Barriers and Strategies of Workplace Culture for Reporting Medication Errors As Perceived By Nurses: A Comparative Study

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Abstract: *The present study aimed to assess nurses' Perceptions of workplace culture for medication errors reporting in Taif-hospitals(KSA) and Assiut University Hospital(upper -Egypt), identify and compare barriers that prevent nurses from reporting medication errors and exploring the strategies which might encourage them to report errors in both hospitals.*
Methods : *Analytic -comparative design was used ,One tool included two parts:*
First part *: A structured interview questionnaire was designed to collect demographic data ,*
Second part: *Consists of two parts : 9 questions regarding information about barrier of reporting medication error and 5 questions regarding strategies to improve reporting of errors. The sample consisting of 300 (nurses) from different hospitals in Taif , Saudi Arabia and Assiut- upper Egypt were selected randomly .****Results:*** *There are many barriers preventing reporting of errors ,the highest barriers were administration factors and lowest barriers regarding reporting process(8.89±1.9 and 4.5±0.9,respectively). Also, There is statistical significant differences were found between the place of hospitals regarding the barriers, (P=.00) and (P = .000); age regarding administrative factors as barriers of reporting the medication errors,(P=.02) , working departments regarding the barriers of reporting,(P =.000); and years of experience regarding fear factors as a barriers of reporting, (P =.01). Also, there was significant difference between the Socio-demographic data of the respondents and strategies of reporting errors. Conclusion and recommendation: The results of this study indicated that the highest perceived barriers to medication administration error (MAE) reporting were administration factors followed by fear factors, and then factors related to the process of reporting from the nurse's opinion in Taif and Assiut hospitals. Also the study indicated that new technology, open communication with health team and feelings safe about working environment were the most strategies of reporting medication errors . The following recommendations were made: A designed in-service training program for all nurses about processes of medication error reporting and -Use of new technology for reporting errors.*

keywords*:Medication errors ,Culture of blame, barriers and strategies.*

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موانع واستراتيجيات ثقافة مكان العمل عن تسجيل الأخطاء الدوائية من وجهة نظر الممرضات: دراسة مقارنة
ملخص

هدفت الدراسة إلى : تقييم تصورات الممرضات لثقافة مكان العمل عن تسجيل لأخطاء الدوائية ، وتحديد ومقارنة حواجز منع الممرضات من تسجيل الأخطاء الدوائية واستكشاف الاستراتيجيات التي قد تشجيع الممرضات للإبلاغ عن الأخطاء الدوائية في كل من مستشفيات الطائف بالمملكة العربية السعودية و مستشفيات أسيوط بصعيد مصر.

طرق اخذ ألعينه : استخدمت أداة واحدة تتكون من جزأين: **الجزء الأول**: تم تصميم استبيان لجمع البيانات الديموغرافية، **الجزء الثاني**: ويتكون من جزأين: 9 أسئلة تشمل المعلومات حول موانع تسجيل الأخطاء الدوائية والثاني يشمل خمس اسئله عن استراتيجيات تحسين الإبلاغ عن الأخطاء. تتكون عينة من 300 من الممرضات (150بمستشفيات الطائف، المملكة العربية السعودية و 150 من مستشفيات أسيوط -بصعيد مصر)وقد تم اختيارهم عشوائيا

النتيجة: هناك العديد من الحواجز التي تحول دون الإبلاغ عن الأخطاء ، أعلى نسبه كانت العوامل الإدارية ، وأدنى نسبه كانت في إعداد التقارير (8.89 ± 1.9 و 4.5 ± 0.9، على التوالي). أيضا، هناك فرق واضح بين اماكن المستشفيات بشأن الحواجز والاستراتيجيات، و توجد علاقة بين السن وأقسام وسنوات الخبرة و العوامل الإدارية وعامل الخوف وعامل اعداد التقارير بمثابة حواجز للابلاغ عن الأخطاء الدوائية. أيضا، كان هناك فرق كبير بين البيانات الاجتماعية والديموغرافية لأفراد العينة واستراتيجيات تحسين الأخطاء الدوائية.الخلاصة **والتوصية**: أشارت نتائج هذه الدراسة إلى أن أعلى الحواجز ينظر إلى كانت العوامل الإداريين، تليها عوامل الخوف، ومن ثم العوامل المتعلقة بعملية اعداد التقارير من خلال ا راء الممرضات في مستشفيات الطائف و أسيوط. كما أشارت الدراسة إلى أن التكنولوجيا الجديدة، الاتصال مفتوحة مع فريق الصحة والمشاعر آمنة حول بيئة العمل كانت معظم استراتيجيات تحسين الإبلاغ عن الأخطاء الدوائية. **وقدمت التوصيات التالية** : تصميم برنامج تدريب لجميع الممرضين والممرضات حول تجنب الأخطاء الدوائية وكيفيه استخدام التكنولوجيا ألحديثه لمنع الأخطاء الدوائية

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I.   Introduction

Safety culture refers to the way patient safety is thought about, structured and implemented in an organization. Safety climate is a subset of this, focused on staff attitudes about patient safety. There is more evidence that improving safety culture impacts on staff safety behaviors and injury rates among staff [1].

