

Barriers of Reporting Medication Errors at Arar Central Hospital, KSA

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Abstract: This study aimed to identify the barriers to reporting medication errors at Arar Central Hospital in Saudi Arabia. A descriptive cross-sectional survey of 241 health care providers was conducted at Arar Central Hospital (85 males and 156 females). The R-Studio assertion analysis program was used to identify factors considered as barriers to reporting medication errors. Confirmation factor analysis used to compare health care providers and factors influencing the reporting of medication errors. The results of the study showed that there were no differences between health care providers in the effect of the elements as they had the same measurements about the barriers to reporting medication errors. The results also indicated that fear factor is the most important obstacle behind the failure to report medication errors (32.37%), followed by the lack of information (15.7%), and that the lack of time is the least important obstacle Reporting medication errors (8.12%). In the light of the results, the study recommended that a non-punitive, protected, voluntary and simplified communication system should be implemented with an excellent response system if a root cause analysis error occurred, and health care providers should be encouraged to report medication errors. A future study is required to further investigate these and other factors and improve reporting rates.

Keywords: underreporting medication errors, errors, reporting, patient safety, adverse drug events.

معوقات الإبلاغ عن الأخطاء الدوائية في مستشفى عرعر المركزي بالمملكة العربية السعودية

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المخلص: هدفت هذه الدراسة إلى تحديد العوائق التي تقف وراء عدم الإبلاغ عن الأخطاء الدوائية في مستشفى عرعر المركزي بالمملكة العربية السعودية. لتحقيق هدف الدراسة، تم إجراء مسح مقطعي وصفي لعينة بلغت (241) من مقدمي الرعاية الصحية في مستشفى عرعر المركزي بواقع (85) من الذكور و(156) من الإناث، وتم استخدام برنامج "آرستوديو" لتحليل عامل التأكيد لتحديد العوامل التي اعتبرت كعوائق للإبلاغ عن الأخطاء الدوائية، وتحليل عامل التأكيد للمجموعات المتعددة للمقارنة بين مقدمي الرعاية الصحية والعوامل المؤثرة على الإبلاغ عن الأخطاء الدوائية. أظهرت نتائج الدراسة عدم وجود فروق بين مقدمي الرعاية الصحية في تأثير العناصر إذ لديهم نفس القياسات حول حواجز الإبلاغ عن الأخطاء الدوائية. كما أشارت النتائج إلى أن عامل الخوف هو أهم العوائق التي تقف وراء عدم الإبلاغ عن الأخطاء الدوائية وقد جاء بنسبة (32.37%)، تلاه عامل نقص المعلومات وقد جاء بنسبة (15.7%)، وأن عامل قلة الوقت يمثل أقل العوائق أهمية في الوقوف وراء عدم الإبلاغ عن الأخطاء الدوائية وقد جاء بنسبة (8.12%). في ضوء النتائج، أوصت الدراسة بضرورة تنفيذ نظام البلاغ غير العقابي والمحمي والطوعي والمبسط مع نظام استجابة ممتاز إذا حدث خطأ لتحليل السبب الجذري، وضرورة تشجيع مقدمي الرعاية الصحية للإبلاغ عن أخطاء الدواء. ومطلوب دراسة مستقبلية لمواصلة التحقيق في هذه النتائج وغيرها من العوامل وتحسين معدلات الإبلاغ.

الكلمات المفتاحية: عدم الإبلاغ عن الأخطاء الدوائية، الأخطاء، إعداد التقارير، سلامة المرضى، الآثار الضارة للأدوية.

1. Introduction:

Medication errors (MEs) are the most common types of medical errors harming about 1.5 million people, kill 107000 people (Aspden et al., 2006). An estimated number of 48000 - 99000 patients die from medical errors each year. About 7000 people annually are expected to die from medication error (Phillips et al., 1998). Dr. Makary and Daniel estimated that "medical errors are third cause of death in US" (Makary and Daniel, 2016). Medication errors also oblige significant costs between 6 billion US \$ and 29 billion US \$ per year (WHO, 2014) and cost around 3.5 billion US \$ yearly (Aspden et al., 2006).

Adverse drug events (ADEs) and medication errors (MEs) are frequent in health care institutions and can happen at any step in the medication use process. Medication errors are most common than ADEs. Depending on the setting, about a third to half of ADEs are typically related to medication errors (Leape et al., 1993). Adverse drug events (ADEs) considered the most cause of harm to hospitalized patients (Samsiah et al., 2016). Medication errors and adverse drug events are a continual source of error in healthcare and associated with the increased illness of patients and cost (Roughead and Semple 2009). Although the rate of medication errors was widely different as a result of a difference in definition and detecting methods of medication errors, it has given alarming of medication errors problem.

Medication errors are drawing attention of the organizations, agencies, quality institutions worldwide as one of the most critical challenges in front of patient safety. World Health Organization announced that "Medication without harm" is WHO's Third Global Patient Safety Challenge, Medication without Harm aims to reduce severe avoidable medication-related harm by 50%, globally in the next five years (Donaldson et al. 2017). An error will occur, and Human error is unavoidable. Nothing to be done to eliminate human errors. To effectively avoid the mistake that can cause patient harm, improvement system problems is required. System problem can be visible through reports all errors harming patients, errors that reached patient but do not result in patient harm, and errors that were prevent before reached patient (Wolf and Hughes, 2008).

Reporting errors is the most common method of learning and preventing future errors. Reporting and using information extracted from these reports about medication errors and near misses are essential to improve patient safety and to avoid their recurrences (Koczmara, 2006). Despite Reporting error is the most common method for Identifying error types, its frequency, consequences and prevent future mistakes, there is underreporting (Hogan et al., 2008). Underreporting medication errors is a worldwide problem.

