Vol. 15(8), pp. 152-163, August, 2021
DOI: 10.5897/AJPP2021.5254
Article Number: E7E277C67591
ISSN: 1996-0816

http://www.academicjournals.org/AJPP

ACADEMIC JOURNALS
expand your knowledge

African Journal of Pharmacy and Pharmacology

Full Length Research Paper

Examining characteristics, knowledge, attitude and practice of pharmacovigilance by health care professionals in Sub-Saharan Africa: A systematic review of the literature

Larry L Mweetwa[1*], Thatoyaone J Kenaope[1], Bonang Mosala[1], Kenneth Pule[1], Gerald Juma Obure[1], Getrude Mothibe[1], Kabo O. Tshiamo[2] and Emmanuel Tope Oluwabusola[3]

[1]Department of Pharmacy, Boitekanelo College, Plot 5824 Masetlheng Rd, Gaborone 00000, Botswana.
[2]Nathan and Family Pharmacy, P. O. Box 1299 ABG, Gaborone 00000, Botswana.
[3]Department of Chemistry, Marine Biodiscovery Centre, University of Aberdeen, United Kingdom.

Received 13 May, 2021; Accepted 15 July, 2021

The pharmacovigilance practices aim to improve the safety and care of patient in relation to the utilization of medications, as well as other medical and paramedical interventions. Due to emergence of outbreaks of infections, the sub-Saharan African countries have been widely utilizing the trial drugs, which have been increasing the events of Adverse Drug Reactions (ADRs) in the region. This systematic literature review aims to examine the characteristics, knowledge, attitude and pharmacovigilance practices performed by health care professionals in sub-Saharan Africa. This systematic review included N=7 studies, published between 2010 and 2020, and dealing with characteristics, knowledge, attitude and pharmacovigilance practices performed by health care professionals of sub-Saharan African region were extracted from CINAHL, Science Direct, and PubMed. Seven journal articles were selected through PRISMA research tool to identify the key factors which included inadequate training, under-reporting, knowledge assessment, practice, and good attitude. All selected studies were published in sub-Saharan Africa for this systematic review. The healthcare professionals working in the region of sub-Sahara Africa lack expertise in pharmacovigilance practices, due to lack of awareness, unavailability of support, and several other factors. Pharmacovigilance practices can be improved by arranging education, training, and role-play sessions for them.

Key words: Pharmacovigilance, adverse drug reactions, knowledge, attitude, practice, sub-Saharan Africa, KAP.

INTRODUCTION

The World Health Organization (WHO) mentioned that an Adverse Drug Reaction (ADR) is referred to as inadvertent, unwanted, as well as deleterious reactions to medications. The maladministration of medications

*Corresponding author. E-mail: larrymweetwa1@gmail.com Tel: (+267) 3911-009

utilised for prevention, diagnosis, as well as treatment purposes at the therapeutic doses is likely to result in the physiological malfunction (Mascolo et al., 2017). Thus, the ADR is referred to as noxious, undesired, and unintended effect of medications, which is likely to be experienced by individuals utilising medications for prophylaxis, diagnosis, or therapeutic purpose (Adedeji et al., 2013). The ADR has been reported as a substantial cause of morbidity as well as mortality, and have a significant influence on the population of all age groups. The ADR might also occur even after the correct utilisation of medications, such that there has been a range of factors, which either predispose or contribute to the development of ADR (Adedeji et al., 2013). These factors include the irrational utilisation of medications, poor patterns of medication prescriptions, the promotional activities and campaigns considered by the pharmaceutical industries, the inadequate access to the objective resources of information, and unhealthy pharmaceutical practices (NPC, 2012). The ADR might be predicted and related to dose, time (delayed reactions), the withdrawal reactions, and the unexpected reactions due to the failure of treatment (Food, Medicine, and Healthcare Administration and Control Authority of Ethiopia, 2014). For reducing the risk of morbidity and mortality due to ADR, the healthcare professionals need to achieve competence in the handling of ADRs within the clinical practice not only for the safety of patients but also for the monitoring of drug safety level at the level of the population (van Eekeren et al., 2018).

A range for the clinical reports, as well as the policymakers for putting efforts to curtail the problems of ADRs (Haque et al., 2013). The emergence of outbreaks of infections has been contributing to the utilisation of trial medications for treating population. Specifically, the sub-Saharan African countries have been widely utilising the trial drugs, manufactured by the developed countries of the world. For this reason, genetic, cultural, environmental, as well as social differences between the regions in which the medications have been prepared and utilised increases the probability of the ADR. The researchers have been focusing on the pharmacovigilance practices of the healthcare professionals, for reducing the likelihood of ADRs (Haque et al., 2013). For this reason, it is evident to identify the attitudes, knowledge, characteristics, as well as pharmacovigilance practices performed by the healthcare professionals.

Significance of pharmacovigilance

The term pharmacovigilance is referred to as the science as well as activities relating to the detection, assessment, understanding, as well as prevention of the adverse effects or other problems which might arise due to the intake of medication (Awodele et al., 2011). The specific purpose behind pharmacovigilance is improving the safety and care of the patient in relation to the utilisation of medications, as well as other medical and paramedical interventions. The pharmacovigilance contributes to assessing the harm, benefits, effectiveness, as well as risks associated with the intake of medications, and facilitates in the promotion of understanding of the potential consequences of ADR. There are three core functions of pharmacovigilance, including case management, signal management, as well as the benefit-risk management (Beninger, 2018). The analysis of the effectiveness of pharmacovigilance is carried out by using the Spontaneous Reporting System (SRS), which contributes to the early detection of the signals of new, rare, as well as serious ADRs (Srba, 2014). The SRS enables the physicians, pharmacists, as well as the patients to report the ADRs at the pharmacovigilance centre (Ganesan et al., 2016). Other than the healthcare professionals, the pharmaceutical industry has also been utilising the SRS for collecting information related to the medications. However, pharmacovigilance efficacy is substantially dependent on the knowledge and attitudes of healthcare professionals.

