ASSESSMENT OF HEALTH CARE PROVIDERS PRACTICE CONCERNING MEDICATION ERRORS IN SAUDI ARABIA

ABSTRACT

Introduction: Medication errors are one of the leading causes of patients' morbidity and mortality in health care settings

Objective: Assess awareness, attitude and practices of health care providers toward medication errors in Saudi Arabia.

Methodology: Cross-sectional study design was used in the period of three months from first of July till end of November 2023 on random sample of 329health care providers including physicians, pharmacists and nurses working in different hospitals, primary health care centers and private clinics in different regions of Saudi Arabia, all data analyzed using Microsoft excel program.

Results: The mean score of good knowledge about medication errors among respondents was 77%, average score of o good attitudes toward medication errors among respondents was 72%,74% of respondents will inform supervisorif they noticed a medication error. The causes for ignoring medication error were fear of any legal consequences (41%), self-management (23%), busy with work (15%) and did not know whom to inform (21%). Less than half (48%) of study subjects had previously filled an adverse drug reaction form.

Conclusion: In conclusion, medication errors play a major role in effecting the quality of health of our patients. Health care providers in Saudi Arabia have good knowledge and positive attitude toward medication errors. However, medication error reporting still not sufficiently applied.

INTRODUCTION

Medication errors are one of the leading causes of patients' morbidity and mortality in health care settings and considered to be common. Medication errors can lead to unnecessary harm and pain to the patients and may lead to death in some cases.The Agency for Healthcare Research and Quality (AHRQ) defines the medication error (ME) as "an error (of commission or omission) at any step in the pathway that begins with prescription of medication by the clinician and ends when the patient actually receives the medication." [1] In the United States, medication errors, have been reported to be responsible for 7,000 injuries to patients each year. Also, in United Kingdom, a similar incidence and consequences was reported.[2]

Medication errors include many types of errors, can occur at any stage of the medication use pathway. However, prescribing errors are the most common subtype of MEs in all healthcare settings. [3]The percentage of prescribing errors reported to be ranged from 29% to 56% of all reported MEs in adults.[3]Previous systematic review of 65 studies reported that prescribing errors accounted for 50% of hospital admissions and 7% of medication orders.[4]

Prescribing error is defined in different ways in previous studies. The definition developed byDean *et al.* (2000) is the most validated definitions. He defined prescribing error as the error which occur when there is unintentional, significant reduction in the probability of treatment being timely and effective; or increase in the risk of harm when compared to generally accepted practice as a result of prescribing decision or prescription writing process.[5] It can also be further defined as "a failure in the prescription writing process by a physician that lead to a wrong instruction about one or more of the normal constituents of a prescription." [15] The normal constituents of the prescription include the

identity of the recipient, the identity of the drug, dose, route, timing, formulation, frequency and duration of administration.[6]

The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP), which includes 27 national organizations, suggests that MEs are preventable.[7] However, the prevention of medication errors can be challenging, particularly in inpatient settings as the prescription orders are more prone to errors [17] which may result in increased patient care costs due to prolonged length of hospital stay and an increase in the incidence of mortality.[8]

OBJECTIVES OF THE STUDY

- To assess awareness of health care providers about medication errors
- To assess attitude and opinions of health care providers toward medication errors
- To evaluate practices of health care providers toward medication error reporting

LITERATURE REVIEW

Medication errors can be defined by different classification systems. So, estimating the prevalence of medication errors is difficult. Rates can vary depending on the category used (e.g., patient, prescription or a specific medication). The challenge is compounded by the availability and use of incident reporting systems and variations in health care system organization.[9]

