ASIA-PAC J PHARMACOTHER TOXICOL

OPEN ACCESS

RESEARCH ARTICLE

Received 15 May 2023 | Accepted 18 Dec 2023 | Published Online 25 Dec 2023 https://doi.org/10.32948/ajpt.2023.12.07

Knowledge, attitude and practice about medication errors reporting system among health care professionals in public hospitals of Pakistan

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Cite this article: Khan KS, Mustafa G, Samiullah S, Watanpal A et al. Knowledge, Attitude and Practice about Medication Errors Reporting System Among Health Care Professionals in Public Hospitals of Pakistan. Asia-Pac J Pharmacother Toxicol 2023, 3: 7-15. https://doi.org/10.32948/ajpt.2023.12.07

Abstract

Background Medication errors can cause morbidity and mortality. The reporting system for medication errors can prevent harms to patients. This survey was conducted to evaluate the knowledge, attitude and practice about medication errors reporting system among healthcare professionals in public and private hospitals of Mirpur AJK.

Methods A questionnaire comprised of 32 questions (11 related to knowledge, 12 related to attitude and 09 related to practice) was distributed to 210 healthcare professionals (physicians, Pharmacist, Nurses and MBBS final year students) of two public and 4 private hospitals. SPPS software version 25 was used for data analysis.

Results 198 out of 210 questionnaires were completely filled with a response rate of 94.76% which included 73 (36.7%) physicians, 13 (6.5%) pharmacists, 68 (34.2%) nurses and 45 (22.6%) MBBS students (final year). Majority of the population (45.73 %) exhibited good knowledge and (14.57%) had poor knowledge about medication errors reporting. About 89.95% respondents showed positive attitude and only 10.05% respondents showed negative attitude about medication errors reporting system. Good practice of medication error was only in 28.15% respondents.

Conclusion This study suggested that there is a need for training regarding medication errors and reporting system for medication errors of healthcare professionals. This study also suggested that there is a need for medication errors reporting system in Hospitals of Mirpur AJK.

Key words medication errors, healthcare professionals, prescription, health, drugs

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Introduction

Medication errors are a common reality in healthcare system. These errors are caused by incorrect use of medications that can cause patient harm, but the nature of these errors is entirely preventable. These errors can happen at any part or stage of the medication process, such as prescription, dispensing, administration, and monitoring [1].

According to one study, in the United States, for example, it is estimated that between 44 to 98 thousand patients die annually from clinical errors, close to 7% of which can be attributed to medication errors [2]. Meanwhile, throughout the world, despite efforts of healthcare professionals, medication errors occur every day, which causes serious harm to patients [3].

The consequence of these errors can result in life-threatening situations. A research study conducted in Saudi Arabia highlighted significant shortcomings in medication error reporting and clarity about the stages at which medication errors occur [4]. This lack of understanding and reporting can result in repeating the same mistakes, thereby escalating the risk for patients. Insights from another study conducted in a tertiary care teaching hospital revealed that while healthcare professionals generally have good to average awareness about medication errors and their reporting system, awareness alone is insufficient [5]. It must be accompanied by actionable steps to effectively curtail the incidence of such errors.

Various studies have evaluated the knowledge, attitudes, and practices (KAP) surrounding medication errors and their reporting systems in various healthcare settings. For example, in Malaysia, higher work load environment led to underreporting of medication errors, that prompted exploration of alternative reporting mechanisms, such as smartphone-based applications [6]. Such innovations provide alternative solutions to underreporting and medications errors.

Another facet of medication error is the the psychological effect on healthcare providers. Such errors can evoke negative emotions, potentially leading to self-victimization and moral distress [7]. The stigma associated with errors and their disclosure can cause healthcare professionals to question their competence, thereby, highlighting the need for supportive reporting systems [8].

Regionally, in Pakistan, healthcare ethics and practices have been a topic of interest. A recent study examined the KAP of healthcare ethics among doctors in selected hospitals, emphasizing the need for increased awareness and adherence to ethical guidelines [9]. Another study highlighted the practices of self-medication, especially during the COVID-19 pandemic, raising concerns about potential medication errors and their implications [10]. The unique challenges faced by healthcare professionals in Pakistan, combined with the global concerns about medication errors, make it imperative to study the KAP about medication errors reporting systems in this region.

Our research aims to find the KAP regarding medication error reporting systems among healthcare professionals in the hospitals of Mirpur, Azad Jammu, and Kashmir, Pakistan. This study aims to contribute valuable insights to the existing body of knowledge and inform future interventions.