Rationale of research

The ADRs have been experienced by healthcare professionals during their professional practices; therefore, they are required to possess awareness regarding ADR reporting (Mouton et al., 2015). ADR management requires a multi-professional approach; therefore, healthcare professionals must be trained to perform pharmacovigilance practices efficiently. Specifically, the regions dealing with multiple pandemics at a time have been testing several new medications at a time, increasing the likelihood of ADRs. Taking the example of the sub-Saharan African Region, which was worst hit by the HIV pandemic, and diseases, there is a requirement to monitor the ongoing antiretroviral therapies (ART) (Avong et al., 2018). The integration of new medications into the standard treatment guidelines in the African region has been increasing the frequency of ADRs (Mouton et al., 2015). For this reason, it is significant to improve the mechanism of ADR reporting. However, the integration of new medications into the standard treatment approaches demands a significant improvement in the pharmacovigilance practices, improvement in training, and awareness of the healthcare professionals towards ADR prevention, and ADR reporting. The improvement in the pharmacovigilance practices of medical professionals, pharmacists, and nursing professionals is likely to safeguard the health and wellbeing of the population.

Aim of research

This systematic literature review aims to examine the characteristics, knowledge, attitude and

pharmacovigilance practices performed by the by health care professionals in sub-Saharan Africa. It further aimed to find out the gaps identified by the healthcare professionals regarding the pharmacovigilance practices, and propose recommendations to conduct further research.

MATERIALS AND METHODS

This systematic review was focused on the studies examining the knowledge, characteristics, attitudes, as well as the practices of pharmacovigilance by the healthcare professionals in the countries located within the sub-Saharan African region. This systematic review was focused towards the articles presenting the ADRs and pharmacovigilance, on the basis of concepts presented by the WHO with the exclusion of overdosing, errors associated to the administration of medications, non-compliance of medications, as well as the therapeutic failures (Patel and Ganguly, 2010). The ADRs are caused as a result of the inherent properties of medications, and are less likely to be prevented; therefore, the ADRs were considered to assess the attitudes, and knowledge of the healthcare professionals towards the practices of pharmacovigilance.

Data sources

Three of the electronic databases including CINAHL, Science Direct, and PubMed were utilised for extracting the research articles focused towards attitudes, knowledge, as well as practices performed by the healthcare professionals towards the ADRS and pharmacovigilance. The studies were searched by using the search terms and keywords, including ‘adverse drug reaction’, ‘ADR’, ‘pharmacovigilance’, ‘knowledge’, ‘attitude’, ‘characteristics’, ‘practices’, ‘healthcare professionals’, ‘pharmacovigilance practices of healthcare professionals’, ‘ doctors’, ‘pharmacists‘ physicians, and ‘medical practitioners’. The considered search terms and keywords were joined by Boolean operators, ‘AND’, and ‘OR’, for refining the process of literature search. The process of the literature search was carried out by using the pre-defined inclusion and exclusion criteria (Table 2).

Criteria for inclusion and exclusion of studies

With reference to the inclusion criteria considered for this research, the studies published between the years 2010 to 2020 were extracted for this literature review. This time frame was specifically considered to extract the current levels of knowledge, attitudes, characteristics, as well as practices of pharmacovigilance performed by the healthcare professionals. The studies available in the English language were considered for this systematic review, to avoid the risk of bias which resulted due to difficulty in understanding the studies. This research was focused towards the characteristics, knowledge, attitudes, and pharmacovigilance practices performed by the healthcare professionals working in sub-Saharan African region; therefore, despite considering the studies conducted globally, the research was restricted to the sub-Saharan African region. This particular region was selected because it has been hit by the worst HIV pandemic, along with several other diseases, and has been reported to have a high frequency of ADRs due to testing of medications (Mabirizi et al., 2018). Thus, the geographical restriction was applied to acquire a significant insight into the current pharmacovigilance practices in Africa. Only peer-reviewed full-accessed papers were included to ensure data viability, reliability, and validity.

The exclusion criteria considered for this systematic literature review assured that the studies conducted before 2010 were not considered due to the likelihood of providing less efficient analysis of the current levels of knowledge and attitudes of the healthcare professionals towards the pharmacovigilance practices. In addition, the studies conducted in the regions of the world other than the sub-Saharan African countries were also excluded from the research, on the basis of the research aim and objectives. Any grey literature, paper without abstract was excluded to ensure quality and credibility of the manuscript.

Study selection

The literature search was performed by using *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) framework. This framework comprised a set of guidelines, which are categorised by using a four-phase diagram, referred to as identification, screening, eligibility assessment, and the consideration of inclusion, as well as exclusion criteria (Tricco et al., 2018). Figure 1 shows the flow diagram of PRISMA considered for this systematic literature review.

Figure 1 shows that the literature search by using the considered electronic databases resulted in the extraction of N=140 studies, whereas, the searching performed by using google scholar facilitates the extraction of N=25 studies. The initial screening of the extracted studies was performed by analysing their titles, and N=40 duplicate studies were removed from this research. The abstracts of remaining N=125 studies were screened, and N=75 studies were further removed due to language other than English, and publication before 2010.

The complete texts of N= 50 studies were screened, and on the basis of quality standards, N=43 studies, and due to having no focus towards the knowledge, attitudes, and pharmacovigilance practices of the healthcare professionals in regions other than sub-Saharan Africa. In this regard, only N=7 relevant studies were included in this systematic review, and the findings of these studies were correlated, which led towards recommendations and conclusion. Table 1 shows the summary of research studies included in this systematic review.

RESULTS

Seven authors were selected according to Prisma research tool guidelines in order to identify key factors coming out of the reviewed journals which build this discussion and as summarised in Figure 2.

Description of included researches

A total of N=7 studies published in sub-Saharan Africa were considered within this systematic review. Out of these studies, a total of two of the studies (Seid et al. (2018) and Alemu and Biru (2019)) were conducted in Ethiopia. Whereas, N=4 studies, conducted by Awodele et al. (2011), Bello and Umar (2011), Adedeji et al. (2013), and Osakwe et al. (2013) were conducted in Nigeria. In addition, one of the considered studies, Adenuga et al. (2020) was conducted in Namibia.