Medication errors have been recognized as an area of grave concern and are preventable adverse events in all age groups of patients. The National Coordinating Council for Medical Error Reporting and Prevention has given the following definition: "Medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer. [2, 3]

The link between aspects of safety climate and medication errors has also been examined. For instance, researchers in the USA investigated the impact of safety climate on nurse and patient outcomes. A survey of staff from a random sample of hospitals found that safety climate predicted medication errors, nurse back injuries, urinary tract infections, patient satisfaction, patient perceptions of nurse responsiveness and nurse satisfaction. [4,5,6,7,8,9]

In the third world and developing countries, it is difficult to acquire accurate estimates about medication administration errors due to absence of a proper recording and reporting system and shortage of research information, but experts consider that the rate of these errors is high, and the increasing number of complaints against health care team in judicial authorities [10].

Medication errors are a significant and growing problem in health care settings. Enhanced understanding of some associated factors, such as the hospital unit and nursing shift, on which the error occurred, might support nursing administrators to identify common patterns and improve nursing care, ensure patient safety, and reduce hospital costs. Better organizational systems then could be designed and implemented to reduce potential medication errors [11,12].

Knowledge of what inhibits reporting', (**Hartnell etal.,, 2012**)[13] could remarkably 'result in improved patient care and safety'. It includes three parts: 'patient safety and causes of medical errors, barriers and strategies which encourage the nurses and physicians to report the errors'.

There are abundant advantages and ethical bases in elaboration and reports of nurses' errors, it is very difficult to obtain accurate statistics of medication errors due to nurses' protection against punishment, absence of an appropriate reporting and recording system, and shortage of information [14]

Mrayyan's study (2012)[15]who stated that few number of studies in relation to medication errors in Jordan. This study was assessed the reported incidences, causes and reporting of medication errors in ICUs and wards of Jordanian teaching hospitals, choose 212   nurses from four teaching hospitals. The mean of the reported incidence of medication errors for the whole sample was 35%; 36.4% in ICUs and 33.8% in wards. Poor quality or damaged medication labels were the most common reported cause of errors. Nurses did not report medication errors because they were afraid that they might be subjected to disciplinary actions, [16]

Frith, (2012) [17] indicated that 'the incidence and cost of medication errors continues to be a problem requiring solutions'. A number of technology strategies have been 'implemented to decrease the number of medication errors including computerized physician order entry, automated medication administration records, and bar coding administration' .Health care leaders need to consider not only technology capital investments but also human capital as a strategy to keep patients safe. [18]

In the Middle East hospitals, the culture of "Medical Dominance" is still affecting the work situation and the inter-professional relationships between doctors and nurses. This is true as a significant number of physicians used to deal with nursing professionals as if they are in the lower hierarchy and have no right to discuss a decision related to patient's condition. Instead, they have to obey and implement physician's orders as followers to these physicians. Accordingly, seldom are doctors held accountable for mistakes in ordering care that nurses must execute, since a nurse's role is to carryout doctors' orders [19,20] In such culture, doctors are considered as licensed medical practitioners whereas nurses are only licensed care givers within a similar context. Therefore, often the professional at the lower level always tends to be the target of blame when there is need for blame to be placed on a professional. [21]

Alahmadi [2010][[22] conducted a study relating an assessment of patient safety culture in Saudi Arabian hospitals and concluded that leadership is a critical factor in patient safety culture along with the fear of blame on nurses.

In Egypt Zein El-Din and AbdElAal [2013][23], investigated the relationship between safety climate, nurses' work environment and barriers to medication administration errors reporting, it was found that the nurses were unable to detect these errors and medication error is not clearly defined for them. Justified as to lack of nurses' training, especially, about the rules of medication administration, lack of supervision for the early detection of medication administration errors, as well as, the inability of nurses to define the medication errors consistently. Concurrently,unawareness of nurses about the outcomes that result from medication

administration errors and underreporting these events, as well as the absence of incident reporting systems made nurses fear from being reporting any detected medication error [24]

Hartnell, etal. (2012) [13] :They attempted to identify 'incentives, barriers have been identified as individual, organizational , cultural and facilitators to encourage medication error reporting as perceived by front-line hospital staff, to understand why certain factors serve as barriers, and to explore how some hospitals have successfully removed barriers'. The study was conducted on four hospitals and focused groups were designed to identify thoughts on multiple aspects of medication errors from the perspectives of front-line healthcare professionals (e.g. physicians, pharmacists and nurses) and in-depth interviews. Major changes of this study to improve the process and improve medication error reporting are not going to occur quickly but will require much deliberation, dedication and resource allocation..

The study of **McFadden, etal, (2006)**[25] reported that there are seven critical strategies for reducing hospital errors based on a case study of four Chicago-area hospitals. These strategies include: '1) partnership with stakeholders, 2) reporting errors free of blame, 3) open discussion of errors, 4) cultural shift, 5) education and training, 6) statistical analysis of data, and 7) system redesign'.[26]

Significant of study

Medication errors are recurrent and expected to be a prolonged problem in the health care system and lead to increase mortality and morbidity and can cause serious consequences for patients. Medication management in health care sector and particularly in hospitals received a lot of concern and attention from hospital managers and researchers. Investigating the reported medication incidents could help to design prudent quality improvement projects and plan organizational efforts to enhance patient safety [27].

