, insecurity and legal issues, complacency, diffidence, indifference, ignorance, and lethargy – see Table 10). The results in Table 10 indicate that majority of the HCPs have positive attitude toward ADR reporting. For example,

HCPs exhibited enthusiasm (lethargy; 92.3%, overall percentage score) and diffidence (83.4%) in reporting ADRs. They are also not indifferent (93.6%), complacent (93.1%), and ignorant (90.7%) on issues related to reporting ADRs.

On the contrary, as much as 58.7% of the respondents agreed that financial incentives should be provided to motivate the reporting of ADRs, while 71.5% of the HCPs agreed to the assertion that 'fear of being blamed for the occurrence of an ADR will discourage reporting' (insecurity and legal issues).

#### **Discussion**

The study sought to examine the rate of ADR reporting as well as awareness, knowledge, and attitudes toward ADR reporting among health professionals in selected hospitals in Ghana. The results suggest that although a higher proportion of HCPs have come across issues of ADR, only a little more than half of the HCPs surveyed reported the ADRs they came across, with pharmacists being more likely to report an ADR compared with doctors and nurses. The results further suggest that majority of HCPs were aware of the existence of a national pharmacovigilance system, although that number reduces significantly when it comes to awareness of a pharmacovigilance system at the health facility level, with HCPs in a district healthcare facility being more likely to be aware of the existence of a pharmacovigilance system compared with their counterparts from Regional and Teaching Hospitals. The results also indicate that while a little more than half of

**Table 9.** Knowledge about ways of reporting ADRs.

Indicator	Number of respondents	Percentage (%)
Knowledge about the different ways of reporting ADRs		
None	76	21.0
One	191	52.6
Two	56	15.4
Three	26	7.2
Four	7	1.9
Five	6	1.7
Tools for reporting ADRs		
Paper ADR reporting form (Blue Form)	245	67.5
Phone call to the FDA	93	25.6
Online <i>via</i> Safety Watch System	59	16.3
Mobile application (MedSafety app)	28	7.7
Mobile short code (4015)	15	4.1
Source: Authors Calculation. ADR, adverse drug reaction; FDA, Food and Drug Administration.		

the HCPs surveyed had adequate knowledge on issues of ADR reporting, the majority had a positive attitude toward ADR reporting, except on the role of financial incentives and fear from blame. The current findings have important implications for the literature and practice, and are discussed below.

The results of the study do not only suggest that ADR reporting rate (52.6%) is low but also confirms existing reports<sup>24–26</sup> that doctors and nurses report less of ADRs compared with pharmacists. The general low level of ADR reporting by nurses and doctors who constitute majority of the health workforce must be of concern to the regulator and policy makers, because an improvement in their reporting rate can serve to improve overall reporting of ADRs, which is generally low. Although the reason for the low level of ADR reporting is not directly apparent from the study, an understanding of HCPs' awareness, knowledge, and attitudes toward ADR reporting will give some indications and pointers, given that they are argued to influence ADR reporting.<sup>20–22</sup>

First, there is a generally high level of awareness among HCPs of the existence of a National PV system in Ghana, which is also consistent with report received from health facilities by the FDA and reported in the FDA DrugLens<sup>23–26</sup> as well as earlier studies.<sup>30,38</sup> Notwithstanding the above, the majority of HCPs are unaware of the existence of a pharmacovigilance system in their health facilities. This may reflect the presence of poor communication between hospital management and health workers, or perhaps the absence of a robust safety management system in the respective health facilities. It is also interesting to note that HCPs from district hospitals were more likely to be aware of a pharmacovigilance system both at the national and health facility levels compared with their counterparts in a regional or teaching hospital. Given that regional hospitals have higher level staff, one would have expected HCPs in regional hospitals to be better aware of the existence of a pharmacovigilance system both at the national and health facility levels. Although we do not have any direct explanation for the finding, it is likely that contact persons in regional hospitals who are supposed

**Table 10.** The determinants of ADR reporting attitude among HCPs.

Items	Total respondents (N)	Agree	
		Number of HCPs	Percentage (%)
Financial incentives			
C.1 Incentives and rewards should be provided for ADR reporting rather than seen as a mere professional responsibility.	375	220	58.7
Insecurities and legal issues			
C.2 Fear of being blamed for the occurrence of an ADR will discourage reporting.	375	268	71.5
Complacency			
C.3 Not all reactions are identified during clinical trials prior to marketing of drugs, therefore the need to still report ADRs.	374	348	93.1
Diffidence			
C.4 I will still report an ADR if I am not certain it caused the reaction even if it will make me appear ridiculous.	374	312	83.4
Indifference			
C.5 A single report makes significant contribution to pharmacovigilance or medical knowledge.	376	352	93.6
Ignorance			
C.6 Serious and unexpected reactions are not the only ADRs to be reported.	375	340	90.7
Lethargy			
C.7 Regardless of the workload in my unit, I will report an ADR if it is brought to my attention.	377	357	94.7
C.8 I will make time to report an ADR even if my schedule is tight.	372	354	95.1
C.9 I will follow through the process for reporting an ADR no matter how long it takes.	375	339	90.5
C.10 Reporting of ADRs is still necessary although feedback may not be received in any form.	376	354	94.2
C.11 I will continue to report ADR even if I do not receive direct feedback.	376	330	87.8
Source: Authors' calculation. ADR, adverse drug reaction; HCP, healthcare professional.			

to disseminate information on national and facility level pharmacovigilance systems may not be doing so as expected. Finally on awareness, the

study findings suggest that HCPs working in government hospitals are better aware of the existence of a pharmacovigilance system at the

national and health facility levels. The incorporation of the pharmacovigilance assessment tool (PAT) into the peer review checklist of the GHS (government-owned) health facilities nationwide may explain the relatively higher levels of awareness of HCPs from government-owned health facilities compared with the others.