Methods and Materials

Study Setting

This study was carried out in six hospitals of Mirpur, AJK to name, Divisional Head Quarter and Teaching Hospital, Divisional Head Quarter and Teaching Hospital, Mohi-ud-din Teaching Hospital, Noor Memorial Hospital and Riaz Hospital, Riasat Hospital. Ethical approval of study was taken from IRB (Institutional Review Board) of college. Rationale of the study was explained to the participants and ensured the confidentiality and privacy of the study. Study flowchart is provided as below.

Study Design and Population

This study used an observational cross-sectional study design and was carried out in a hospital environment with doctors, pharmacists, and nurses participating. A cross-sectional questionnaire was designed based on literature review, and a sample of questionnaire was tested randomly among healthcare professionals for reliability and validity, and the final questionnaire was employed for the study. The questionnaire comprised questions including demographic data, knowledge of medication errors, availability of reporting systems in hospitals, knowledge of national reporting system, attitudes toward error reporting, and causes of common medication errors. The survey used in the study was modified from a previously published studies that evaluated knowledge, attitude, and practice [4, 11, 12]. The questionnaire was amended to cater to the local context and was provided to experts for comments and input. After that the questionnaire was validated by conducting a pilot study before administering it to the population of Physicians, Pharmacists, Nurses, MBBS final year students. **Figure 1** shows the study flowchart.

Data analysis

WoSCC-based literature analysis was used for general data research, including annual output, countries, organizations, journals, authors, references and keywords. Followed by that, VOSviewer software was used for the identification of the countries, organizations, journals, authors, references and research cooperation. Finally, CiteSpace software was used to identify research hotspots and frontiers via co-word network analysis of the keywords.

Results

Sociodemographic data

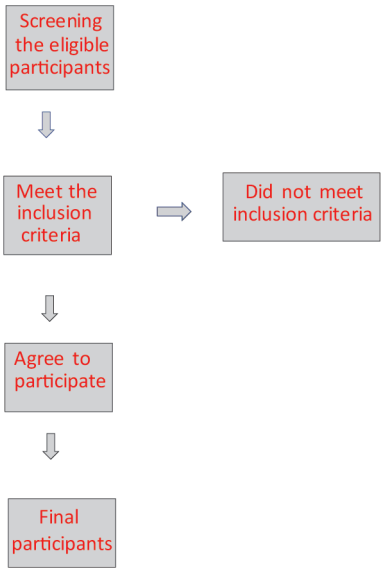

Figure 1. Study flowchart.

Table 1. Demographical characteristics.

No.	Variables	Categories	Number (Percentage)
1	Gender	Males	74 (37.2 %)
		Females	125 (62.8 %)
2	Age	20-30 years	134 (67.33 %)
		31-40 years	45 (22.61 %)
		41-50 years	14 (07 %)
		More than 50 years	06 (03 %)
3	Category of healthcare professionals	Physicians	73 (36.7 %)
		Pharmacists	13 (6.5 %)
		Nurses	68 (34.2 %)
		MBBS final year students	45 (22.6 %)
4	Years of experiences	Less than 1 year	72 (36.2 %)
		1-5 years	58 (29.1 %)
		6-10 years	33 (16.6 %)
		11-15 years	21 (10.6 %)
		16-20 years	11 (5.5 %)
		More than 20 years	04 (02 %)
5	Hospitals	Divisional Head Quarter and teaching hospital, Mirpur	82 (41.2%)
		Divisional Head Quarter and teaching hospital, New city	12 (06 %)
		Mohi-ud-din teaching hospital, Mirpur	76 (38.2%)
		Noor memorial hospital, Mirpur	11 (5.5 %)
		Riaz hospital, Mirpur	09 (4.5 %)
		Riasat hospital, Mirpur	09 (4.5 %)

Demographical Characteristics provides an overview of the demographic of the study. The primary data recorded are Gender, Age, and the specific Category of healthcare professionals. Additionally the data shows diverse age groups from 20 years to more than 50 years. Moreover multiple professional categories are also included in the table. This table provides details on the diversity and representation of the sample. There were more females than males in the sample, while the dominant age group is 20-30 years. Moreover, in terms of healthcare professional categories, Physicians make up more than 36% of the sample, while the least represented are Pharmacists. Moreover, 210 questionnaires were distributed among physicians, nurses, pharmacists and MBBS final year students in 2 public hospitals and 4 private hospitals of Mirpur AJ&K. 199 questionnaires were completely filled and 11 incompletely filled questionnaires were rejected, giving the response rate of 94.76% (**Table 1**).