As a result of the increasing medical errors, there is a need to identify the barriers preventing nurses from reporting it in both (Taif and Assiut hospitals). Also, we need to specify the possible strategies that could improve and encourage nurses to report medication errors, **So the study aimed to**:. Assess nurses' Perceptions of workplace culture for medication errors reported in both Taif-Assiut and hospitals. Identify and compare the barriers preventing nurses from reporting medical errors in Taif-hospitals and Assiut hospitals. Exploring the strategies which might encourage nurses to report the errors in both hospitals..

Research question

-What are the barriers of reporting medication errors among nurses?
- There are differences between barriers in Assiut hospitals and taif hospitals?
- What are the strategies used to encourage reporting medication errors?
- What is the relationship between reporting medication errors (barriers and the strategies) and socio-demographic variables?

II. Research Methodology

Research Design

Analytical- Comparative study research design was carried out for the current study.

Setting

The study was conducted in multiple settings, intensive care unit (ICU), coronary care unit (CCU) , emergency unit(ER), medical and surgical units in Taif -hospitals (King Faisal and Abdul-Aziz, hospitals) at Taif-City and Assiut hospitals(University Hospital and liver Hospital) at the Upper Egypt

Subjects

A total number of nurses 300 (150 of them working at Assuit University Hospitals and 150 working at Taif - Hospitals), who are working in the previously mentioned settings and available at the time of data collection were included in this study, these nurses had to fulfill the criteria of having a minimum of one year experience in the work setting, with different categories to guarantee that nurses are involved in administering medications. The exclusion criterion was unwillingness to participate in the study.

Data Collection Tool

One tool composed of two main parts used to collect data of the present study.

First part:

A structured interview questionnaire was designed to collect demographic data of nurses including age, work position, years of experience, and occupation.

Second part: Consists of two parts concerned with Survey to seek information about barriers of reporting medication errors in hospital and strategies to improve reporting of medication errors, questionnaire designed by Allina Hospitals and Clinics, 2002 ©, Minneapolis, Minnesota[28] and modified by researchers ,includes 9 questions regarding information about barriers of reporting medication errors in hospitals and 5 questions regarding strategies. The response to each question was on a 5-point Likert scale that ranges from 1 and 2

(agree and strongly agree) to 3- 5 (disagree, strongly disagree and not applicable). For each section, the scores of the items were summed-up (9-45 degree) and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score. The scale content validity was done through experts' opinions, and its reliability was measured by Cronbach alpha coefficient which was 0.79.

Method of data collection and ethical consideration.

Permission to conduct the study was taken from ethical research committee in College of Applied Medical Sciences – Taif University and Assiut University after explanation of the aim of the study. A permission to conduct the study was obtained from the director of the selected Hospitals. Oral consent was obtained from all study subjects after informing them about the objectives and methods of the study. Questionnaire was developed and tested for its content validity and relevance by 5 faculty members in medical-surgical nursing and nursing administration departments and 2 nurses managers in the hospital. A staff meeting was done under the supervision of the head nurse to clarify the purpose, objective and nature of the study as well as to explain the way of answering the questionnaire. Each nurse in the study subjects was interviewed individually to collect the necessary data, their right to withdraw at any time, and asked to fill out the questionnaire in10- 15 minutes during the period started from 1ˢᵗ of April to the end of December, 2014. Upon the completion, the questionnaire was submitted to Statistical Analysis.

Statistical Analysis:

Data was coded analyzed and tabulated by the researchers using SPSS version (20). Descriptive statistics, Frequency and percentages were used for describing and summarizing qualitative data. Categorical data Mean (X), Standard Deviation (SD) and t-test and ANOVA were used for the quantitative data. $P<0.05$ was considered a statistical significant.

III. Results

Table (1) : Represents Socio demographic characteristics of the studied sample, statistical significance differences were found between participants in Assiut and Taif hospitals P <0.05, regarding their age ,occupation , working departments and years of experience . As regard age: Majority participants their age ranged between in 20<40 ys in Assiut university and taif hospitals [94% an 82%,respectively],with Mean ±SD (28.7 ±7.3) years . Staff nurses represent 86% in Taif hospitals compared with 72% of them in Assiut hospitals, supervisors represent (12% and 6.7%, of participants respectively) in Assiut and Taif hospitals.

Regards level of education, 60% and 57% of participants had Diploma degree of nursing in Taif and Assiut hospitals respectively, while in Assiut hospitals participants with bachelors degree of nursing represented (20.7%) compared with (14%) of those in Taif hospitals with no statistical significance difference. Years of experience among participants were ranged between 1 to more than 16 years with Mean ±SD (8.52±6.8) years, 64.7% of nurses had years of experience ranged from 1-5 years of in Taif hospitals compared with (26%) of them in Assiut hospitals , 18%, 9.3%, and 8%, of participants in Taif hospitals compared with 28.7%, 26% and 19.3%, of them in Assiut hospital had years of experience ranged from 11-15 years, 6-10 years and 16 or more respectively. As for the working departments, 28.7% of participants in Taif compared with 42% of than in Assiut hospitals are working in the medical units, also 37.3% of participants in either Taif or Assiut hospitals are working in the emergency units with statistically significant difference p= 0.004 .