Table 1. Key Findings.

S/N	Author/Year	Research design	Setting	Sample population and sample size	Outcomes
1	Seid et al. (2018)	Cross-sectional research	Ethiopia	N=102 healthcare professionals: 61 Registered Nurses, 16 Health Officers, and 25 Pharmacy Professionals.	The healthcare professionals had positive attitudes towards reporting. However, they are required to improve their knowledge of efficiently performing pharmacovigilance practices.
2	Alemu and Biru (2019)	Cross-sectional research	Ethiopia	N=114 healthcare professionals: 26 Physicians, 49 Registered Nurses, 17 Pharmacy Professionals, 12 Health Officers, and 10 Midwives.	A considerable majority of healthcare professionals have a positive attitude; however, are required to improve their knowledge and practices of ADR reporting.
3	Bello and Umar (2011)	Quantitative Research	Nigeria	N=61 Physicians comprising of 6 consultants, 1 chief medical officer, 7 principal medical officers, 4 senior medical officers, 1 house officer, 4 senior registrars, 10 registrars, and 25 medical officers.	The ADR reporting is not adequate, due to lack of awareness, and lack of training opportunities for the healthcare professionals. There is a requirement of including the educational strategies for improving ADR reporting in healthcare.
4	Adedeji et al. (2013)	Cross-sectional research	Nigeria	N=35 healthcare professionals of which 10 medical doctors practicing in family medicine, 5 in internal medicine, 2 in surgery, 4 paediatrics, 5 obstetrics, 2 in Psychiatry, 2 in Ophthalmology, 3 in Laboratory Medicine, and 2 did not reveal the speciality.	The ADR reporting rate was low due to inadequate training opportunities for healthcare professionals.
5	Awodele et al. (2011)	Cross-sectional research	Nigeria	N=251 medical doctors	The healthcare professionals must improve pharmacovigilance practices, specifically in the areas of clinical pharmacy, and clinical pharmacology.
6	Osakwe et al. (2013)	Descriptive cross-sectional study	Nigeria	N=341 healthcare professionals: 120 Pharmacists, 84 Medical Doctors, 77 Nurses, 21 Medical Laboratory Scientists, 39 Dietitians, Radiographers, Physiotherapist, and Biomedical Engineers.	Training resulted in a significant improvement in pharmacovigilance practices; however, healthcare professionals need to focus on their pharmacovigilance practices.
7	Adenuga et al. (2019)	Cross-sectional survey	Namibia	N=197 healthcare professionals: 87 Nurses, 31 Medical professionals, 62 Pharmacy professionals, 5 Dentists, 5 Allied Healthcare workers, and 9 other healthcare personnel.	There is a requirement of workforce strengthening and advocacy for ADR reporting.

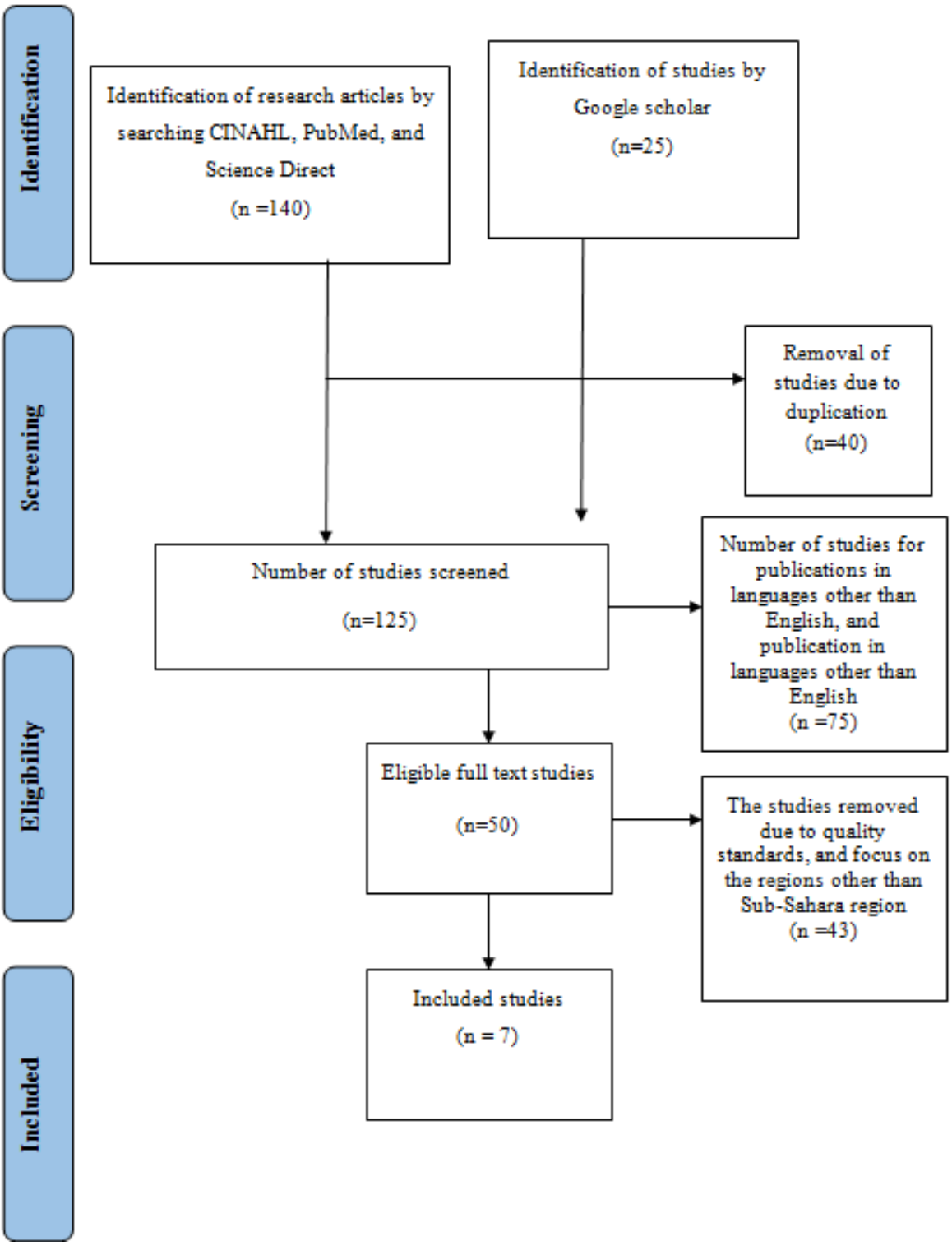

Figure 1. PRISMA flow chart.