Medications awareness level

Moreover, the understanding and awareness levels of healthcare professionals regarding medication errors. From the data, we see a majority indicating awareness of what a medication error is, but variations appear when segmented by professional categories or gender. This table assess the knowledge of healthcare professional about medication errors and medication errors reporting system, 11 questions related to knowledge were included in questionnaires. The answer "Yes" for any question was given the score of "1" and

Table 2. Knowledge about medication errors.

	No.	Questions	Yes %	No%
Results of questions	1	Do you know what medication error is?	82.9% (n=165)	17.1% (n=34)
	2	Do you have knowledge about near misses?	64.8% (n=129)	35.2% (n=70)
	3	Do you know who can report medication error?	64.3% (n=128)	35.7% (n=71)
	4	Is medication error reporting mandatory?	72.4% (n=144)	27.6% (n=55)
	5	Is medication error reporting system is present in your hospital?	36.7% (n=73)	63.3% (n=126)
	6	Are you aware of various categories of medication error?	47.7% (n=95)	52.3% (n=104)
	7	Are you aware of the various interventions to prevent medication errors?	61.3% (n=122)	38.7% (n=77)
	8	Are you aware how to proceed if medication errors occur?	58.3% (n=116)	41.7% (n=83)
	9	Do you know what can happen if an error is made?	61.3% (n=122)	38.7% (n=77)
	10	Are you aware of reporting system and how to report?	46.7% (n=93)	53.3% (n=106)
	11	Should there be an improved system in hospitals regarding administration and dispensing of drugs?	79.4% (n=158)	20.6% (n=41)
	Classification	**Excellent**	**Good**	**Average**
Knowledge Score on Healthcare professional Categories	Physicians	17.8% (n=13)	42.46% (n=31)	19.2% (n=14)
	Pharmacists	46.2% (n=6)	38.5% (n=5)	7.6% (n=1)
	Nurses	22% (n=15)	45.5% (n=31)	26.5% (n=18)
	MBBS final year students	6.6% (n=3)	53.3% (n=24)	20% (n=9)
	Grading	**Male**	**Female**	**Total**
Knowledge Score based on Gender	Excellent	35.1% (n=13)	64.9% (n=24)	18.5% (n=37)
	Good	41.7% (n=38)	58.3% (n=53)	45.7% (n=91)
	Average	35.7% (n=15)	64.3% (n=27)	21.1% (n=42)
	Poor	31% (n=09)	69% (n=20)	14.5% (n=29)

"No" for any question was given the score of "0". If the total score of an individual was 10-11, 7-9, 5-7 and ≤4 then knowledge about medication errors was categorized as excellent, good, average and poor respectively.

It was observed from the results about 82.9% (n= 165) knew about medication errors, and 64.8% (n=129) had knowledge about near misses. While 64.8% (128) had knowledge about who can report medication errors. About 72.4% (n=144) accepted that reporting medication errors is necessary. About 63.3% (n=126) were agreed that there was no reporting system present in their hospitals. Only 47.7% (n=95) knew different categories of medication errors and 61.3% (n=122) were aware of different interventions that can be used to prevent medication errors. About 58.3% (n=116) had knowledge about how to proceed if medication errors occurred. Only 46.7% (n=93) knew how to report medication errors.

While for Healthcare professionals, Pharmacists had the highest percentage score for having knowledge of medication errors (**Table**

Table 3. Attitude towards medication errors.