Table (2): Shows mean and Std. deviation of barriers for reporting medication errors from nurses point of view, Mean ± SD of administrator factors was [8.89±1.9], followed by fear factors was [7.4±1.8] and reporting process was [4.5± 0. 99] as stated by all participants in the study.

Table (3) : Illustrates Comparison between nurses perception regarding barriers prevent reporting of medication errors in Taif and Assiut hospitals, statistically significant differences were found nurses perception in Taif and Assiut hospitals related to barriers prevent reporting of medication errors related all items in the table. Most of nurses reported (agree & strongly agree), about **Lack of a clear guidelines about procedure of report error & No support from individual when recording medication error,**(88.7%,85.3%and 76.0%,80.7%,respectively),in Taif compared with those in Assiut hospitals P=0.04. **Also,** Above have of nurses reported agree and stronglly agree regarding **department/unit places blame on individuals when an error is reported, fear there will be negative consequences associated with reporting medical errors.** 57.3%, 56% and 32%,28%,respectively), in Taif compared with them in Assiut hospitals P≤0.05. In addition in Assiut hospitals most of nurses reported agree and strongly agree about **workload interferes with my ability to practice patient safety**, **believe that a medical error is the result of a failure of a complex system**, in comparing with those in Taif hospitals (76.7%,68.7% and 58%,62.7%,respectively) P≤0.05.

In Assiut hospitals nearly two third of nurses were responded disagree and strongly disagree regarding items of **Medication protocols in hospital are too complex, process of reporting errors at their hospital is cumbersome compared with those in Taif-hospitals** (62, 62.7% and 55.3%, 59.3% ,respectively)

Table (4): Shows c**omparison between barriers of reporting medication errors and demographic data of nurses participated in Taif and Assiut hospitals ,** statistical significance differences were found between nurses responses and their place of the hospitals ,age , years of experience and departments regarding the barriers reporting of medication errors ,(p=.000<.05) while no statistical significance difference was found between nurses occupation and their responses related to barriers of reporting medication errors (p. ≥0.05).

Table (5):**Denotd Mean ± SD score of strategies that improve reporting the medication errors as responded by participants in the study, the** highest score was regarding item of **New technologies,** such as electronic medical records or Pyxis, are creating a safer environment for patients in hospital(2.65±1.5), Work in an environment where can openly communicate opinions about patient care practices (2.59±1.4) and item of **New technologies** available in hospital are fully utilized to help prevent medical errors (2.04±1.1) , followed by **department/unit** acts on reported information related to medical errors (near miss, incident, sentinel event) to improve patient safety & **Senior** managers at hospital communicate to other that patient safety is a high priority (1.93±1.1 and 1.53±0.81,respectively with total mean ± SD (10.7±3.4).

 Table (6) : Illustrates nurses perceptions about strategies that improve reporting of medication errors in Taif and Assiut Hospitals Statistical significant differences were found between nurses in Taif and Assiut hospitals related to their perceptions about all strategies that improve reporting medication errors with more prevalent of agree and strongly agree responses concerning all items in the table among nurses in Taif ad Assiut hospitals .P≤0.00.

Table (7) :Illustrates association between strategies responded by nurses to improve report the medication errors and their socio demographic characteristics, statistical significant differences were found between strategies responded by nurses to improve report the medication errors & their age and work departments(p ≤.05) . While no statistical significant differences were found between strategies responded by nurses to improve report the medication errors & their place of work, occupation and years of experience (p ≥..05).

Table 1 : Socio demographic characteristics of nurses participated in the study at TAIF and ASSIUT Hospitals N=300					
F					
Variable	Hospital Name		Total 300	X2	P. value
	TAIF HOSPITAL N=150	ASSUIT HOSPITAL N=150			
Age 20<40y	123(82%)	141(94%)	264(88%)	10.2	.001**S
40<60 y	27(18%)	9(6%)	36(12%)		
Mean age	28.74±7.3				
Occupation Staff nurse Head nurse Supervisor Nursing assistant	129(86%) 14(9.3%) 7(4.7%) 0	108(72%) 14(9.3%) 18(12%) 10(6.7%)	237(79%) 28(9.3%) 25(8.4%) 10(3.3%)	16.7	.001**S
Level of education Diploma Associated degree Bachelors degree	90(60%) 39(26%) 21(14%)	86(57.3%) 33(22%) 31(20.7%)	176(58.7%) 72(24%) 52(17.3)	2.51	0.285 Ns
Departments				15.41	.004**S
Medical	43(28.7%)	63(42%)	106(35.3%)		
Surgical	28(18.7%)	24(16%)	52(17.3%)		
Intensive care	14(9.3%)	7(4.7%	21(9%)		
Coronary care	9(6%)	0	9(3%)		
Emergency	56(37.3%)	56(37.3%)	112(37.3%)		
Years of experience 1-5 years 6-10 years 11-15 years 16 and more	97(64.7%) 27(18%) 12(8%) 14(9.3%)	39(26%) 39(26%) 43(28.7%) 29(19.3%)	136(45.4%) 66(22%) 55(18.3%) 43(14..3%)	49.6	.000**S
Means of experience	8.52±6.8				