Knowledge and awareness of healthcare professionals towards pharmacovigilance

Awodele et al. (2011) found that 82.9% of the healthcare professionals were aware of the term pharmacovigilance, and defined the term as the utilisation of knowledge for detecting, assessing, and preventing the ADRs. Out of the considered studies, Seid et al. (2018) performed the

Table 2. Search strategy summary.

Research sources	Search Date	Search Strategy	Total Results
Databases		**CINAHL**	
"Adverse Drug Reaction and Pharmacovigilance"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	7,125
"Pharmacovigilance and Knowledge"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	1,226
"Pharmacovigilance practices of healthcare professionals AND Attitude"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	3,009
ADR and Pharmacovigilance AND healthcare professionals OR doctors OR physicians OR medical practitioners OR Pharmacist	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	987
Databases	**Science Direct**		
"Adverse Drug Reaction and Pharmacovigilance"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	2,985
"Pharmacovigilance and Knowledge"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	987
"Pharmacovigilance practices of healthcare professionals and Attitude"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	1.336
ADR and Pharmacovigilance aND healthcare professionals or doctors oR physicians or medical practitioners Or Pharmacist	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	125
Databases		**PubMed**	
"Adverse Drug Reaction and Pharmacovigilance"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	5,987
"Pharmacovigilance and Knowledge"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	876
"Pharmacovigilance practices of healthcare professionals AND Attitude"	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	1,004

Table 2. Contd.

ADR AND Pharmacovigilance AND healthcare professionals OR doctors OR physicians OR medical practitioners OR Pharmacist	12 June 2020 – 30 June 2020	Full Text Peer-Reviewed 2010-2020 English	765

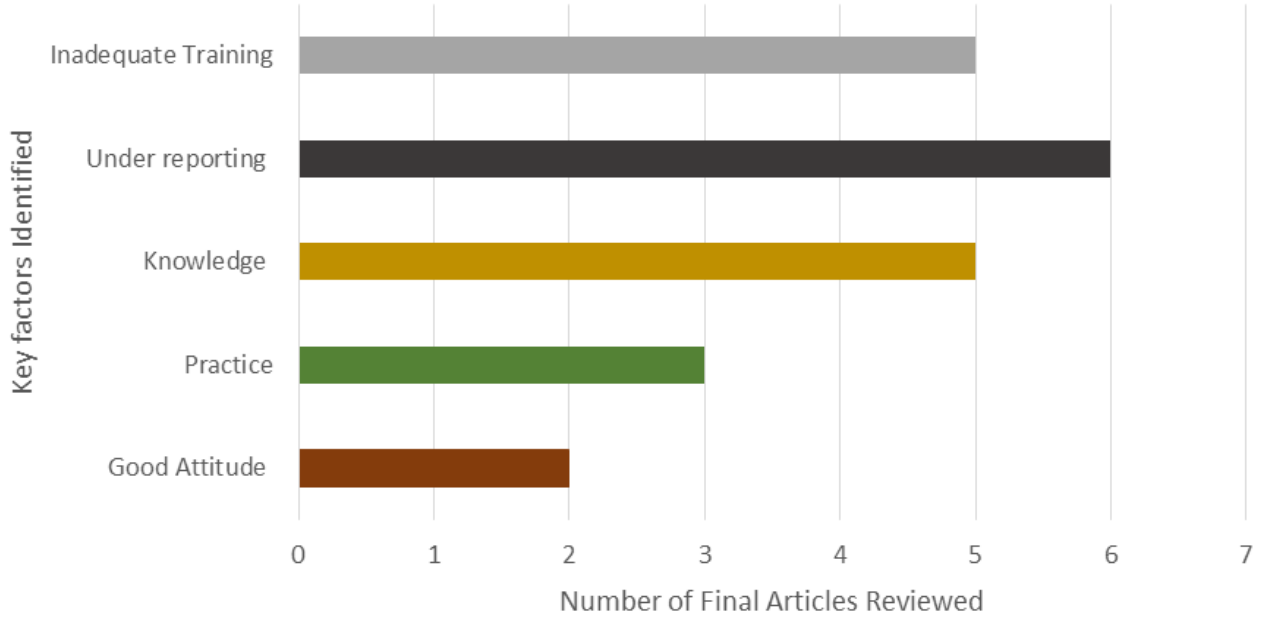

Figure 2. Key factors identified.

cross-sectional research, and collected data by preparing a questionnaire created by considering guidelines, and already published evidence. The questionnaire comprised different sections, including the socio-demographic characteristics, the knowledge of healthcare professionals regarding ADRs, and attitudes, practices, and other points related to ADRs (Seid et al., 2018). Another cross-sectional research conducted by Alemu and Biru (2019) considered the self-administered questionnaire, which was developed from available evidence, along with other professional guidelines. Similar to Seid et al. (2018), the questionnaire considered by Alemu and Biru (2019) analysed the socio-demographic characteristics of the sample population, along with their knowledge, attitudes, and pharmacovigilance practices. Seid et al. (2018) reported that approximately 12.7% of the healthcare professionals were aware of the term pharmacovigilance, and 49% possessed knowledge regarding the ADR reporting systems. Seid et al. (2018) and Alemu and Biru (2019) reported that about 80.4 and 58.77% of the healthcare professionals perceived pharmacovigilance as a professional obligation. In addition, the self-administered questionnaire considered by Adedeji et al. (2013) sought detailed information of the elements of attitudes and practices of healthcare professionals towards ADRs. Adedeji et al. (2013) also found that 88.6% of the healthcare professionals perceived ADR reporting is an obligatory duty of healthcare professionals. Adenuga et al. (2020) found that 64.3% of the healthcare professionals were aware of the ADR reporting mechanism, and monitoring systems in Namibia, whereas, almost 76.7% of the respondents knew the centre responsible for pharmacovigilance activities in Namibia. Moreover, Adenuga et al. (2020) reported that approximately 75.1% of healthcare professionals acknowledge that every healthcare worker is responsible for ADR reporting. Bello and Umar (2011) found that a considerable majority of practising physicians lack awareness regarding the ADR reporting systems; however, the healthcare professionals having awareness regarding the reporting channels and reporting systems were found to report ADRs efficiently. Moreover, Osakwe et al. (2013) utilised the peer-reviewed questionnaire, which collected the information related to demographics, the knowledge of healthcare professionals regarding pharmacovigilance, the actual