These issues are reflected in the widely varying prevalence rates of error reported in different regions of the world.[10] For example, a study from United Kingdom found that 12% of all primary care patients may be affected by a monitoring or prescribing error over the course of a year, and these errors increasing to 38% in those 75 years and older and 30% in patients receiving polypharmacy of five or more drugs during a one-year period. Overall, it is estimated that 5% of prescriptions had prescribing errors.[11] Another Swedish study found a medication error rate of 42%. However, two-thirds were related to a failure to state the diagnosis on prescriptions and an incorrect dose resulted in only 1% of errors.[12] A previous study in Saudi Arabia reported that about one-fifth of primary care prescriptions contained errors, but only a small percentwas considered serious.[13]These

examples show that medication errors are a global issue not limited to one country. One systematic review conducted with an alternative approach to assessing error rates based on classifying medication usage processes. The review found error dispensing errors accounted for 3% of the errors and failure to review repeat medications at least once at every sixth request in 72% of cases. Problems were also noted at the interface between primary care and secondary care. Recommendation to outpatient to general practitioners were associated with a 77% error rate and discrepancies in medication discharge following hospitalization affected 43% to 60% of items [14] indicating mistakes during transitions of care.

Undesirable outcomes include lack of efficacy, adverse drug reactions, drug-drug interactions, suboptimal patient adherence and poor quality of life and patient experience. In turn, these may have consequences on health and economically, including the preventable medication-related hospital admissions, increased use of health services, and death.[15] In some countries,it has been estimated that approximately 6-7% of hospital admissions appear to be medication related, 60% of these considered avoidable and thus, potentially due to errors. The problem is likely more pronounced in the elderly, because of multiple risk factorsincluding polypharmacy. [16]

Several studies have examined factors associated with medication errors. The Commonwealth Fund International Health Policy survey compared factors associated with patient-reported medication errors across seven countries. In 11% of patients experiencing a medication error, risk factors included cost-related barriers to medical services or medicines, poor coordination of care, multimorbidity and hospitalization.[17] Other studies have found that medication errors mostly occur with increasing number of medications, childhood and older age, and specific medications and medications for certain disease states (e.g., immunosuppression, infections, cardiovascular, musculoskeletal, oncology, dermatology, ophthalmology and otolaryngologic conditions,)[18] Table 1 summarizes some of the key factors associated with medication errors

Table 1. Factors that may influence medication errors[11,19]

Category	Factors
Health care professionals associated factors	Inadequate drug knowledge and experience Inadequate knowledge of the patient Lack of therapeutic training Inadequate perception of risk Overworked or fatigued health care professionals Physical and emotional health issues Poor communication between health care professional and with patients
Patient associated factors	Clinical case complexity, including multiple health conditions, polypharmacy and high-risk medications Patient characteristics (e.g., personality, literacy and language barriers)
Work environment related factors	Distractions and interruptions Workload and time pressures Lack of standardized protocols and procedures Insufficient resources Issues with the physical work environment (e.g., lighting, temperature and ventilation)
Medications related factors	Naming Labelling and packaging
Tasks related factors	Repetitive systems for ordering, processing and authorization Patient monitoring (dependent on practice, patient, other health care settings, prescriber)
Computerized information systems	Lack of accuracy of patient records Difficult processes for generating first prescriptions (e.g. drug pick lists, default dose regimens and missed alerts) Difficult processes for generating correct repeat prescriptions Inadequate design that allows for human error
Primary-secondary care interface	Limited quality of communication with secondary care Little justification of secondary care recommendations

MATERIALS AND METHODS

3.1. Study design and duration

Cross-sectional study design was used in the period of three months from first of July till end of November 2023.

3.2. Study population

Random sample of 329health care providers including physicians, pharmacists and nursesworking in different hospitals, primary health care centers and private clinics in different regions of Saudi Arabia.The inclusion criteria were to be a licensed,currently practicing and agree to participate in the study, the study excluded subjects who were not agree to participate in the study or gave incomplete answers

3.3. Data Collection tool

Health care providers approached and asked to fill the structured closed ended self-administered questionnaire which was developed from literature review to collect the data. (attached in the appendix 1)

The questionnaire included four parts:

- First part included questions to obtain demographic characteristics of study subjects.
- Second part included questions pertain to the fundamental knowledge regarding medication errors and interventions used in prevention and management of medication errors.
- Third part included questions pertain to practices of study subjects toward reporting system for medication errors.
- Fourth part included questions pertain to attitudes and opinions of study subjects toward medication error.

All participants will be asked to answer all questions.

3.4. Ethical considerations

Only the health care providers who agreed to fill the questionnaire were included and confidentiality of data was assured.