Table 2: Mean and Stander Division about barriers prevent reporting of medication errors N=300

Barriers	N	Minimum	Maximum	Mean	Std. Deviation
Administrator factors					
The medication protocols in hospital are too complex	300	1.00	5.00	2.62	0.88
Believe that a medical error is the result of a failure of a complex system	300	1.00	5.00	2.16	0.86
Workload interferes with ability to practice patient safety	300	1.00	5.00	2.12	1.03
No support from individual when recording medication error	300	1.00	5.00	1.98	0.87
Total	**300**	**4**	**16**	**8.89**	**1.9**
Fear factors					
Department/unit places blame on individuals when an error is reported	300	1.00	4.00	2.72	0.961
Fear there will be negative consequences associated with reporting medical errors.	300	1.00	5.00	2.66	0.954
Feel comfortable reporting medical errors made by co-workers.	300	1.00	5.00	2.01	1.004
Total	300	**3**	**13**	**7.4±**	**1.8**
Reporting process					
The process of reporting errors at hospital is cumbersome	300	1.00	5.00	2.58	0.87
Lack of a clear guidelines about procedure of report error.	300	1.00	3.00	1.9	0.6
Total	**300**	**2**	**7**	**4.5**	**0.99**

Table 3: Comparison between nurses perception regarding barriers prevent reporting of medication errors in Taif ad Assiut hospitals

Variables	Taif hospital		Assiut hospital		Qui-squer	P Value
	N= 150	%	N= 150	%		
No support from individual when recording medication errors					10.05	.04* S
Strongly Agree & Agree	128	85.3%	121	80.7%		
Disagree & Strongly Disagree	22	14.7%	22	14.7%		
Not Applicable	0	0	7	4.6%		
The medication protocols in the hospital are too complex					47.7	.000**s
Strongly Agree & Agree	61	40.7%	55	36.7%		
Disagree & Strongly Disagree	89	59.3%	93	62%		
Not Applicable	0	0	2	1.3%		
Believes that a medical errors is the result of a failure of a complex system					53.12	0.000**s
Agree & Strongly Agree	87	58%	115	76.7%		
Disagree & Strongly Disagree	63	42%	33	22%		
Not Applicable	0	0	2	1.3%		
Workload interferes with the ability to practice patient safety					63.3	0.00**s
Agree & Strongly Agree	94	62.7%	103	68.7%		
Disagree & Strongly Disagree	56	37.3%	45	30%		
Not Applicable	0	0	2	1.3%		
Department/unit places blame on individuals when an error is reported					23.4	0.000**s
Agree & Strongly Agree	86	57.3%	48	32%		
Disagree & Strongly Disagree	64	42.7%	102	68%		
Not Applicable	0	0	0	0		
Fear there will be negative consequences associated with reporting medical errors.					53.7	0.00**
Agree & Strongly Agree	84	56%	42	28%		
Disagree & Strongly Disagree	65	43.3%	108	72%		
Not Applicable	1	0.7	0	0		
Feel comfortable reporting medical errors made by co-workers.					141.9	0.000**s
Agree & Strongly Agree	69	46%	143	95.3%		
Disagree & Strongly Disagree	79	52.7%	6	4%		
Not Applicable	2	1.3%	1	0.7%		
The process of reporting errors at hospital is cumbersome					44..1	0.000**s
Agree & Strongly Agree	67	44.7%	56	37.3%		
Disagree & Strongly Disagree	83	55.3%	94	62.7%		
Not Applicable	0	0	0	0		
Lack of a clear guidelines about procedure of report error.					10.7	.005*s
Agree & Strongly Agree	133	88.7%	114	76.0%		
Disagree & Strongly Disagree	17	11.3%	36	24%		
Not Applicable	0	0	0	0		

Table (4): Comparison between barriers of reporting medication errors and demographic data of participants N=300

Items	Barriers of reporting medication error		
	Administrator Factors Mean ±SD	**Fear factors** Mean ±SD	**Reporting process** Mean ±SD
Hospitals			
Taif hospitals	9.30±1.44	7.72±1.80	4.51±0.83
Assiut hospital	8.47±2.34	7.07±1.88	4.58±1.13
T -test **P value**	3.70 0.00**	3.06 0.002**	-.640- 0.00**
Age			
	Administrator Factors Mean ±SD	**Fear factors** Mean ±SD	**Reporting process** Mean ±SD
20<40y	8.85±2.04	7.40±1.85	4.56±0.96
40<60y	9.13±1.57	7.33±2.01	4.44±1.15
t-test **p. value**	0.800 0.02**	0.22 0.4	0.68 0.42
Occupation			
	Administrator Factors Mean ±SD	**Fear factors** Mean ±SD	**Reporting process** Mean ±SD
Staff nurse	8.95±1.9	7.45±1.8	4.55±0.9
Head nurse	8.39±2.0	7.42±1.9	4.35±.9
Super visor	9.12±2.3	6.92±1.7	4.72±0.8
Nursing assistant	8.20±1.2	7.20±1.8	4.50±1.3
ANOVA **p. value**	13.96 0.31	6.91 0.58	1.80 0.61
Years of experience			
	Administrator Factors Mean ±SD	**Fear factors** Mean ±SD	**Reporting process** Mean ±SD
1- 5 years	9.06±1.7	7.76±1.8	4.50±0.8
6-10 years	8.72±1. 9	7.10±1.7	4.50±1.1
11-15 years	8.61±2.4	6.98±2.08	4.56±0.97
16 and more	8.93±2.0	7.23±1.65	4.74±1.27
ANOVA **p. value**	10.1 0.46	34.6 0.01**	2.04 0.55
Departments			
	Administrator Factors Mean ±SD	**Fear factors** Mean ±SD	**Reporting process** Mean ±SD
Medical	8.24±2.32	6.89±2.02	4.20±1.03
Surgical	8.86±1.76	7.17±1.90	4.73±.99
Intensive care	9.28±1.64	7.04±.97	5.09±.94
Coronary care	10.22±1.78	7.33±2.64	4.22±.83
Emergency	9.33±1.62	8.05 ±1.58	4.71±.87
ANOVA **p. value**	85.07 0.000**	80.06 0.000**	24.36 0.000**