pharmacovigilance practices performed by the healthcare professionals, challenges experienced during the pharmacovigilance practices, and recommendations for addressing these challenges. Osakwe et al. (2013) found that a considerable majority of the healthcare professionals who had received training regarding the pharmacovigilance practices had good knowledge scores, as compared to the healthcare professionals who had no received training for pharmacovigilance practices.

Seid et al. (2018) found that approximately 50% of the healthcare professionals utilise national formulary and national standard treatment guideline (STG), whereas, 6.9% of the respondents considered the pharmacist as a source of information regarding the ADR. Adedeji et al. (2013) reported that 71.4% of the respondents possessed awareness National Pharmacovigilance Center (NPC), and 85.7% of the healthcare professionals suspected ADR into their practice. In addition, Alemu and Biru (2019) found that 56.1 and 46.5% of the respondents were following National Drug Formulary and Standard Treatment Guideline (STG), and the standard textbooks for dealing with ADRs. Awodele et al. (2011) also utilised the questionnaire to analyse the socio-demographic factors, attitudes towards the ADR reporting, and pharmacovigilance, and ADR practices. Awodele et al. (2011) found that 41.4% of the healthcare professionals acquired knowledge regarding pharmacovigilance practices from the textbooks, whereas, 18.3% recognise this term from seminars and training. Other most common sources of acquiring information regarding the pharmacovigilance practices include internet, electronic media, and professional colleagues. In addition, Osakwe et al. (2013) indicated that 40% of the healthcare professionals were reported to receive only quarterly newsletter had good knowledge scores; however, 44% of them were found to have poor knowledge score, indicating that receiving newsletter was not associated to improved knowledge regarding the pharmacovigilance practices.

The attitude of healthcare professionals towards pharmacovigilance practices

Seid et al. (2018) found that 79.4% of the respondents mentioned that ADRs need to be reported spontaneously; however, 83.3% respondents declared that prior to reporting ADRs, the healthcare professionals need to assure that the ADR is related to medications. Alemu and Biru (2019) reported that approximately 81.6% of the healthcare professionals conveyed that ADRs must only be reported if the reactions are serious and life-threatening. One of the Nigeria based study, Bello and Umar (2011) also reported that physicians lacked awareness regarding the flow of information, which hinders the ADRs reporting. In addition, Adedeji et al. (2013) proclaimed that the 85.7% of the respondents agreed that ADR is a substantial practice of the medical practice; however, the only 57.1% of the healthcare professionals practised the ADR. Osakwe et al. (2013) indicated that 38.3% of the healthcare professionals who had received training for ADR reporting had filled the reporting form, such that the percentage is significantly higher as compared to the healthcare professionals who had not received training related to the ADR practices. Adenuga et al. (2020) also considered questionnaire for analysing the demographic data of the respondents, the knowledge, and attitudes of healthcare professionals about pharmacovigilance, and the measures taken by them for pharmacovigilance practices. Considering from the context of Namibia, Adenuga et al. (2020) reported more than half of the respondents were aware that ADR reporting is one of the most significant responsibilities of the healthcare professionals; however, only 37.3% of the healthcare professionals had reported ADR during their professional practice.

Pharmacovigilance practices performed by the healthcare professionals

Seid et al. (2018) found that 55.9% of the healthcare professionals reported that they had encountered ADRs in their professional practice; however, 49.1% of the respondents reported ADRs. Alemu and Biru (2019) described that out of 29.82% of the healthcare professionals who have experienced the ADR within the last 12 months, 70.59% recorded, and 50% reported the ADRs. Awodele et al. (2011) mentioned that approximately 5.6% of the respondents reported about ADRs in the last months, whereas, 92% of them did not pay attention towards ADRs, and its reporting. Osakwe et al. (2013) demonstrated that the knowledge scores of the healthcare professionals regarding the pharmacovigilance were improved immediately after the training session, which increases the frequency of ADR reporting; however, still, only 8.3% of the healthcare professionals filled ADR forms, and 61.7% still did not report ADR within the six months of receiving ADR training. In addition, Adenuga et al. (2020) mentioned that 37.3% of healthcare professionals had reported ADR issues.

The quantitative research conducted by Bello and Umar (2011) also utilised the questionnaire for data collection and analysed the demographic variables, questions regarding the attitudes and knowledge of healthcare professionals towards ADR on the basis of the Inman's and non-Inman's factors. Bello and Umar (2011) also acquired the information related to the frequency of utilisation of the reporting system, and pharmacovigilance practices within one year of professional practice, and the situations which have hindered the healthcare professionals from reporting the adverse events. Bello and Umar (2011) reported that the healthcare

professionals having experience in their fields demonstrated that ADRs could easily be detected; therefore, the healthcare professionals must have the idea of the channels available for ADRs reporting. When the method preferred by the healthcare professionals to report ADRs was analysed, it was found that most of the healthcare professionals prefer yellow card for ADR reporting, whereas, a considerable majority also preferred reporting of ADR to the pharmacy department, and hospital (Alemu and Biru, 2019). Adedeji et al. (2013) proclaimed that 2.9% of the healthcare professionals reported ADR in yellow form. Thus, healthcare professionals selected different types of reporting systems for ADR reporting.