3.5. Data processing and Statistical Analysis

All data categorized, tabulated and analyzed usingMicrosoft excelprogram. Frequency and percentage calculated for each variable with representation by figures (bar graph and pie chart).

RESULTS

Demographic characteristics of study subjects

Among the respondents, 61% were in the age group (20-30 years) and 22% between 31 and 40 years. (Demographic characteristics of study subjects represented in figure1),67% of study respondents was females, according to professional category; pharmacists represented 53%, nurses represented 16% and physician represented 19%. Large percentage of study respondents (56%) had less than 5 years of practice, 58% work in hospitals and 17% work in private clinics.

knowledge of study subjects about medication errors and interventions used to prevent and manage medication errors

When the participants asked if they know about medication errors; 81% responded yes,
When asked if they understand the relevance of the term medication error; 79% responded yes, 76% had good knowledge about the categories of medication errors, figure 2 represent details of knowledge of study subjects about medication errors and interventions used to prevent and manage medication errors).76% of study subjects aware of the various interventions to prevent medication errors and 73% aware how to proceed if medication errors occur. The mean score of good knowledge about medication errors among respondents was 77%.

Attitudes of study subjects toward medication error

When the respondents asked ‘’Do you recommend the presence of medication error guidelines in hospitals-clinics and care units is important”; 65% answered with yes, when

asked ‘Do you recommend integrated approach toward training and education about the medication error in medical institute and the general public?; 81% answered with yes, when asked ‘Do you think your institute should form an independent body for reporting medication errors?’; 64% answered with yes, (table 4represent attitudes of study subjects toward medication error, when asked ‘Should proper recommendations to be instituted in the areas of organization, legislation, regulation and resources to improve surveillance and safe rationale use of drugs?’; 78% answered with yes, when asked ‘Do you recommend standardized implementation of proper maintenance of data regarding medication error and rational use?’; 77% answered with yes. Average score of positive attitudes toward medication errors among respondents was 72%.

Practices of study subjects toward reporting system for medication errors.

74% of respondents will inform supervisor, 15% will try to solve the problem, 6% will never inform any body and 5% will not do any thing if they noticed a medication error. figure 3 represent practices of study subjects toward reporting system for medication errors). The causes for ignoring medication error were fear of any legal consequences (41%), self-management (23%), busy with work (15%) and did not know whom to inform (21%). Less than half (48%) of study subjects had previously filled an adverse drug reaction form, 53% previously received specific training in the area of medication error management.

Opinions of study subjects toward medication errors

67% of study subjects think that drug packaging is part of the reasons for medication error, 56% think that drug information in the labels was not clear enough and might lead to medication error, (Table 3), 65% think that pediatric population medication error is particularly more common, 59% think that patient should receive counseling to avoid medication error or irrational use by pharmacists.

Source of information of study subjects

Books (45%) and mobile applications (25%) are the main source of information about drug-drug interaction among study subjects. Similarly, Books (43%) and mobile applications (25%) are the main source of information about drug dosing among study subjects. Figure 4