Table 5: Mean ± SD score of strategies that improve reporting the medication errors as responded by participants in the study

Strategies	N	Minimum	Maximum	Mean	Std. Deviation
Strategies improve reporting errors					
New technologies, such as electronic medical records or Pyxis, are creating a safer environment for patients in hospital	300	1.00	5.00	2.65	1.569
New technologies available in hospital are fully utilized to help prevent medical errors	300	1.00	5.00	2.04	1.119
Work in an environment where I can openly communicate my opinions about patient care practices.	300	1.00	5.00	2.59	1.400
Senior managers at hospital communicate to nurses that patient safety is a high priority	300	1.00	5.00	1.53	.819
Department/unit acts on reported information related to medical errors (near miss, incident, sentinel event) to improve patient safety	300	1.00	5.00	1.93	1.109
Total	300	5	22	10.7	3.4
Mean ± SD	**10.3±3.3**				

Table (6) : Nursing perceptions about strategies that improve reporting of medication errors in Taif and Assiut Hospitals

Variables	Taif Hospitals		Assiut Hospitals		X^2	P Value
	N= 150	%	N= 150	%		
New technologies, such as electronic medical records or Pyxis, are creating a safer environment for patients in hospital					51.542[a]	0.000** s
Agree & Strongly Agree	101	67.3%	84	56%		
Disagree & Strongly Disagree	23	15.4%	12	8%		
Not Applicable	26	17.3%	54	36%		
New technologies available in hospital are fully utilized to help prevent medical errors					33.5	0.000** s
Agree & Strongly Agree	104	69.3%	119	79.4%		
Disagree & Strongly Disagree	37	24.7%	23	15.3%		
Not Applicable	9	6%	8	5.3%		
Work in an environment where can openly communicate to opinions about patient care practices.					68.12	0.000** s
Agree & Strongly Agree	102	68%	76	50.7%		
Disagree & Strongly Disagree	46	30.7%	19	12.7%		
Not Applicable	2	1.3%	55	36.6%		
Senior managers at hospital communicate to staff that patient safety is a high priority						
Agree & Strongly Agree	144	96%	131	87.3%	16.1	0.00**S
Disagree & Strongly Disagree	6	4%	13	8.7%		
Not Applicable	0	0	6	4%		
Department/unit acts on reported information related to medical errors (near miss, incident, sentinel event) to improve patient safety					28.6	0.00**S
Agree & Strongly Agree	141	94%	110	73.4%		
Disagree & Strongly Disagree	9	6%	20	13.3%		
Not Applicable	0	0	20	13.3%		

Table 7: Association between strategies responded by nurses to improve report the medication errors and their socio demographic characteristics

Items	Strategies improve report	
	Mean	Std. Deviation
Taif hospital	9.97	2.92
Assiut hospital	11.53	3.79
T-test	**0.00**	
P-value	**3.98 NS**	
Age		
	Mean	Std. Deviation
20-39y	10.90	3.50
40-60y	9.63	3.05
ANOVAs test	50.80	
P-value	0.04** S	
Occupation		
	Mean	Std. Deviation
Staff nurse	10.77	3.53
Head nurse	10.17	3.03
Super visor	11.00	3.43
Nursing assistant	11.20	3.55
ANOVAs test	12.89	
P-value	0.78 NS	
	Mean	Std. Deviation
1- 5 years	10.72	3.47
6-10 years	10.66	3.60
11-15 years	10.72	3.66
16 and more	11.02	3.11
ANOVAs test	**3.81**	
P-value	**0.95 NS**	
Department		
	Mean	Std. Deviation
Medical	10.59	3.48
Surgical	10.67	3.62
Intensive care	10.47	3.07
Coronary care	7.33	1.87
Emergency	11.26	3.43
ANOVAs test	**139.54**	
P-value	**0.02** S**	

IV. Discussion

The current study attempting to assess nurses' perceptions of workplace culture for reporting medication errors in Taif and Assiut hospitals, identify and compare the barriers preventing nurses from reporting medication errors and exploring the strategies which might encourage them to report errors in both work places hospitals.