In the USA, Reporting system missed 90% of adverse events (Hogan et al., 2008). In another study estimated underreporting of adverse drug events to range from 50%–96% annually (Leape, 1994). Reporting errors in hospitals occurring in at least one and maybe three out of ten errors (Hughes and Blegen, 2008). In England, the rate of reporting simple error is 22%-39%, while more severe errors often go no reported (Leigh, 2006). In Saudi Arabia, Medication errors are under-reported (Alshaikh et al. 2013;

Tobaiqy and Stewart, 2013). Underreporting of medication errors occurred in all medication process; Prescribing, dispensing, and administration. Underreporting of medication errors is a widespread problem that must be determined the causes to prevent medication errors (Kim et al., 2014).

Many researchers studied barriers to poor reporting of medication errors. According to Bahadori et al. (2013), the most significant role of underreporting of medication errors by nurses related to managerial factors as lack of positive feedback, blame culture, Disproportionate reactions of the head with importance and seriousness of error. if response system to medication errors inactive, the reporting system is useless. Positive feedback to a reporter from supervisor and persons responsible of the reporting system is critical to illustrate the importance of reporting system, and as a result, accurate and complete information will be filled by reporter next time. Fear of blame, punishment is still an obstacle in reporting medication errors, non-punitive culture is essential for encouraging reporting. Reporting near misses (i.e., an event when no patient harm happened) are very important because it can occur 300 times more frequently than adverse drug events, and it can give us more information to preventing error (Barach and Small, 2000). Sometimes decision making for reporting of medication error is determined by the severity of the outcome of the errors (Samsiah et al. 2016).

1.1 Aim of study:

This study aims to identify the barriers to reporting of medication errors.

1.2 Significance of study:

The finding of this study will help healthcare's providers (physicians, nurses, and pharmacists), quality team and hospital administration to prepare and implement new policies and strategies to create a culture where healthcare providers feel comfortable to reporting medication errors, which enhancing patient safety.

2. Literature review

Medication error defined as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is under the control of the health care professional, patient, or consumer" (National Coordinating Council for Medical Reporting and Prevention, (NCCMERP)).

Adverse Drug Event (ADE: "An injury resulting from medical intervention related to a drug." Source: Institute of Medicine (IOM). Preventable ADE "is harm caused by the use of a drug as a result of an error (e.g., the patient is given a normal dose of a drug, but the drug was contraindicated in this patient). These events warrant examination by the provider to determine why it happened. Non-Preventable ADE is drug-induced harm occurring with appropriate use of medication (e.g., anaphylaxis from penicillin in a

patient and the patient had no previous history of an allergic reaction)", (see Figure 1 for a graphical depiction with no intended meaning to size of circles).

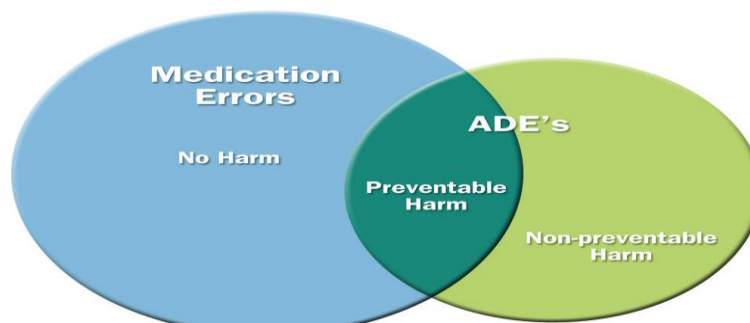


Figure (1) Relationship between medication errors and adverse drug events

1Adapted from Figure 1 in Qual Saf Health Care

2004, 13:306–314. doi: 10.1136/qshc.2004.010611

Generally, Reporting error is acceptable as the primary initiative in patient safety improvement (Pittet and Donaldson, 2006). Information released from reporting system essential to identification errors, its frequency, and consequences. This information used to learn and prevention future errors. To improving patient safety and the prevention of medication errors which is the most common type of medical errors and adverse drug events causing morbidity and mortality in health care institutions. For that, reporting medication errors and near misses are very important. Reporting of near misses offers benefits very much over adverse events including more frequently, fewer barriers to date collection, less responsibility, and retrieval patterns that can be analyzed, and used for improvement (Barach and Small, 2000).

Despite the importance of reporting medication errors, there is underreporting (Hogan et al., 2008; Leape, 1994; Huges and Blegen, 2008; Alshaikh et al., 2013; Tobaiqy and Stewart, 2013; Kim et al., 2014).

There are many factors play a role in underreporting of medication errors. In Banakhar et al. (2017) demonstrated that lack of time was the significant barriers to reporting medication errors. The complexity of nurse work also considered an essential factor is contributing to underreporting of MEs. Majority of participants disagree that lack of knowledge and procedure to be considered barrier. Fear of being blamed or/ and punished not deemed as barriers. Reporting error is not a priority, not our responsibility, reporting error will not make any improvement, the difficulty of filling a form, and reporting system inadequate not deemed as barriers.

In a cross-sectional survey conducted at Riyadh and Al-kharj cities,167 physicians and nurses participated, showed that fear of blame was an important factor for inadequate reporting of medical errors, followed by fear of being punished, difficulty in filling form, lack of knowledge of what will be reported, medication error reporting is inadequate, and lack of procedure on reporting medication errors,

respectively. Regarding the relationship between social-demographic characterizes and response of participants to reporting an error, participants who more experience were less response to reporting medical errors. In another hand, younger participants age range (31-40) showed more response to reporting the barriers. Participants with board qualification have more response to reporting barriers than those who hold the diploma qualification (Alduais et al., 2014).