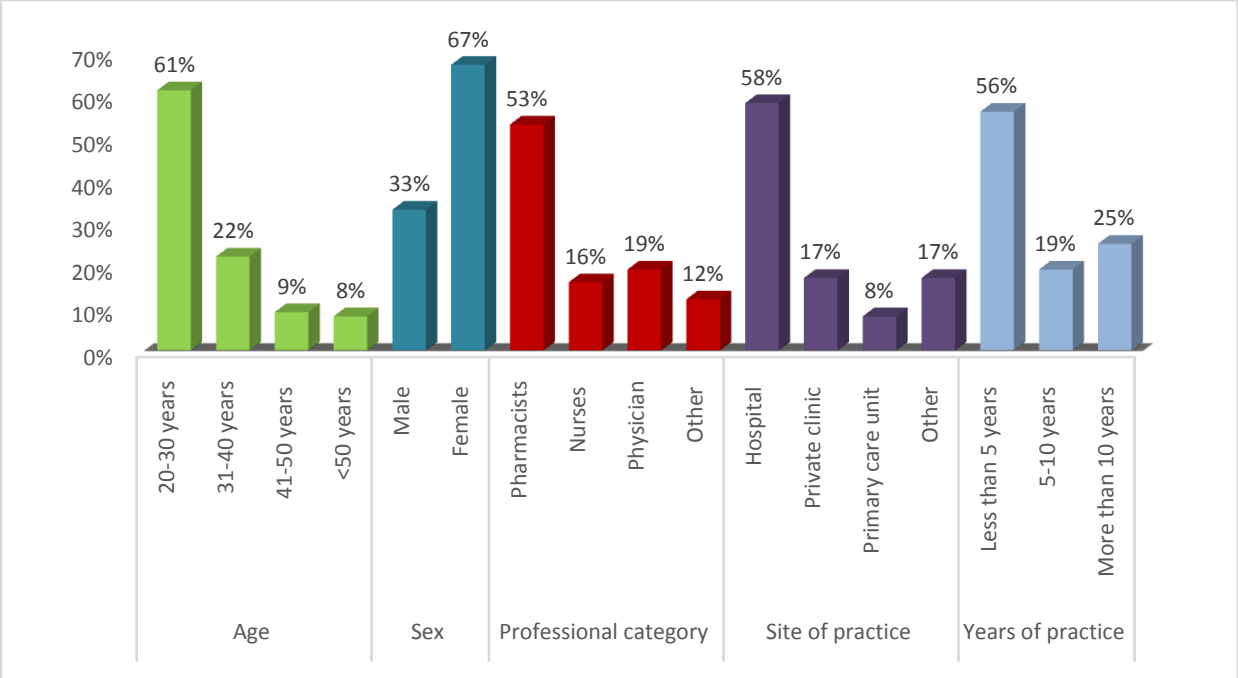

Figure 1. Demographic characteristics of study subjects

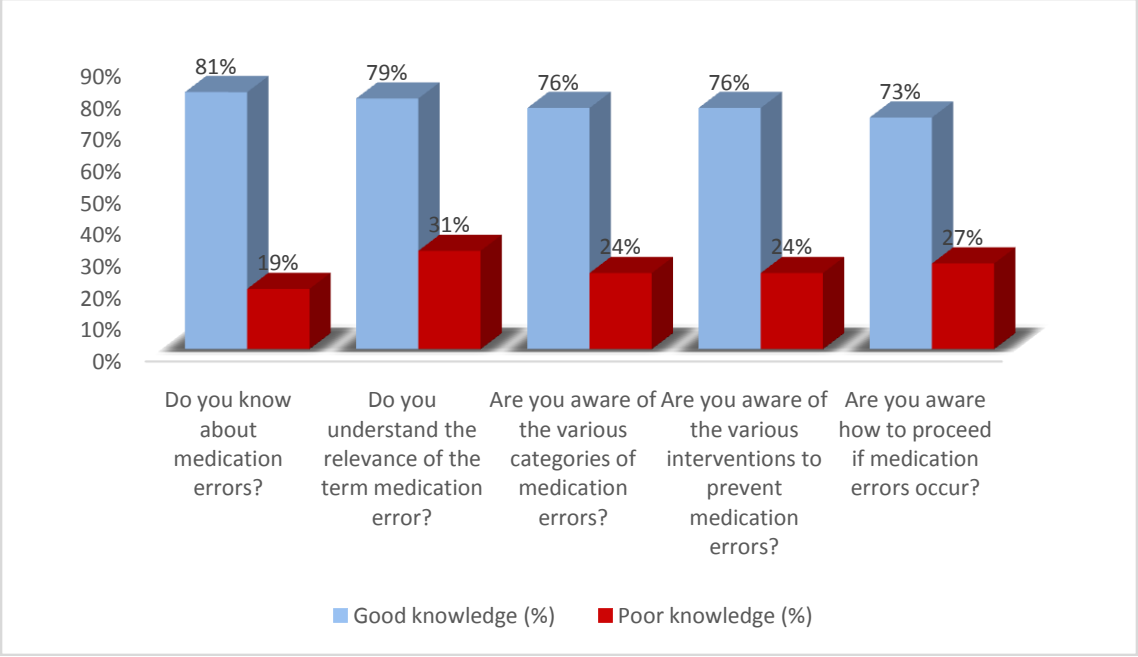

Figure 2.a. knowledge of study subjects about medication errors and interventions used to prevent and manage medication errors