	Items	Classification	Positive	Negative	p-Value	
Gender and healthcare professional categories	Gender	Male	86.4 % (n=64)	13.5% (n=10)	0.211	
		Female	92% (n=115)	8% (n=10)	0.211	
	Healthcare professional Category	Physicians	89% (n=65)	11% (n=8)	0.538	
		Pharmacist	100% (n=13)	0% (n=0)	0.538	
		Nurses	91.2% (n=62)	8.8% (n=6)	0.538	
		MBBS final year students	86.7% (n=39)	12.3% (n=6)	0.538	
		Questions	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**
Attitude towards Medication Errors	1	Is medication error reporting necessary?	60.8% (n= 121)	37.2% (n=74)	1.5% (n=3)	0.5% (n=1)
	2	Medication error reporting provides benefits to both patients and doctors?	46.2% (n=92)	50.3% (n= 100)	2.5% (n=5)	1% (n=2)
	3	Do you think physicians, nurses and pharmacists are important in detecting and identifying medication error?	45.7% (n=91)	38.7% (n=77)	13.1% (n=26)	2.5% (n=5)
	4	Reporting Medication errors is professional role of a pharmacist.	40.2% (n=80)	49.7% (n=99)	4.5% (n=9)	5.5% (n=11)
	5	I believe that the monitoring drug safety is important.	53.8% (n=107)	37.7% (n= 75)	6% (n= 12)	2.5% (n= 5)
	6	If you noticed a medication error, did you not inform due to fear of any legal consequences?	14.6% (n=29)	30.2% (n= 60)	34.2% (n= 68)	21.1% (n= 42)
	7	After noticing the medication error, did you not inform as you were too busy?	19.6% (n=39)	28.1% (n=56)	31.2% (n= 62)	21.1% (n=42)
	8	After noticing the medication error, did you not inform as you did not know whom to inform?	17.1% (n=34)	32.2% (n= 66)	29.1% (n= 58)	20.6% (n= 41)
	9	It is important for community pharmacist to attend training programs in pharmacovigilance.	41.7% (n=83)	45.7% (n=91)	10.6% (n=21)	2% (n=24)
	10	Do you think error reporting is also a role of healthcare professionals?	44.7% (n=89)	41.7% (n=83)	10.1% (n=20)	3.5% (n=7)
	11	Consulting the physician is important before.	45.7% (n=91)	40.7% (n=81)	10.1% (n= 20)	3.5% (n=7)
	12	Reporting medication errors is part of pharmaceutical care process.	40.2% (n=80)	49.2% (n=98)	8% (n=16)	2.5% (n=5)
	13	Senior staff should encourage suggestions from team members about Medication error.	48.7% (n=97)	40.7% (n=81)	8% (n=16)	2.5% (n=5)

2).

While Attitude towards Medication Errors explains perception or attitude towards medication errors. It has recorded the attitudes of healthcare professionals about medication errors. The data highlights the extent to which professionals view error reporting as necessary and beneficial. With categories like 'Positive'

Table 4. Practice regarding medication errors.

Items			Good Practice	Poor Practice	P-value
Gender and healthcare professional categories	Gender	Male	48.2% (n=28)	32.6% (n=46)	0.038
		Female	51.8% (n=30)	67.4% (n=95)	0.038
	Healthcare professional categories	Total	29.1% (n=58)	70.9% (n=141)	0.038
		Physicians	31% (n=18)	39% (n=55)	0.04
		Pharmacists	6.8% (n=04)	6.3% (n=09)	0.04
		Nurses	48.3% (n=28)	28.36% (n=40)	0.04
		MBBS final year students	13.7% (n=8)	26.24% (n=37)	0.04
Questions questionnaire	Practice regarding medication errors reporting	**Items**	**Questions**	**Yes**	**No**
		1	Have you ever found any medication error?	62.8% (n=125)	37.2% (n=74)
		2	Have you ever seen medication error reporting form?	37.2% (n=74)	62.8% (n=125)
		3	Have you documented Medication error?	28.6% (n=57)	71.4% (n=142)
		4	Have you ever reported any medication error?	35.2% (n=70)	64.8% (n=129)
		5	Have you taken any training classes or attended workshop regarding medication error reporting system?	34.2% (n=68)	65.8% (n=131)
		6	Your health care system encourages you about reporting medication error?	44.7% (n=89)	55.3% (n=110)
		7	Is medication error reporting form is easily available?	27.6% (n=55)	72.4% (n=144)
		8	Have you ever visited any medication error reporting center?	29.1% (n=58)	70.9% (n=141)
		9	I am very well prepared to report any ADRs notice in my future practice.	69.8% (n=138)	30.2% (n=61)
Different hospitals categories	Different hospitals	**Hospitals**	**Healthcare Professionals with Good practice**	**Healthcare Professionals with poor practice**	**p-Value**
		Divisional Head Quarter and teaching hospital,	09	73	<0.001
		Divisional Head Quarter and teaching hospital,	01	11	<0.001
		Divisional Head Quarter and teaching hospital,	48	28	<0.001
		Noor memorial hospital,	0	11	<0.001
		Riaz hospital,	0	9	<0.001
		Riasat hospital,	0	9	<0.001

and 'Negative' attitudes and levels of agreement with certain statements, it provides a comprehensive view of the mindset of the professionals. Such insights are pivotal for designing interventions or training programs.