Regarding Aboshaiqah, (2013) Researchers used a cross-sectional survey that was conducted among 307 nurses in a tertiary hospital in Riyadh. The most affecting factors determined as barriers in reporting errors in this study included that fear of being blamed if medication error resulted in patient harm and reaction of nursing administration, which focus on human error rather than system failure, then no-positive feedback, is given for passing medications correctly. Another finding in this study was, participant disagreed with following factors as underreporting causes: hospital medication error definition, medication errors not clearly defined, the nurse cannot recognize the error, some medication errors are trivial to report, and consuming time for filling form or contact physician for medication error.

In Tabatabaee et al. (2014) cross-sectional study carried out on 180- bed, a private hospital in Iran, the number of participants was 97 nurses. The results indicated that the most important reasons behind underreporting medication errors include: fear of legal involvement, fear of losing a job, fear of the bad outcome of medication error respectively. One the other hand, forgetting to report MEs, lack of time to reports MEs and lack of information to recognize MEs were the lowest factors contributing to underreporting MEs.

In Sarvadika et al., (2010) cross-sectional study carried out on 900- bed tertiary referral hospital, the number of participants was 56 health care providers. The results indicated that physicians were unlikely to report near misses and medication errors less harm or no harm patients. In contrast, pharmacists and nurses were most likely to report all medication errors. About blame and punishment, all health care think, they will be blamed or punished, especially nurses and pharmacist respectively. However, all of them think that they will blame and punished if the patient outcome is worsening as a result of a medication error. Another cross-sectional study illustrated that lack of awareness of the reporting policy; workload and time consuming with reporting; and unavailability of the reporting form were the most important barriers for underreporting medication errors (Tobaiqy and Stewart, 2013).

Regarding cross-sectional study based on questioners, participant's 300 nurses from King Fahd medical city to identify the barriers of underreporting administration medication errors among nurses. The results revealed that fear of blame, fear of reflecting medication error happened as measure of the quality of nursing care provided., fear of revealing medication error to patient and his/her family and their reactions, and fear of reaction of nursing administration is concentrating on individuals rather than system failure were highest rates as obstacles for reporting medication errors (Mohammad et al., 2016).

3. Materials and methods:

3.1 Design

A descriptive Cross-sectional survey was conducted in Arar central hospital. The study population is all healthcare providers' involvement in the medication use process (nurses, pharmacists, and physicians).

3.2 Setting

The research was conducted within Arar central hospital (ACH), The hospital is reference hospital in the northern-bordered region, KSA. It has more than 300 beds. Arar Central hospital policy on medication error reporting has adopted NCCMERP definition of medication error, with healthcare professionals mandated to report all medication errors and near misses. The reporting system is paper-based.

3.3 Sample frame

A total of 245 physicians (consultants, specialists, and residents), 360 nurses' staff, and 35 pharmacists employing in Arar central hospital invited to complete the survey. 3ower calculation for population survey was done using Raosoft website (<http://www.raosoft.com/samplesize.html>). With the margin of error of 5%, a confidence interval (CI) of 95%, and a response distribution of 50%, the minimum sample size required was 241.

3.4 Development and Distribution of questionnaire

A draft questionnaire was developed based on published literature on medication error reporting (Hammoudi et al., 2017, Banakhar et al. 2017, Bahadori et al., 2013, Tobaiqy and Stewart, 2013). The questionnaire was two parts:

- The first part contained demographics of the healthcare providers together with their social wellbeing (name, age, gender, marital status, professional, academic level, and work experience).
- The second part had factors influencing as barriers of medication errors reporting, list of factors influencing as barriers of medication errors reporting will be 13 items which were translated into the Arabic language to be clear for participants and to obtain more reliable answers. The items will score based on Likert's five-point scale from "completely agree" (Score 5) to "completely disagree" (Score 1). The questionnaire was designed using Google Forms and a short hyperlink was created to access the survey. After approval from the administration of Arar central hospital, this hyperlink distributed into various healthcare WhatsApp. groups such as a medical department group, surgical department group, emergency department group, among others. The letter attached with a short hyperlink of survey considered as consent to participate. The survey

distribution and data collection took about two months (30/8/2018 to 20/10/2018) to achieve the required sample size.

3.5 Ethical approval

Participation on the study was voluntary and based on informed consent. The study was approved by the research committee of the faculty of postgraduate studies in Riyadh Elm University, with a registration number **FPGRP/43739009/233**. Also, approval was granted by Local Committee for Research Ethics in Northern Border Region with registration number **9/1440**.

3.6 Statistical analysis

The aim of this analysis to identify the most factors that considered as barriers of reporting the medication errors in Arar central hospital. A sample of 241 healthcare professionals was asked to answer the questions about factors influencing as barriers to medication errors reporting. The questionnaire was reliable with Cronbach Alpha (0.82). R studio software was used to run Confirmatory Factor Analysis to identify latent traits (factors) of barriers to report medication error and multiple group- Confirmatory Factor Analysis used to compare between healthcare providers. Frequencies and Percentages used as descriptive statistics for demographic variables. Median used as a single measurement of the item that explains the degree of agreement of barriers.