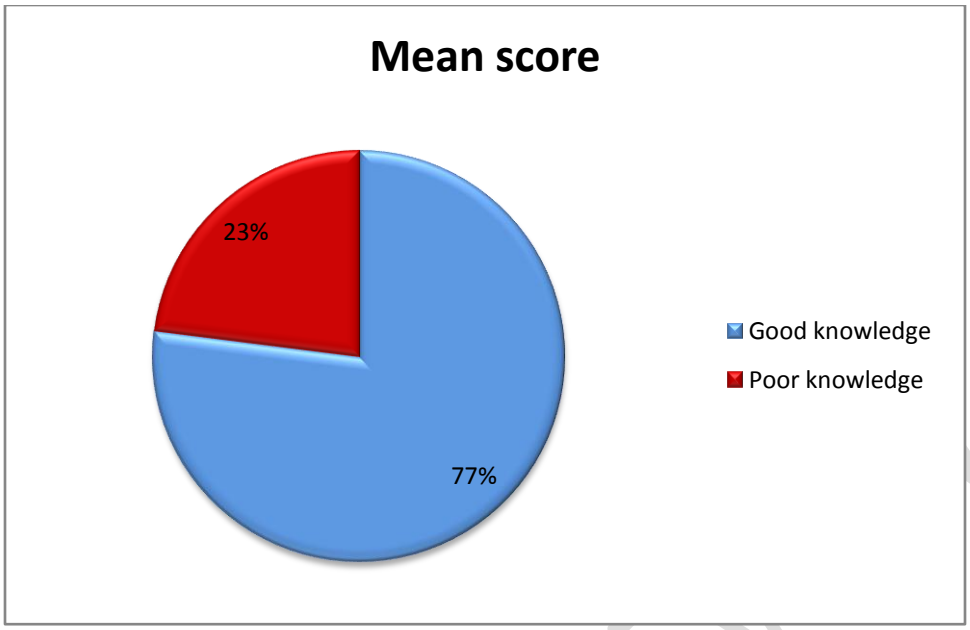

Figure 2.b. Average score ofknowledge of study subjects about medication errors and interventions used to prevent and manage medication errors

Table 2. Attitudes of study subjects toward medication error

Questionnaire items	Positive attitude		Negative attitude	
	n	%	n	%
Do you recommend the presence of medication error guidelines in hospitals-clinics and care units is important?	212	65%	117	35%
Do you recommend integrated approach toward training and education about the medication error in medical institute and the general public?	260	81%	69	19%
Do you think your institute should form an independent body for reporting medication errors?	212	64%	117	36%
Should proper recommendations to be instituted in the areas of organization, legislation, regulation and resources to improve surveillance and safe rationale use of drugs?	252	78%	77	22%
Do you recommend standardized implementation of proper maintenance of data regarding medication error and rational	248	77%	81	28%