In actuality, there are many researchers described the barriers and strategies of reporting medication errors that occur in hospitals and all of them agreed that it revolves around a combination of factors includes :Administrative factors ,fear factor and process of reporting , for example, **Aboshaiqah (2013)**and **Kouhestani and Baghcheghi (2009)**[29-30] reported in their study that managerial factor was the most important factor causing not reporting on medication errors, and other factors including factors related to the process of reporting and fear of the consequences of reporting had the later priorities for not reporting on medication errors from the viewpoint of nurses. while, **Abussad etal,2015**[31] reported that fear factors was the most important factor causing not reporting on medication errors and other factors including factors related to the process of reporting and administration factors had the next priorities for not reporting on medication errors . Also, **Alduais etal,(2014)**[32] found in his that the participants were vary in responding to the barriers which prevent reporting the medical errors, the highest mean range was for fear of being blamed. On the other hand, the lowest mean was for reporting errors is not a priority. **Hashemi etal. (2012)**[33] , stated that the most common barriers prevent reporting the medical errors include: fear of legal action and job threats, fear of economic losses, fear of honor and dignity, weakness of knowledge and weakness of nursing skills in error management. The present study is supported by the pervious researches on the same factors where results showed that the barriers of reporting medication errors were the highest ranking as regard barriers from administrator factors with total means [8.8± 1.9], followed by fear factors [7.4±1.8] and factors related to reporting process [4.5±0.99],**as shown in table 2**.

Comparison between Taif-KSA hospitals and Assiut- Egypt hospitals regard barriers of reporting medication errors , statistical significant differences were found between places of the hospitals regarding administrative factors , fear factors and reporting process as a barriers of medication error reporting p=0.000, as shown in **table 4.** Regarding administration factors most of nurses in Taif hospitals reporting more barriers than those in Assiut hospitals P≤0.05 ,this is may be due to heavy work load pleaded on nurses ,shortage of nurses and centralize organizational structure. This study supported by [**Betancourtetal.2012 and Chiovitte,2011**][34,35.] Who reported that: Harm to patient often comes from failing system (not an individual) that lacks the human and/or non-human resources necessary to provide patients with the proper level of care. **Al-Sale K. S. etal.2012**[36]who pointed that contributing factors include systems-based problems such as heavy workloads, lack of education, time constraints, distractions, fatigue, and inadequate coordination of resources, all of which form the milieu for compliance. Most policies come from a top-down mandate, which in a complex system such as hospital settings, are sometimes necessary to maintain order. However, the problems that imposed mandates are that the people who must adhere to the policy are also distanced from the origins of the policy[37].Other study, found that nurses who worked 12 hours or more hours in a shift were three times more likely to make errors, a significant increase over those who worked 8.5 h or less. Heavy workload of the personnel will limited the time needed for proper handling of clinical or managerial duties. On the other hand, fatigue caused by heavy workloads will compromise the staff's ability to think correctly and following the appropriate therapeutic procedures. [**Alkorashy H.2013**][38].**Aboul-Fotouh etal.(2012)**[39],reported that the main area of strength regarding patient safety culture in Ain Shams University hospitals was organizational learning which gained the highest average composite positive score of 78.2%. Another study showed that there was an increased willingness of nurses to report error when they perceived that their environments are supportive [40].

Most of nurses in Taif hospitals stated that **fear factors** as a barrier of medication error with more prevalent than those in Assiut hospital P=0.002, as shown in table 4: This result may be related to in Saudi Arabia most of nurses are foreigners and contracted, these errors affect on nurses annual evaluation or may lead to termination of contract when they report medication errors. Also, they don't support from other individuals when recording errors. This study is supported by **Abusaad etal (2015**[31], As regard fear from the consequences of reporting most of nurses strongly agreed that fear from producing side effects in patients and fear from the impact of reporting of errors on the personnel's annual evaluation were the common barriers to medication errors reporting. Also, A similar study by **Tol et al (2011)**[41] identified that fear of legal liability, job threat, economic adverse effects, face saving concerns, and adverse consequences of reporting for the individual are the most important barriers to error reporting. While another study carried out by **Hosseinzadeh, etal (2012)**[42] indicated that the most important reasons for not reporting on medication errors were fear of being blamed, fear of being labeled as incompetent nurses and inadequacy, fear of their future professional career, fear of judicial issues, and adverse reactions of their heads and colleagues. Blaming nurses weakens the motivation to report errors, and hinders us from recognizing the weaknesses in the system and procedures. when error isn't reported, its informational value will be unused, thus limiting our ability to analyze the causes and

consequently our ability to prevent future events. Three major factors must be eliminated before patient safety culture is improved: 1) scolding; 2) fear; and 3) negligence and silence [43]. Study, blaming and focusing on individuals rather than Further studies may be needed in order to explore the looking at systems as the potential cause of errors were underlying reasons why nurses in this setting do not identified where medication administration errors (MAEs) were not likely to be reported considering fear as a factor why MAEs were not reported . [44]