Factor analysis (Principle Component factors) was conducted to identify the most factors effect on reporting the medication error. The patterned relationship among variables checked by the correlation matrix, the correlation among variables was significant (P-value=0.000), and Bartlett's test with significant P-value = 0.000 confirm that the data has patterned relationships. The Kaiser-Meyer Olkin measure (KMO) of sampling adequacy =0.834 showed that data is suitable for factor analysis – see table (1)

Table (1) Suitability of data collected for factor analysis

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.834
Bartlett's Test of Sphericity	Approx. Chi-Square	932.393
	Degree of freedom	78
	Sig.	.000

4. Results:

4.1 Respondents' demographics:

Response rate was 37.9% (241/640), of 241 respondents, 85(35%) male and 156(65%) Female. Of them, 150(62.2%) are Nurses the majority of respondents, 37(15.4%) are Pharmacists, and 51(21.2%)

are Physicians. Most of the respondents 131(54.4%) aged [25-34]. For more descriptive statistics about the sample, see-table (2) and figure 2: Demographic data

Table (2) Descriptive Statistics of Demographic data

Demographic Variable	N (%)
Gender	
Male	85(35%)
Female	156(65%)
Age [Years]	
[20-24]	11(4.6%)
[25-34]	131(54.4%)
[35-44]	57(23.7%)
[45-60]	40(16.6%)
Marital Status	
Divorce	4(1.7%)
Married	183(75.9%)
Single	52(21.6%)
Professional	
Nurse	150(62.2%)
Pharmacists	37(15.4%)
Physicians	51(21.2%)
Academic Level	
Bachelors	93(38.6%)
Master	35(14.5%)
Doctorate	12(5%)
Technician	97(40.2%)
Working Experience	
1-5Years	63(26.1%)
5-10Years	70(29%)
Less than one Year	14(5.8%)
More than 10 Years	93(38.6%)

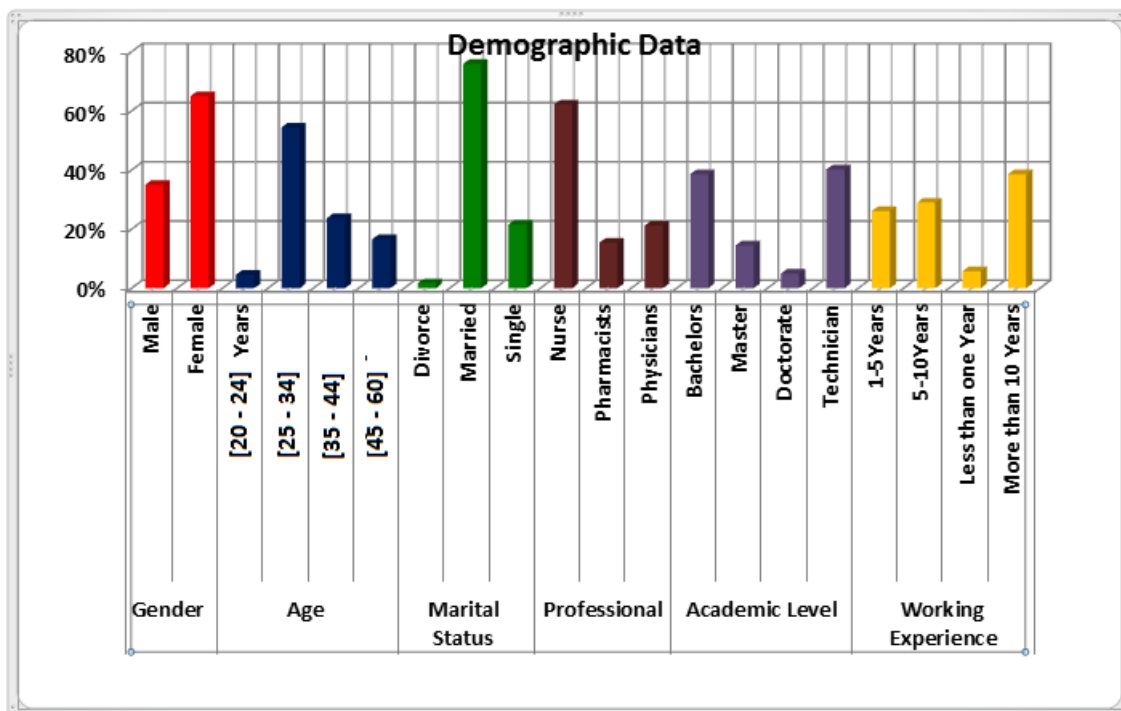


Figure (2) Demographic data

4.2 Barriers of reporting medication errors

Table 3 showed the frequency and percentage of answers of items of questionnaire by Likert scale.

Table (3) Frequencies and Percentages of answers measured by Likert scale

Items	Completely Disagree	Disagree	Neutral	Agree	Completely Agree
1-Fear of punishment after reporting medication error.	69(29.1%)	37(15.6%)	61(25.7%)	31(13.1%)	39(16.5%)
2-Fear of blame	67 (28%)	49(20.5%)	63(26.4%)	25(10.5%)	35(14.6%)
3-Fear of effect of medication error reporting in annual evaluation.	76 (31.8%)	52(21.8%)	50(20.9%)	26(10.9%)	35(14.6%)
4-Fear of reveal of medication error to patient and his/her family and their reactions.	54(22.6%)	26(10.9%)	63(26.4%)	38(15.9%)	58(24.3%)
5-Lack of information on how to report a medication error.	67(28.2%)	48(20.2%)	59(24.8%)	28(11.8%)	36(15.1%)
6-Medication error form is too complex.	82(34.9%)	54(23%)	58(24.7%)	24(10.2%)	17(7.2%)
7-Difficulty in recognizing medication error.	90(38%)	52(22%)	59(25%)	22(9.3%)	13(5.5%)
8-Medication error form is not available.	136(57.4%)	33(13.9%)	32(13.5%)	16(6.8%)	20(8.4%)
9-Lack of information about importance	65(27.3%)	52(21.8%)	56(23.5%)	30(12.5%)	35(14.7%)