use?				
Mean score	237	72%	92	28%

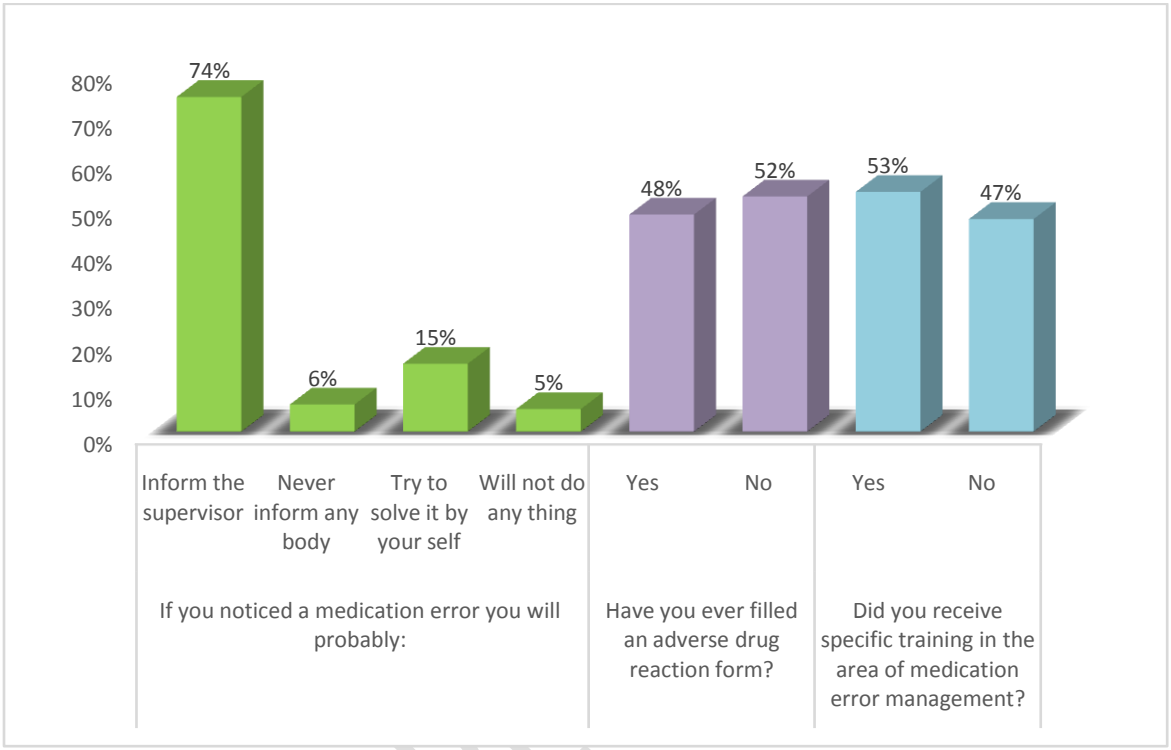

Figure 3.a. Practices of study subjects toward reporting system for medication errors.

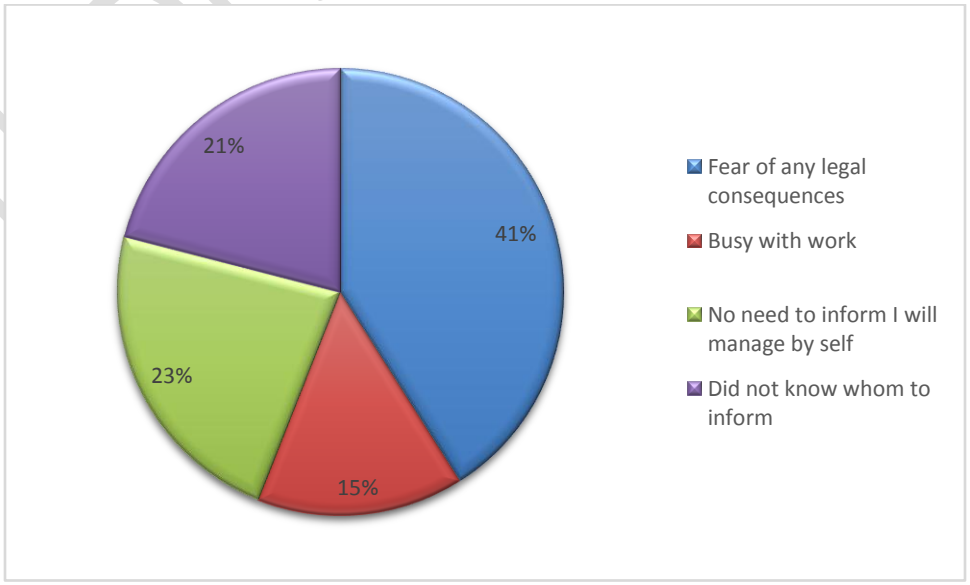

Figure 3.b. Causes of ignoring medication error

Table 3.Opinions of study subjects toward medication errors

	Categories	n	%
Do you think the drug packaging is part of the reason for medication error?	Yes	222	67%
	No	107	33%
Do you think the drug information in the labels was not clear enough and might lead to medication error?	Yes	184	56%
	No	145	44%
Do you think pediatric population medication error is particularly more common?	Yes	212	65%
	No	117	35%
You think the patient should receive counseling to avoid medication error or irrational use by:	The pharmacist	192	59%
	The physician	40	12%
	The nurse	23	7%
	Any of the health care providing team member	58	18%
	No need for counseling	13	4%