Factors influencing pharmacovigilance reporting

Factors discouraging pharmacovigilance practice

Knowledge regarding pharmacovigilance practice is one of the most significant factors, influencing the pharmacovigilance practices. Seid et al. (2018) found that only 30.7% of the healthcare professionals were aware of the regulating bodies responsible for ADR monitoring in Ethiopia, whereas, a considerable majority of the healthcare professionals were uncertain about the ADR regulatory bodies. The knowledge regarding the regulatory bodies had a significant influence on ADR reporting practices. Unavailability of training opportunities for the healthcare professionals regarding ADR reporting was the significant reason for inadequate knowledge of physicians, nurses, and health officers regarding pharmacovigilance practices (Seid et al., 2018).

Bello and Umar (2011) found that 95.1% of the respondents had no idea regarding the availability of ADR reporting system in Sokoto, Nigeria. The healthcare professionals reported that they are less likely to receive appropriate information and training regarding the possible adverse effects of medications (Alemu and Biru, 2019; Adedeji et al., 2013). Some of the healthcare professionals avoided ADR reporting due to the risk of experiencing legal problems after performing the pharmacovigilance practices (Alemu and Biru, 2019; Adedeji et al., 2013).

It was reported that healthcare professionals were encouraged to report ADR only when the reaction was due to new medication, or when the reaction was serious (Seid et al., 2018; Alemu and Biru, 2019). In this regard, the healthcare professionals were uncertain of the circumstances in which ADR should be reported, which further hindered adequate ADR reporting. The research outcomes revealed that lack of feedback from the healthcare authorities, unavailability of the reporting forms, and lack of awareness regarding the systematic process of ADR reporting also discourage the healthcare professionals from performing pharmacovigilance practices (Awodele et al., 2011; Seid et al., 2018; Alemu and Biru, 2019; Bello and Umar, 2011). In addition, lack of knowledge regarding the significance, and consequences of the ADR reporting, uncertainty regarding the reactions of medications, intense workload, and the risk of the negative impacts of reporting on the manufacturers of medications (Adedeji et al., 2013). Osakwe et al. (2013) pointed out those poor communication skills, lack of training regarding the continuity of ADRs reporting, and inadequate workforce were some of the most significant factors limiting the ADR reporting practices. Adenuga et al. (2020) found that out of the considered staff of healthcare organisation, nurses were six times less likely to report ADRs, which might be due to lack of awareness of the ADR reporting systems or their busy schedule.

Factors encouraging pharmacovigilance practices

The studies included in this systematic review revealed that healthcare management also plays a substantial role in refining the pharmacovigilance practices. Bello and Umar (2011) presented that the ADR-related knowledge possessed by the physicians increase the likelihood of reporting of ADR events. In addition, Alemu and Biru (2019) also emphasised on the arrangement of the targeted educational strategies for strengthening the ADR practices. Moreover, Awodele et al. (2011) also proclaimed that approximately 89.6% of the healthcare professionals demonstrated a willingness to receive training for improving pharmacovigilance practices. For this reason, delivering on-job training to the healthcare professionals regarding the pharmacovigilance practices might result in substantial improvement in the ADR practices. Osakwe et al. (2013) stated that emphasis of the healthcare management on case scenarios and role-plays while delivering training sessions regarding pharmacovigilance practices is likely to improve the learning skills of healthcare professionals regarding the ADR practices. Moreover, Adedeji et al. (2013) proclaimed that training on the ADR reporting, delivering Continuing Medical Education (CME) for pharmacovigilance practices, improving the accessibility of the healthcare professionals towards the yellow forms, setting up a committee for pharmacovigilance practices, and the inclusion of training for pharmacovigilance practices in the undergraduate and postgraduate curriculum have been some of the factors encouraging the pharmacovigilance practices within the healthcare. Moreover, Adenuga et al. (2020) reported that the accessibility of the healthcare professionals towards the electronic reporting systems or database, and the availability of trained staff facilitating the assessment, reporting, detection, and reporting of ADRs encourage the healthcare professionals to timely report ADRs.

A majority of the considered studies analysed the

attitudes, knowledge, and pharmacovigilance practices of doctors (Awodele, et al., 2011; Bello and Umar, 2011; Adedeji et al., 2013). However, some of the studies recruited physicians, nursing professionals, professionals working in the pharmacy, midwives, health officers, dietitians, medical laboratory workers, physiotherapist, radiographers, and biomedical engineers (Seid et al., 2018; Alemu and Biru, 2019; Osakwe et al., 2013).

DISCUSSION

The ADRs are a common cause of morbidity and mortality and are likely to cause a significant increment in the overall healthcare cost. For this reason, characteristics, knowledge, and attitude of healthcare professionals significantly contribute to the pharmacovigilance practices. The healthcare professionals must be able to able to identify the expected as well as unexpected reactions which are likely to be experienced by the patients taking medications. Healthcare professionals must also be capable of assessing, managing, and reporting adverse events (Alemu and Biru, 2019).

The evidence reported that 82.9% of the healthcare professionals in research conducted by Awodele et al. (2011) were aware of the concepts, and the formal definition of pharmacovigilance. In addition, almost all of the studies indicated that a considerable majority of the healthcare professionals possessed awareness regarding the ADR reporting systems (Awodele et al., 2011; Seid et al., 2018; Osakwe et al., 2013; Adenuga et al., 2020) and perceived that ADR is one the major drug therapy problems, which is likely to have significant impacts on public health, and quality of life of the service users (Alemu and Biru, 2019). For this reason, a majority of healthcare professionals perceived ADR reporting as their professional obligation (Seid et al., 2018; Alemu and Biru, 2019; Adedeji et al., 2013; Adenuga, et al., 2020). These outcomes are also supported by studies conducted by Kefale et al. (2017) and Angamo et al. (2012), who also proclaimed that healthcare professionals performing professional practice in sub-Saharan Africa perceived the ADR reporting as their professional obligations.