Items	Completely Disagree	Disagree	Neutral	Agree	Completely Agree
of medication errors reporting.					
10-Reporting medication errors are not a supervisor's concern.	97(41.1%)	44(18.6%)	50(21.2%)	13(5.5%)	32(13.6%)
11-No enough time for reporting of medication error.	90(38%)	40(16.9%)	51(21.5%)	25(10.5%)	31(13.1%)
12-Some medication errors are trivial to be reporting.	73(30.8%)	35(14.8%)	58(24.5%)	35(14.8%)	36(15.2%)
13-No positive feedback from system after reporting medication error.	43(18.1%)	32(13.5%)	62(26.2%)	46(19.4%)	54(22.8%)

Table 4 showed median value of Likert scale of answers for each item with interpretation of median and conclusion. Where (1-Completely Disagree, 2-Disagree, 3- Neutral (neither agree nor disagree), 4 –Agree and 5- Completely Agree).

Table (4) Median value of 13 Items (Ordinal data-Likert scale)

Items	Median of Likert scale	Interpretation of Median	Conclusion
1-Fear of punishment after reporting medication error.	3	Most of respondents seem to be neither agree nor disagree regarding this item.	These 4 items explained Fear of reporting medication error. Most of respondents seem to be neither agree nor disagree to these barriers to reporting medication error.
2-Fear of blame	3	Most of respondents seem to be neither agree nor disagree for this item	
3-Fear of effect of medication error reporting in annual evaluation.	2	Most of respondents seem be disagree	
4-Fear of reveal of medication error to patient and his/her family and their reactions.	3	Most of respondents seem to be neither agree nor disagree	
5-Lack of information on how to report a medication error.	3	Most of respondents seem to be neither agree nor disagree	6 items explained lack and Difficulty of Information to reporting medication error. Most respondents seem to be Disagree to these barriers
6-Medication error form is too complex.	2	Most of respondents seem disagree	
7-Difficulty in recognizing medication error.	2	Most of respondents seem to be disagree	
8-Medication error form is not available.	1	Most of respondents seem to be Completely disagree	
9-Lack of information about importance of medication errors reporting.	3	Most of respondents seem to be neither agree nor disagree	

Items	Median of Likert scale	Interpretation of Median	Conclusion
10-Reporting medication errors are not a supervisor's concern.	2	Most of respondents seem to disagree	These 3 items explained small variations and they are less important items explained the time.
11-No enough time for reporting of medication error.	2	Most of respondents seem disagree	
12-Some medication errors are trivial to be reporting.	3	Most of respondents seem to be neither agree nor disagree	
13-No positive feedback from system after reporting medication error.	3	Most of respondents seem to be neither agree nor disagree	

4.3 Factors Extraction:

Factor analysis technique used to classify the 13 items into factors, each factor consists of interrelated items (correlated) which explained a specific construct. Three factors were extracted to represents the most critical items influence the barriers on reporting the medication errors. The first factor extracted represents Fear (4 items; Fear of punishment after reporting medication error, Fear of blame, Fear of reveal of medication error to patient and his/her family and their reactions, and Fear of effect of medication error reporting in annual evaluation) which represent the maximum variance accounted in the data, means that what items that have the most influences on barriers of reporting the medication error. Figure 3 showed the percentage of answers fear factor.

The second factor represents Lack of Information and difficulty (5 items; Lack of information on how to report a medication error, Lack of information about importance of medication errors reporting, Medication error form is too complex, Difficulty in recognizing medication error, Reporting medication errors are not a supervisor's concern, and Medication error form is not available). Reporting medication errors is not a supervisor's concern Excluded, figure 4 showed the percentage of answers lack information and difficulty factor.

The third factor represents a lack of Time (3 items; Some medication errors are trivial to be reporting, no positive feedback from system after reporting medication error, and No enough time for reporting of medication error), figure 5 showing the percentage of answers lack of time factor.