Attitude about medication errors

To assess the attitude of healthcare professionals about medication errors reporting, 13 questions related to attitude were asked in questionnaires. The answer of "Strongly agree" was assigned with a score of "4", "Agree" with a score of "3", "Disagree" with "2" and "Strongly disagree" with "1" for each type of question. Reverse scoring was done in the case of negatively worded questions and total attitude score was calculated for each respondent on the basis of which respondent's attitude was categorized as a positive attitude and negative attitude if the score was 35-52 and less than 35 respectively. The result indicates that 89.9 % (n=179) respondents had a positive attitude for reporting medication errors and only 10.1% (n=20) respondents had a negative attitude for reporting medication errors (**Table 3**).

Practice about medication errors

Additionally Practice Regarding Medication Errors investigates the behaviors, experiences, and practices of healthcare professionals when confronted with medication errors. Personal encounters with medication errors, familiarity with error reporting forms, and overall practices were investigated. Data based on gender or professional category were segmented, the table provides a detailed picture of how knowledge and attitudes translate into action in real-world settings.

The practices regarding medication errors reporting in two public and 4 private hospitals of Mirpur AJK were assessed by including 9 questions related to practices in the questionnaire. A score "1" was given to answer as "Yes" and score "0" was given to answer as "No" and then scoring was done on filled questionnaire and if the score is between 6-9 then it was regarded as good practice and if the score less than 6 then it was regarded as poor practice.

The results indicate that 70.9% (n=141) respondents had poor practices of reporting medication errors, out of which 32.6% (n=46) were males and 67.4% (n=95) were females. About only 29.1% (n=58) had good practices out of which 48.2% (n=28) were males and 51.8% (n=30) were females. The Pearson chi-square also indicated that there was significant association present between genders and practices of reporting medication errors at p-value 0.038 as shown in **Table 4**.

Discussion

The survey was conducted across two public and four private hospitals located in the city of Mirpur. No prior studies in Mirpur AJK had been conducted to explore reporting of medication error reporting. The aim of this survey was to measure the knowledge, attitude, and practice related to medication error reporting among a group comprised of doctors, pharmacists, nurses, and final year MBBS students in the selected hospitals.

The results revealed that only 2% (n=4) of pharmacists in public hospitals and 4.5% (n=9) in private hospitals participated. This underscores the limited presence of pharmacists in both public and private hospitals of Mirpur AJK. Pharmactists play a pivotal role in dispensing and access to medications hence they can play an integral role in preventing harm from medication errors. A study by Azhar et al. in Pakistan supports these findings, highlighting the underrepresentation of pharmacists in hospitals compared to physicians and nurses. The study further emphasized the under recognized role of pharmacists in Pakistan, leading to a dearth of pharmacy services in hospitals. Developed countries like the US and UK have structured and sound clinical pharmacy services, but many developing nations, including Pakistan and India, lag behind [13]. Another study from the UAE further corroborate the limited pharmacist-to-population ratios in these regions [14].

Similarly, another study by Rayes et al. in United Arab Emirates (UAE) indicated that the number of pharmacists was than developed countries. The data from the study shows that the ratio of pharmacist to population is on 4: 1000 which is significantly low [15]. A survey by Kheir et al. in Egypt indicated that pharmacists were very low. About 138000 pharmacists were present while the total population was 82 million and ratio of pharmacists to population was 2: 1000 [16].

Knowledge of medication errors is very important for reporting medication errors. If physicians, pharmacists and nurses possess good knowledge of medication errors and its reporting procedure, then they can play an important role in reporting medication errors and thus can prevent damage caused by medication errors. The results showed that pharmacists have good knowledge of medication errors but knowledge of physicians, nurses and final year MBBS students was poor and requires some improvements. In contrast, the study conducted by Iffat et al. in hospitals of Karachi, Pakistan showed that the knowledge of healthcare professionals was sufficient [17]. Another study conducted by Sewelet. al. in India, showed that good knowledge was possessed by healthcare professionals about medication errors and its reporting system [18]. The result of poor knowledge in MBBS final year students about medication errors corresponds to the study conducted by Aghakouchakzadeh et. al., in Iran showed that the knowledge of medical students (final year) about medication errors and ADRs was inadequate [19]. In contrast to results of over study, a survey conducted by Johnson et. al., in Ajman, UAE, showed that Iranian nurses had good knowledge regarding medication errors [20]. Although their study showed that their education system was providing better knowledge regarding medication errors and reporting system than in Pakistan. Furthermore, poor knowledge was possessed by healthcare professionals including physicians, pharmacists and nurses about medication errors indicated by a study by Abdel-latifet. al., in Medina, Saudi Arabia [21]. A survey conducted by Sangheraet. al., in UK, showed that healthcare professional in NHS (National Health services) trust hospital had good knowledge about medication errors, its types and procedure for reporting [22].