The World Health Assembly had laid the foundation of the international drug monitoring programs, which have supported the region-specific drug monitoring centres (Osakwe et al., 2013). The evidence reported that standard treatment guidelines were the most substantial sources preparing healthcare professionals for pharmacovigilance practices (Seid et al., 2018; Alemu and Biru, 2019; Adedeji et al., 2013). These outcomes are also supported by Goshime (2015), who also proclaimed that most of the healthcare professionals relied on the national guidelines and standard practices for ADR reporting. However, the textbooks, seminars, training, assistance from the pharmacist, internet, electronic media, and newsletter were other sources, which have improved knowledge of the healthcare professionals regarding the pharmacovigilance practices (Awodele et al., 2011; Osakwe et al., 2013). The evidence reported that the healthcare professionals had different attitudes, and perspectives regarding the ADR reporting, such that some of the healthcare professionals proclaimed that ADR is required to be immediately reported; however, some of them indicated that ADR reported must be carried out after affirming that ADR is only related to medications (Seid et al., 2018). In addition, some of them reported that ADRs must only be reported if the reactions are perceived as serious and life-threatening (Alemu and Biru, 2019). The research conducted by Denekew (2014) also affirmed that healthcare professionals must affirm that ADR is due to medications, prior to reporting them.

The analysis of factors which discourage the healthcare professionals from ADR reporting revealed that lack of awareness regarding the systematic procedure for ADR, unavailability of training opportunities regarding pharmacovigilance practices were barriers to ADR reporting by the healthcare professionals (Awodele et al., 2011; Seid et al., 2018; Osakwe et al., 2013). Denekew (2014) also affirmed that the healthcare professionals who have not received training for pharmacovigilance practices are less likely to report ADRs immediately. Moreover, it was also described that the risk of experiencing legal problems after performing the pharmacovigilance practices also discourage healthcare professionals from immediate ADR reporting (Alemu and Biru, 2019; Adedeji et al., 2013). In addition, the healthcare management related issues, including lack of feedback from the healthcare authorities, inaccessibility of healthcare professionals towards the ADR reporting forms, uncertainty regarding the reactions of medications, intense workload and the risk of the negative impacts of reporting on the manufacturers of medications are some other factors hindering the ADR reporting (Awodele et al., 2011; Seid et al., 2018; Alemu and Biru, 2019; Adedeji et al., 2013). Analysing the factors hindering the ADR practices performed by the healthcare professionals working in Sub-Saharan Africa, the arrangement of the targeted educational and training strategies by the healthcare professionals has been positively influencing the practices performed by the healthcare professionals (Awodele et al., 2011; Alemu and Biru, 2019; Bello and Umar, 2011). The healthcare professionals recommended that the emphasis on case scenarios and role-plays while delivering training sessions regarding pharmacovigilance practices is likely to improve the competence levels of healthcare professionals (Osakwe et al., 2013). Moreover, improving the accessibility of the healthcare professionals towards the yellow forms, and delivering Continuing Medical Education (CME) for pharmacovigilance practices to the healthcare

professionals are also likely to encourage the pharmacovigilance practices within the healthcare (Adedeji et al., 2013). It was also recommended that improving the accessibility of the healthcare professionals towards the electronic reporting systems might also positively influence the attitude, and pharmacovigilance practices of healthcare professionals.

Conclusion

In light of the available literature, it can be stated that the healthcare professionals working in the region of sub-Sahara Africa are required to improve the pharmacovigilance practices. This goal can be achieved by arranging education and training sessions regarding the significance of ADR reporting for healthcare professionals.

Limitations

This systematic review included studies conducted only in three countries of sub-Saharan Africa; therefore, outcomes of this research might not be generalised for the healthcare professionals working in the other regions of Africa. Moreover, N=4 studies considered in this review (Awodele et al., 2011; Bello and Umar, 2011; Adedeji et al., 2013; and Osakwe et al., 2013) were conducted in Nigeria. For this reason, the research outcomes might present the characteristics, knowledge, attitudes, and pharmacovigilance practices of the Nigeria based healthcare professionals. Moreover, some of the studies considered in this review had considered only doctors, whereas, other studies recruited the healthcare professionals having different expertise level, which is another limitation to this literature review.

ACKNOWLEDGEMENT

The authors thank Boitekanelo College for supporting and funding production of this manuscript.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests

REFERENCES

Adedeji WA, Ibraheem WA, Fehintola FA (2013). Attitude and practice of doctors toward adverse drug reactions (ADRs) reporting in a Nigerian tertiary health facility. Annals of Ibadan Postgraduate Medicine 11(2):77-80.

Adenuga BA, Kibuule D, Rennie TW (2020). Optimizing spontaneous adverse drug reaction reporting in public healthcare setting in Namibia. Basic & Clinical Pharmacology and Toxicology 126(3):247-253. DOI: https://doi.org/10.1111/bcpt.13325

Alemu KB, Biru TT (2019). Health care professionals' knowledge, attitude, and practice towards adverse drug reaction reporting and associated factors at selected public hospitals in Northeast Ethiopia: a cross-sectional study. BioMed research international 2019:1-11. DOI: https://doi.org/10.1155/2019/8690546

Angamo MT, Tesfa A, Tajure N (2012). Knowledge, attitude and practice of adverse drug reaction reporting among health professionals in southwest Ethiopia. TAF Preventive Medicine Bulletin 11(4):397-406. DOI: http://dx.doi.org/10.5455/pmb.1313732484

Avong YK, Jatau B, Gurumnaan R, Danat N, Okuma J, Usman, I, Mordi D, Ukpabi B, Kayode GA, Dutt S, El-Tayeb O (2018). Addressing the under-reporting of adverse drug reactions in public health programs controlling HIV/AIDS, Tuberculosis and Malaria: A prospective cohort study. PloS One 13(8):p.e0200810. DOI: https://doi.org/10.1371/journal.pone.0200810

Awodele O, Akinyede A, Adeyemi OA, Awodele DF (2011). Pharmacovigilance amongst doctors in private hospitals in Lagos West Senatorial District, Nigeria. *International* Journal of Risk and Safety in Medicine 23(4):217-226. DOI: https://doi.org/10.3233/JRS-2011-0541