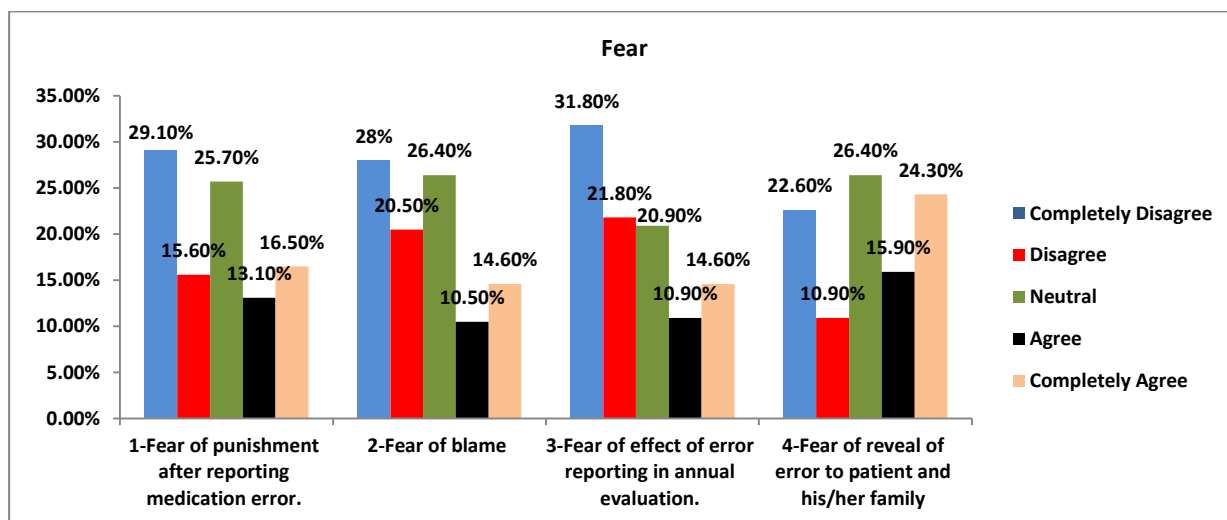


Figure (3) Percentages of answers for Fear factor

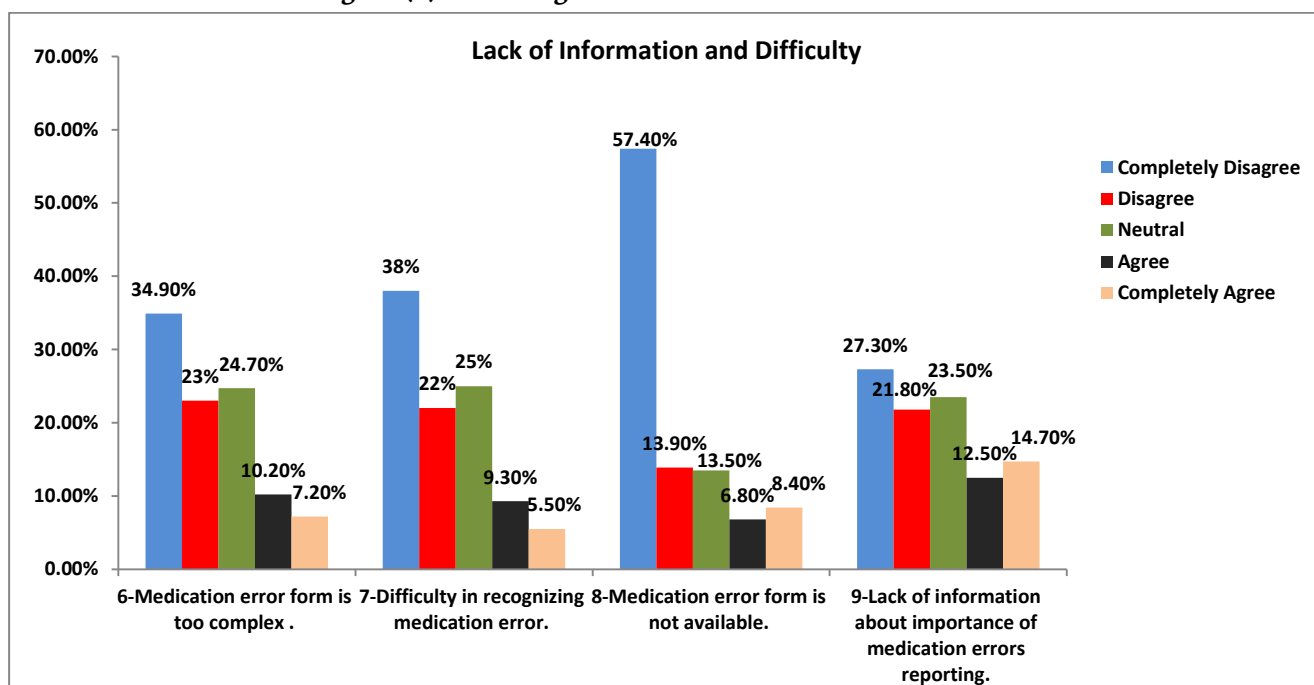


Figure (4) Percentage of answers for lack of information and difficulty factor

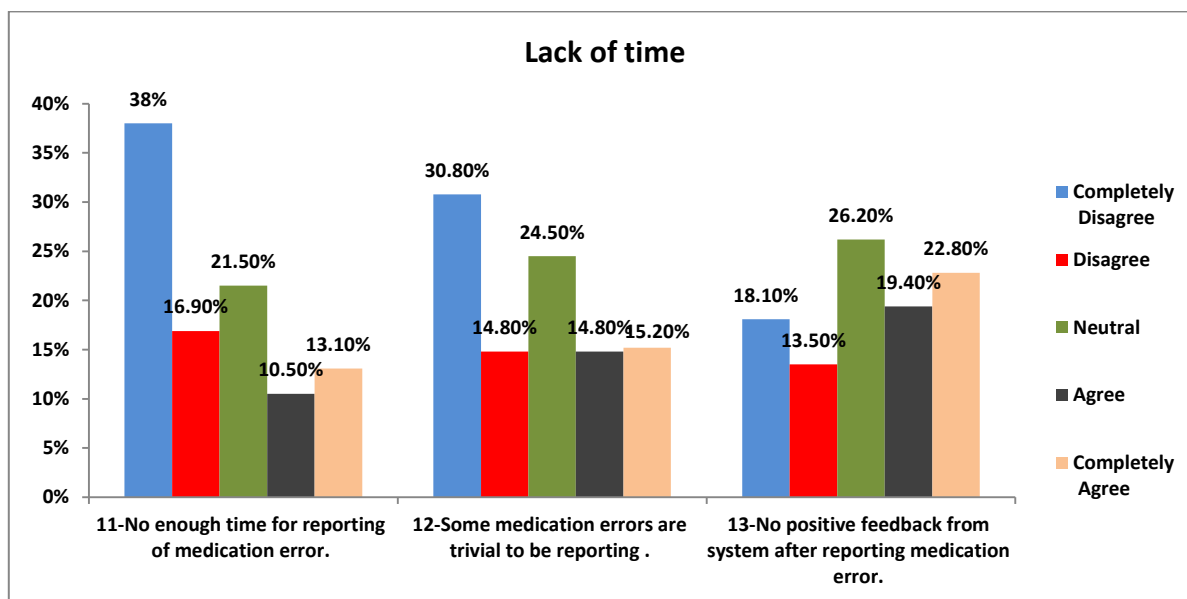


figure (5) Percentage of answers for lack of Time factor

Table (5) Important factors of Barriers of reporting medication errors:

*Factors	Total variance Explained
Factor 1 (Fear)	32.37%
Factor 2 (Lack and Difficulty of Information)	15.7%
Factor 3 (lack of time)	8.16%

Table 5 showed the most critical factors, which contributed as barriers, each, correlated items grouped in one factor. First, the essential factor is Fear which explained 32.37% of the variability in answers. Second is lack of Information and Difficulty which explained 15.7% of the variability in the answers of questions. Moreover, the third factor is the lack of which explained 8.16% of the variability of data.

Cronbach alpha: Measure of the Reliability (correlations among items)

Table (6) Barriers to Reporting Medication error: (In order)

Most Important Factors			
Factors:	Items in a factor	Reliability Cronbach Alpha	Interpretation
Factor1: Fear	1-Fear of punishment after reporting medication error.	0.88	Highest loading means the most important item in this factor.
	2-Fear of blame		
	3-Fear of effect of medication error reporting in annual evaluation.		
	4-Fear of reveal of medication error to patient and his/her family and their reactions.		
Factor 2: Lack of	5-Lack of information on how to report a medication error.	0.75	.

Most Important Factors			
Information and Difficulty	6-Medication error form is too complex.		Most important item in this factor because has highest loading
	7-Difficulty in recognizing medication error.		
	8-Medication error form is not available.		
	9-Lack of information about importance of medication errors reporting.		
	10-Reporting medication errors are not a supervisor's concern.		Excluded
Factor 3: lack of time	11-No enough time for reporting of medication error.	0.53	Important item in this factor because has highest loading
	12-Some medication errors are trivial to be reporting.		
	13-No positive feedback from system after reporting medication error.		

Table 6 explained the most essential items in each factor considered a reason for underreporting of medication errors.

Factor 1: The First factor extracted consist of 4 correlated items describes the fear of healthcare professional with Cronbach alpha 0.88. Hence this factor named Fear. Those four items explained 32.37 % of the variability in data. Since this is the first factor extracted with the highest explained variance, is considered the most critical factor or most essential items that influence on reporting the medication error.

Factor 2: The Second factor extracted consists of 5 correlated items describe the lack of information and difficulty with Cronbach alpha (0.75). Hence this factor named Lack of information and Difficulty. Those five items explained 15.7% of the variability. Since this is the second factor considered as second vital factors that influence as a barrier on reporting the medication error.

Factor 3: The Third factor extracted consists of 3 items describe lack of time and no positive feedback from the system to report the medication error. Only explained 8.12% of the variability in data, so all items in this factor were fewer essential items. This factor 3 named lack of time. (all items here have a moderate correlation (0.53).

Factors Loading: An identity which variables have the most significant effect on factor (has a high correlation with variables within the same factor). Loading range from -1 to 1, loading close to -1 or 1 indicates that the variable strongly influences the factor. Such as:

- Fear of punishment after reporting medication error in factor 1(Fear) has loading 0.92 which indicates that this item is a most critical item that explained barriers of healthcare professional to report medication error cause of Fear.

- Difficulty in recognizing medication error in factor 2 (Lack of information and Difficulty) has higher loading 0.75 indicates that this item is a most crucial item that explained barriers of reporting medication error due to lack of information to recognizing medication error.

4.5 Comparing among healthcare providers in factors that affect in reporting medication errors

Multiple Group Confirmatory Factor Analysis (MG-CFA) applied to 238 respondents. After data preprocessing by deleting the missing records of individuals who did not mention the profession.

Multiple Group Confirmatory Factor Analysis used to test whether the factors loading (explained most correlated items for barriers in reporting the error), the means of total scores of answers and the variability are equal (Invariance) across three groups of healthcare professions.

To test the equality (Invariance) of items among groups, there are Three different levels of measurement invariance or models will be defined (Configural invariance, Weak invariance, and Strong invariance). The result showed that Invariance (equality of loading /correlations of items and mean score of items) still holds among groups ($\Delta CFI < 0.01$)*, with significant Chi-square (χ^2), P-value < 0.05. see table (7)

Table (7) Measurement Invariance test across groups: (Equality across groups)

	(χ^2)	P-value	CFI	Change in CFI ΔCFI	Different across groups?
Configural Invariance (Implies the number of factors/latent variables and loadings are similar across the healthcare professions)	76.57	0.000	0.994	Not available	
Weak Invariance (Implies the magnitude of loadings of items is similar across the groups)	270	0.00	0.893	0.101	Yes
Strong invariance (Implies equal loadings of items and equal means across groups)	270	0.000	0.887	0.006* Less than the cut-point 0.01 (< 0.01)	No

The results in a table 7 suggested that there were not differences existing across groups in the means of items. They have same measurements of barriers which means that they have the same latent trait of obstacles in reporting medication error (since $\Delta CFI < 0.01$ in last model Strong invariance)