Attitude of healthcare professionals is very important in prevention of medication errors. The results of this survey showed that maximum healthcare professionals possess good attitude of reporting medication errors. About 88% healthcare professional accepted that medication errors reporting is important and 96% healthcare professional agreed that reporting of medication errors can provide benefits to both the patients and physicians. A study conducted by Malik et al. in Shifa international hospital, Pakistan also indicated that healthcare professionals including physicians, pharmacist and nurses possessed good attitude toward reporting medication errors [23]. In contrast, a survey conducted by Abdel latif et al. in Medina, Saudi Arabia indicated that only 48% healthcare professionals have positive attitude for reporting medication errors to authority [21]. A survey by agha kouchak zadeh et al. among medical students of Iran indicated that they had good attitude for reporting medication errors and had knowledge about the importance of reporting medication errors [19]. A study conducted by Evans et. al.,in different hospitals of Australia indicated that physicians, pharmacists and nurses had good attitude of reporting medication errors and were very keen to report any incidents and it was also observed that these institutes also encouraged healthcare professional to report medication

errors to the authorities [24].

It was also observed from our results that 70.9% (n=141) respondents had poor practice in reporting medication errors and only 29.1% (n=58) had good practice in reporting medication errors. Similarly, it was observed from a survey in Pakistan that practices of reporting medication errors and ADRs was poor because no system was present for reporting medication errors [23, 25].

A good practice rate was observed in a study conducted in teaching hospital Riyadh, Saudi Arabia. In one year survey by Alshaikhet. al., in UAE indicated that about 0.4% medication errors were reported (949 medication errors from total of 240,000 prescriptions) and out of which 1.5% medication errors were of category E (errors resulting in deaths) [26]. A survey was conducted by Ahmed et al. in Indiato evaluate practice of reporting medication errors by pharmacist which indicated that incidents reporting rate was only 37% and there was no system present in India for reporting of incidents [27]. Another study conducted by Evans et al. in six hospitals of Australia showed good practices rate of reporting incidents by physicians and nurses. It was observed that incidents reporting rate by nurses was more than physicians. This study also indicated that near misses were not frequently reported [24]. A survey conducted Tobaiqyet. al.,in Saudi Arabia also indicated that reporting medication errors was quite less by healthcare professionals[28]. There is a need for the improvements in knowledge, attitude and practices regarding medication errors and its reporting system in hospital of Mirpur AJK.

Conclusion

In conclusion, it was observed from the present study that majority of healthcare professionals have good knowledge of medication errors and good attitude of reporting medication errors while poor practices of reporting medication errors in public and private hospitals. The major factor that prevents them from reporting medication errors is lack of knowledge regarding how to report and whom to report. Our study has concluded that there is a need for medication errors reporting system in Mirpur AJK. This study also suggested that there is a need for training regarding medication errors and reporting system for medication errors of healthcare professionals. Medication errors reporting form should be easily available in hospitals so that reporting rate of medication errors is improved. Medication errors reporting should be mandatory in all hospitals. Workshops related to medication errors reporting should be conducted to provide guidance to physicians, pharmacists and nurses about medication errors reporting. Medication errors reporting rate can also be increased by offering incentives to health-care professionals for reporting of medication errors.

Acknowledgments

The authors are highly thankful to all the staff working in hospitals from where the data was collected.

Ethics approval and consent to participate

Ethical approval of study was taken from IRB (Institutional Review Board) of college. Rationale of the study was explained to the participants and ensured the confidentiality and privacy of the study. Study flowchart is provided as below.

Data availability

The authors have nothing to declare as availability of data upon request.

Funding

None received.

Author contributions

Khanzada Sheraaz Khan collected the data, Ghulam Mustafa conceptualized, supervised the study, Syed Samiullah analysed the data and Abuzar Watanpal entered data.

Competing interests

The authors have declared no conflict of interests.

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