Second, there is evidence to suggest that knowledge on the existence of ADR reporting systems by HCPs can boost the rate of ADR reporting.<sup>22,37,39</sup> This relationship seems to be confirmed by the results of the study, as about 50.3% of HCPs who had never received training on reporting of ADRs were unaware of the existence of ADR systems in their health facilities. The results of the study further suggest the need to improve the knowledge level of HCPs (captured by training on ADR reporting systems) on pharmacovigilance systems. For example, the proportion of all HCPs sampled, who had ever received training in drug safety and reporting of ADRs was 62.9%, with the figure for doctors being as low as 8.2% (results not shown). Even worrying is the fact that ADR reporting trends for over 3 years preceding the survey seem very unstable, with improvements and deterioration over the years. Knowledge about the channel of reporting ADRs in each facility which usually includes where to access the Blue Form when necessary should be well known by healthcare staff. It will, therefore, be important that adequate attention is paid to improving the knowledge of HCPs through training and other channels if ADR reporting is supposed to improve.<sup>37,39</sup> It is also important to emphasize that any such training should focus a lot more attention on nurses and doctors who compared with pharmacists are less knowledgeable on existing procedures for reporting ADRs. The FDA's initiative of including PV into the curriculum of healthcare training institutions seems not to have yielded any significant changes in reporting by HCPs. There is, therefore, the need to reassess this intervention in order to facilitate the development of innovative strategies for improved ADR reporting.

Finally, the results of the study suggest that HCPs exhibited positive attitudes toward ADR reporting as captured by scores on HCPs not being lethargic (92.3%, overall percentage score), diffident (83.4%), indifference (93.6%), complacent (93.1%), and ignorant (90.7%) on reporting ADRs. It is important to emphasize that the

positive attitudes constitute an asset that can be leveraged on by managers of health facilities as well as the regulator to improve knowledge and awareness which can have a positive effect on spontaneous ADR reporting.<sup>9,10</sup> While emphasizing the value of the positive attitudes of HCPs to improving ADR reporting, it is equally important to point out that the presence of some negative attitudes such as the desire to be motivated or provided incentives before reporting ADRs, and failure to report ADRs out of fear of being blamed for their occurrence can constitute a key setback to improving ADR reporting. In countries such as Ghana in which the ADR reporting rate is low, it will be important that all constraints to reporting ADRs are reduced as much as possible.

### Conclusion

The study examined the rate of ADR reporting as well as the level of awareness, knowledge, and attitudes of HCPs in selected health facilities toward ADR reporting. The results of the study suggest that just a little over half of respondents report ADRs they have come across, with doctors and nurses having a relatively lower reporting rate. Although the results suggest a good level of awareness and positive attitudes toward ADR reporting structures and procedures, there still remain challenges that need the attention of healthcare managers and the regulator if the rather low rate of reporting of ADRs is supposed to improve. More importantly, the knowledge of HCPs on ADR reporting procedures and options seem to be limited. It is, therefore, not surprising that awareness and reporting of ADRs continue to be low. Given the fact that the results show that training on ADRs are low for all HCPs, there will be the need for health facility managers and the regulator to put in place a system that constantly identifies ADR reporting needs of HCPs. Based on the needs, appropriate training modules can be developed to help equip HCPs with the required knowledge to aid them not only in understanding ADR reporting procedures but also become better aware of issues related to ADR reporting, improve their attitudes toward ADR reporting, and consequently improve ADR reporting.

Specifically, health facility managers can adopt initiatives implemented in other African countries to increase ADR reporting which include placing posters on ADR reporting in wards and other

public areas, keeping an example of a completed ADR form in each ward, keeping ADR forms in each ward as well as monitoring number of forms completed, creating a 'WhatsApp' platform for ADR reporting for all healthcare providers in the facility, circulating standard operating procedures for the submission of completed ADR forms, and providing monthly feedback to healthcare providers on ADRs reported.<sup>40</sup>

In addition to the policy and practice implications of the findings, this article, which is one of the few to examine ADR reporting across health professionals (doctors, nurses, and pharmacist) and health facilities (ownership types: government, quasi-government, and private; hierarchy: district, regional, and teaching), constitutes an important addition to the existing ADR reporting literature in Ghana. Thus, the findings can be important in evolving appropriate interventions by health facility managers and the regulator to improve the current rate of ADR reporting.

## Declarations

### *Ethics approval and consent to participate*

Ethical approval for this study was obtained from the Ethics Review Committee of the GHS Research and Development Division, with reference no. GHS-ERC 017/05/20. For the web survey, an error-checked informed consent form was included as part of the introduction section to the questionnaire. Respondents were supposed to read the informed consent and agree to it before going ahead to fill the questionnaire. Informed consent was also obtained from respondents who completed the paper questionnaire.

### *Consent for publication*

Not Applicable.

### *Author contributions*

**Abena Ahwianfoa Yawson:** Conceptualization; Methodology; Writing – review & editing.

**Gordon Abekah-Nkrumah:** Conceptualization; Formal analysis; Methodology; Writing – original draft.

**Grace Adjei Okai:** Conceptualization; Writing – original draft.

**Charles Gyamfi Ofori:** Formal analysis; Writing – review & editing.

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### *Competing interests*

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### *Availability of data and materials*

Not Applicable.

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