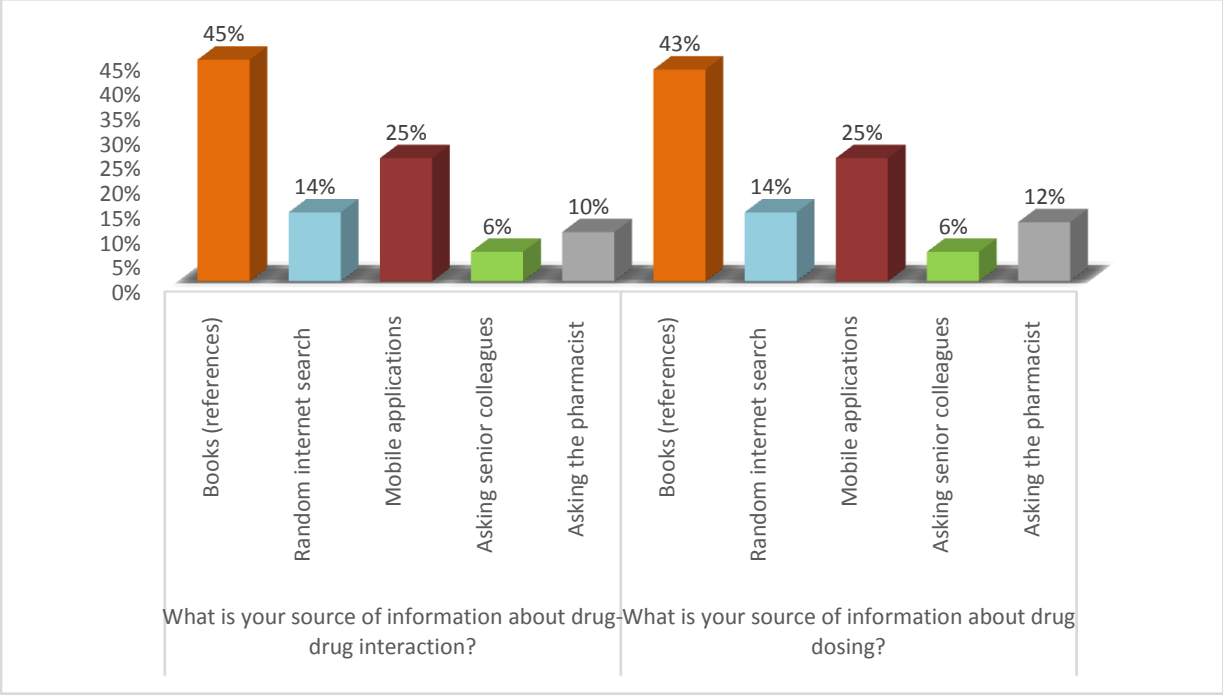

Figure 4. Source of information of study subjects

DISCUSSION

Medical allegations predominately occur from mistakes made by healthcare professionals including physicians, pharmacists, and nurses.[20] Analyzing of awareness and practice of health care professionals may be used to prevent future errors and improve the performance of healthcare professionals. a previous study conducted by Das *et al*.[21]reported that medication errors can result in malpractice claims in 13–25%of cases which occur due to mistakes and lapses of memory. Until now, there's a lack of knowledge and incorrect perception among healthcare providers toward medication errors in healthcare institutions. Tobaiqy and Stewart[22] found that 57%of health care professionals observed 51 errors, and these errors caused patient harm in some cases in Saudi Arabia. Of the key barriers to reporting were lack of awareness of the reporting policy, unavailability of the reporting form, workload, and time constraints. The present study conducted to evaluate awareness a, attitude and practice of health care providers toward medication errors.