Bello SO, Umar MT (2011). Knowledge and attitudes of physicians relating to reporting of adverse drug reactions in Sokoto, northwestern Nigeria. Annals of African Medicine *10*(1):13-18. DOI: https://doi.org/10.4103/1596-3519.76563

Beninger P (2018). Pharmacovigilance: an overview. Clinical Therapeutics 40(12):1991-2004. DOI: https://doi.org/10.1016/j.clinthera.2018.07.012

Denekew A (2014). Knowledge, Attitude and Practice of Adverse Drug Reaction Reporting and Affecting factors among health care Providers Working in art clinics of public health facilities in Addis Ababa city, Ethiopia. Doctoral Dissertation, Addis Abeba University. Retrieved from http://213.55.95.56/bitstream/handle/123456789/3541/Alem%20Denekew.pdf?sequence=1&isAllowed=y (Accessed on 2 June 2020)

Food, Medicine, and Healthcare Administration and Control Authority of Ethiopia. Guideline for Adverse Drug Events Monitoring (Pharmacovigilance) (2014). Retrieved from http://www.fmhaca.gov.et/wp-content/uploads/2019/03/Ethiopian-Pharmacovigilance-Guideline-2014.pdf (Accessed on 2 June 2020)

Ganesan S, Vikneswaran G, Reddy KC, Subrahmanyam DK, Adithan C (2016). A Survey on Knowledge, Attitude and Practice of Pharmacovigilance towards Adverse drug reactions reporting among Doctors and Nurses in a Tertiary Care Hospital in South India. Journal of Young Pharmacists 8(4). DOI: https://doi.org/10.5530/jyp.2016.4.25

Goshime A (2015). Assessment of Knowledge, Attitude and Practices on Adverse Drug Reaction Reporting among Pharmacy Personnel Working at Community Pharmacy, Addis Ababa, Ethiopia. Addis Ababa University. Retrieved from http://213.55.95.56/bitstream/handle/123456789/2145/Alaynesh%20Goshime.pdf?sequence=1&isAllowed=y (Accessed on 2 June 2020)

Haque MA, Rahman NI, Muda, TFM, Alattraqchi AG (2013). Addressing rational prescribers through the pharmacology and therapeutics course work of MBBS syllabus in Bangladesh. International Research Journal of Pharmacy 4(7):60-63. DOI: http://dx.doi.org/10.7897/2230-8407.04713

Kefale AT, Tefera BD, Biru TT (2017). Knowledge, attitude and practice of healthcare professionals towards adverse drug reaction reporting at inpatient wards of tertiary hospital, Ethiopia. Journal of Drug Delivery and Therapeutics 7(4):97-102. DOI: http://dx.doi.org/10.22270/jddt.v7i4.1483

Mabirizi D, Phulu B, Churfo W, Mwinga S, Mazibuko G, Sagwa E, Indongo L, Hafner T (2018). Implementing an Integrated Pharmaceutical Management Information System for Antiretrovirals and Other Medicines: Lessons From Namibia. Global Health: Science and Practice 6(4):723-735.

Mascolo A, Scavone C, Sessa M, di Mauro G, Cimmaruta D, Orlando V, Rossi F, Sportiello L, Capuano A (2017). Can causality assessment fulfill the new European definition of adverse drug reaction? A review of methods used in spontaneous reporting. Pharmacological research 123(2017):122-129.

DOI:https://doi.org/10.1016/j.phrs.2017.07.005
Mouton JP, Mehta U, Parrish AG, Wilson DP, Stewart A, Njuguna CW, Kramer N, Maartens G, Blockman M, Cohen K (2015). Mortality from adverse drug reactions in adult medical inpatients at four hospitals in South Africa: a cross-sectional survey. British Journal of Clinical Pharmacology 80(4):818-826. DOI: https://doi.org/10.1111/bcp.12567
National Pharmacovigilance Centre (NPC) (2012). Training Manual for Personnel of Zonal pharmacovigilance Centers Abuja. NAFDAC. Retrieved from https://www.nafdac.gov.ng/wp-content/uploads/Files/Resources/Pharmacovigilance_Newsletter/Pharmacovigilance-Newsletter_Vol-6-No.-1.pdf (Accessed on 2 June 2020)
Osakwe A, Oreagba I, Adewunmi AJ, Adekoya A, Fajolu I (2013). Impact of training on Nigerian healthcare professionals' knowledge and practice of pharmacovigilance. International Journal of Risk and Safety in Medicine 25(4):219-227. DOI: https://doi.org/10.3233/JRS-130605
Patel A, Ganguly B (2010). Analysis of Dose Calculation of Medicines Prescribed in Pediatric Age Group. International Journal of Pharmaceutical Research 2(4):21-25.
Seid MA, Kasahun AE, Mante BM, Gebremariam SN (2018). Healthcare professionals' knowledge, attitude and practice towards adverse drug reaction (ADR) reporting at the health center level in Ethiopia. International Journal of Clinical Pharmacy 40(4):895-902. DOI: https://doi.org/10.1007/s11096-018-0682-0
Srba J (2014). Pharmacovigilance: Spontaneous reporting systems. Faculty of Pharmacy in Hradec Králové. Department of Social and Clinical Pharmacy. Retrieved online http://hdl.handle.net/20.500.11956/63201 (Accessed on 2 June 2020).
Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, Moher D, Peters MD, Horsley T, Weeks L, Hempel S (2018). PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. Annals of Internal Medicine 169(7):467-473. DOI: https://doi.org/10.7326/M18-0850
van Eekeren R, Rolfes L, Koster AS, Magro L, Parthasarathi G, Al Ramimmy H, Schutte T, Tanaka D, van Puijenbroek E, Härmark L (2018). What future healthcare professionals need to know about pharmacovigilance: introduction of the WHO PV core curriculum for university teaching with focus on clinical aspects. Drug Safety 41(11):1003-1011. DOI: https://doi.org/10.1007/s40264-018-0681-z