5. Discussion:

This study indicated that Fear is the most important factor considered as a barrier to reporting medication errors. This factor contains four items; fear of punishment, fear of blame, Fear of effect of medication error reporting in annual evaluation, and Fear of reveal of medication error to the patient and his/her family and their reactions. The result of this study was compatible with many studies indicated that most cited reason why MEs underreported was fear which expressed in different contexts; fear in general, fear of punishment /blame /disciplinary action (Alduais et al. 2014, Aboshaiqah, 2013, Mohammad et al., 2016, Stewart et al., 2018, George et al., 2018, Chiang and Pepper, 2006, Alsafi et al., 2015, Khowaja et al., 2008) fear of losing job (Alqubaisi et al., 2016, Tabatabaee et al. 2014, Khowaja et al., 2008); fear of annual evaluation (Stewart et al., 2018, Alqubaisi et al., 2016). Fear of reveal of medication error to the patient and his/her family and their reactions (Mohammad et al., 2016). In contrast, a cross-sectional survey among nurses demonstrates that fear of blame/ punishment was not as a barrier of reporting medication errors (Banakhar et al., 2017). Punitive, unprotected, reporting system deprives healthcare institution of essential process information unobtainable by other means to analyze of multiple causation at the level of systems for prevention future error and improving patient safety. In contrast, no punitive, protected, and free of blame culture will encourage healthcare providers to report medication errors reporting (Barach and Small 2000).

Lack of information and difficulty (5 items) was factor determined as second significant barrier to reporting medication errors. Difficulty in recognizing medication error considered as an essential item in this factor has the highest loading. Other items in this factor were; Lack of information about the importance of medication errors reporting. Medication error form is too complicated, Lack of information on how to report a medication error, and Medication error form is not available, respectively.

In the agreement, a qualitative focus group study demonstrated that; The lack of information related to medication errors in general, the importance of medication errors reporting, how to report, recognize if medication error occurs, and complexity of MEs form considered as significant factors for underreporting of medication error. In the same study determined that the complexity of medication error form reason for not reporting medication error (Hartnell et al., 2012). Another study illustrated that the difficulty of recognizing if medication error occurs was one of four significant factors in refusal to report medication errors (Mostafaei et al., 2014, Chiang and Pepper, 2006). The complexity of medication error forms considered as a reason to not report MEs (Rishoej et al., 2017). Lack of information on how to report a medication error determined as the first of six top barriers for physicians to reporting medication errors (Uribe et al., 2002).

In contrast, a study showed that Nurses do not recognize an error occurred was a less significant reason why medication errors not reported (Hammoudi et al., 2017). Moreover, results of Banakhar et al.

study disagreed that lack of knowledge and lack of procedures of medication error reporting were considered as barriers (Banakhar et al. 2017).

Results of this study demonstrated that These three Items; No enough time for reporting of medication error, some medication errors are trivial to be reporting, No positive feedback from the system after reporting medication error less significant reasons for underreporting of medication errors. although many studies demonstrate these items; as significant barriers for reporting; 1) No positive feedback from system after reporting medication error (Aboshaiqah A.E., 2013, Bahadori et al., 2013, Alqubaisi et al., 2016, Hammoudi et al., 2017, Mostafaei et al., 2014, Mohammad et al., 2016, Samsiah et al. 2016, George et al., 2018, Chiang and Pepper, 2006). 2) No enough time for reporting of medication error (Banakhar et al. 2017, Alqubaisi et al., 2016, Hammoudi et al., 2017, Chiang and Pepper, 2006, Rishoej et al., 2017, Burns et al, 2018, Uribe et al., 2002, Elder et al., 2007). 3) Some medication errors are trivial to be reporting which expressed in different terms; Not paying attention to the reporting on some medication errors (Bahadori et al., 2013), Selectively reporting errors depending on severity (Stewart et al., 2018, George et al., 2018, Alsafi et al., 2015, Elder et al., 2007).

There are many factors considered as barriers to reporting medication errors as excusing by no harm, won't occur again, and forget to report & not reporting near misses. Work pressure (Elder et al., 2007). Lack of reporting system for medication error. The non-significance of reports of medication errors to hospital authorities (Mostafaei et al., 2014). Lack of trust in a manager or supervisor (Hartnell et al., 2012). Afraid from destroying the relationship with a colleague if report MEs committed by colleagues (Stewart et al., 2018). workload considered the first factor to not reporting medication error (Fathi et al., 2017)

Many factors identified as facilitating factor to encourage reporting medication errors as simplifying reporting system, no punitive culture, training staff how to report medication error, education staff about importance of reporting medication errors and near misses, positive feedback for reporter, there should be clear guideline, policy, and procedure of reporting medication errors, confidently for reporter (Banakhar et al. 2017, Barach and Small 2000).

6. Conclusion

Underreporting of medication errors is a widespread problem that its causes and factors must be determined to prevent medication errors (Kim et al., 2014). The results of this study illustrated that fear, which expressed by different terms, is a significant factor contributing to underreporting medication errors. Other factors as Lack of information about the importance of medication errors reporting are (Medication error form is too complicated, Lack of information on how to report a medication error, and Medication error form is not available considered significant barriers for reporting a medication error.

Implementation of reporting system featuring by free of blame, anonymous, protected, voluntary, and, simplified will increase the rate of reporting medication errors. At the same time, excellent response system is necessary to encourage healthcare professionals for reporting medication errors. Encourage healthcare professionals happened if root cause analysis of medication done, recommendations to improve is released, and positive feedback for a reporter, in addition to continuing education lectures and awareness healthcare professionals to the importance of reporting all medication errors, and importance of relevant information extracted from reporting system for improving patient safety by reduction of medication errors.

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