The results of the present study reveal that 77% respondents are having good basic knowledge regarding medication errors. These figures suggest that health-care professionals in Saudi Arabia are aware about the medication error. This result is consistent with previous study conducted in India showed that 72% of health care professionals are having average or above average basic knowledge regarding medication errors. [23]

There are several factors which can enhance error reporting, e.g., all health-care team interested in patient safety; providing timely feedback and follow up actions and improvements to reduce future errors; encouraging reporting of near misses; and having a multidisciplinary approach to reporting etc.[24]Although medication error reporting system was established, it does not meet the objective of reducing the medication error. There is a challenge of eliminating the under reporting of errors even after the establishment of reporting system.[25]27% of our study respondentsare not awarehow to proceed if medication errors occur. This result is consistent with previous study conducted in

SaudiArabiashowed that 52% of health care professionals were pointless of how and where to report errors. [26] Additionally, another study demonstrated a poor knowledgeand awareness of pharmacovigilance and adverse drugreactions (ADRs) reporting practice among healthcareprofessionals in hospitals.[27]The main factors reported by study subjects to ignore medication error were fear of any legal consequences (41%), did not know whom to inform (21%), self-management (23%) and work load (15%). Consistently, the factors associated withpoor practice about error reporting systems in other studiesreported to be due to fear of adverse consequences, tarnishing of reputation, overload of work.[28]

Aljadhey *et al*.[29] conducted a study in Saudi Arabia, showed that medication safety practices were not implemented in many Saudi Arabia hospitals. Only 30% of the 78hospitals surveyed had a medication safety committee, and 9% of hospitals had a medication safety officer. Additionally, a study in tertiary care hospital in Riyadh showed that medication errors were under- reported.[30]

Despite some of our participants have poor practices of medication error reporting, our results are more favorable than other studies in other countries.Severalstudies from different regions including France, Italy, Sweden and United Kingdomshowed poor practice of reporting medication errors among health care practitioners, and they didn't know about the pharmacovigilance center in hospitals.[31]

When study subjects asked the causes of not reporting medication errors, 21% pointed that they don't knowwhom to inform. This result is similar to other studies, in the European Union, many healthcare professionals did not know how to report an ADR. Furthermore, about 40% of the respondents were not aware of the existence of the national reporting system in Malaysia, and 71% of the healthcare professionals did not have knowledge of the reporting procedure in China.[32]

About 53% of health care providers participated in the study had received previous training in the area of medication error managementwhich indicate the need for more efforts by the Food and Drugs Authority in organizing various training sessions and workshops forhealth care providerson Pharmacovigilance. Duarte et al, proposes new educational measures in 2015 such as hands-on involvement with real cases, thereby placing ADR reporting closer to the daily routine activities of health care team. [33]

78% of study subjects recommend proper recommendations to be instituted in the areas of organization, legislation, regulation and resources to improve surveillance and safe rationale use of drugs and 77% recommend standardized implementation of proper maintenance of data regarding medication error and rational use. Consistently, another study conducted by Al-hazmi in Saudi Arabia revealed that more than half (67%) of health professionals stated that reporting of adverse drug reactions ought to be compulsory.[55] In Cyprus, the study conducted by Toklu et al. elucidated that an even greater proportion of pharmacists (80%) supported mandatory ADR reporting and proper recommendations to be instituted in the areas of organization, legislation, regulation and resources to improve surveillance and rationale use of drugs.[34]

81% of study subjects recommend integrated approach toward training and education about the medication error in medical institute and the general public. This was consistent with results of a Ugandan study by Kiguba, et al in 2014, where majority of healthcare professionals advocated for sensitization, training and continuous education on pharmacovigilance.[35]

LIMITATION OF THE STUDY

This study might have been affected by recall bias as some of the health care providers may be were not able to accurately remember if they had encountered any medication error or filled an adverse drug reaction form.

Some respondents might have given false information in order to look good or be perceived as being professional.

Additionally, the study conducted on small number of health care providers which limit generalization of results

CONCLUSION AND RECOMMENDATIONS

In conclusion,medication errors play a major role in effecting the quality of health of our patients. Health care providers in SaudiArabia have good knowledge and positive attitude toward medication errors. However, medication error reporting still not sufficiently applied.

Medication error reporting is part of the safety practices is not implemented to large extent; an effort is needed at the national level to increase of such practices.

Training programs for health care providers regarding the medication error reporting and Pharmacovigilance is needed

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