Baghaee etal.,(2012)[45] reported that, errors should not be covered up, but must be learned from and used as the first step towards eliminating their impact and improving patient safety. The managerial capacities of an open communicative atmosphere may be used to promote continuous organizational education.
The present study revealed that majority of nurses in both Taif and Assiut hospitals reported that the process of reporting wasn't a barrier of medication errors with statistical significant difference   P≤0.05. This study in the same line with [**Fukuda etal.2010**][46],who confirmed that ,reporting effort was not collectively perceived as a barrier in reporting medication administration error .Nurses were more likely to submit (MAE) reports when time is short˙ The error reporting procedure in this setting may not be a burden to the nurses.
In association between demographic characteristic of nurses and barrier of medication error reporting that responded by them, the present study observed statistical significant differences were found between nurses age, work departments, years of experience and the responded barriers of medication errors reporting as administrator, fear and reporting process factors p≤0.05, nurses with age ranged from 40-60 years responded that administrator factor as a barrier of medication error reporting more prevalent than other group . p=0.02. **Alduais2014**[32] ,who found that , there is a significance difference between age structures regarding the barriers reporting; (P=.000<.05) in which the age range between 31-40 years has more responses to reporting the barriers than that of the age range 41-50 years, and 50 years and above.

The present study revealed that statistical significant differences were observed between nurses working departments and their responding related to barriers of medication errors reporting with more prevalent among those who are working in coronary, emergency, intensive care units than specific general units p=0.000 , this may be due to the nature of work in special units that characterized by several types of medications preparation which need high number of nurses , heavy work load and environmental factors which causes more stress, burden and high opportunity to the risk of medication errors. This study is disagreed with **Abusaad,2015** [31]and **Dabaghzadeha et al (2013)**[47] who reported that ,there was statistical significant difference between nurses service unit and process of reporting p=0.005 and 0.001 respectively**,** barrier of medication errors administration especially in general unit than specific units. Moreover, there was statistical significant difference between nurse's years of experience   and fear factors as a barrier of reporting medication errors p== 0.01, nurses with years of experience ranged between 1-5 years responded to fear factors more prevalent than those in the other groups. This result is in agreement with results obtained by **Alduais** 2014[32], who declares that there is a significance difference between years of experience regard barriers reporting P=00≤05 in which the 0-10 years and 11-20 years of experience provided more responses to reporting the barriers than that provided by both 21-30 years and 31years and above. **Zahmatkeshan, et al** (2010[48] ,who reported that, no statistically significant relationship between experience and medication errors. As well as the present study indicated that no statistical significant difference was found between nurses occupation and their responding regarding the barriers reporting P ≥..05), because this variable had no effect on reporting area as a barriers to medication administration errors, because nurses do not pay attention to the reporting of medication errors.

Regarding strategies that improve reporting medical errors in the current study highest score was regarding item New technologies, such as electronic medical records, are creating a safer environment for patients in hospital, and low score was regarding Senior managers at hospital communicate to nurses that patient safety is a high priority (2.65±1.5, and 1.5±0.48,respectively),**as shown in table 5.** This study supported by **Health Foundation,(2011)& Dennison, (2007)**[1,49]who reported that several types of information technologies can be used to decrease rates of medication errors, computerized physician order entry with decision support significantly reduces serious inpatient medication error rates in adults. Also, in a survey conducted by **Al-Saleh etal.(2012)**[36] **and Kitch (2005)**[50], to determine characteristics of patient safety culture, it was concluded that teamwork within units; honest and open communication among physicians, administrators and healthcare workers; as well as with patients are considered the principal characteristics of a culture of safety . **Alduais,2014**[32] Initiated that the possible strategies for improving medical errors reporting ranked according to the responses provided by the participants of this study are: 1. There should be a clear guidelines and procedures for reporting errors; 2. Forms and other documentation should be clear; 3. Staff should be trained on reporting medical errors; 4. Staff should always be encouraged to report medical errors; 5. Reporting errors should be mandatory; 6. Staff should always be provided by feedback on what has been reported; 7. Using computerized system; and 8. Reporting errors shouldn't be used against reporters. while **Abusaad 2015**[31],who reported that good relationship with nurse managers and physicians, knowing benefits of reporting and feeling safe about working environment were the most facilitators of reporting medication errors and will

increase the rate of medication errors reporting [51,52] . Additionally, **Frith (2012)**[17] found that increasing the number of registered nurses (RN) hours and decreasing or eliminating licensed practical nurses (LPN) hours can be a strategy to improve reporting medical errors in the hospitals.

Healthcare Information and Management Systems Society, 2011 ,reported new health care technologies including electronic medication administration records, bar coding for automated medication dispensing machines, robots, Computerized Physician/Provider Order; En CPOE and clinical decision support fundamentally change the ordering process resulting in lower costs, reduced medical errors, and more interventions based on evidence and best practices.try (CPOE) and Clinical Decision Support With CPOE, providers produce clearly typed orders, reducing medication errors based on inaccurate transcription. CPOE also gives providers vital clinical decision support (CDS) via access to information tools that support a health care provider in decisions related to diagnosis, therapy, and care planning of individual patients.[53]

The pervious study is in agreement with the current study which found that the possible strategies for improving medical errors reporting ranked according to the responses provided by the participants of the study are: 1. Senior managers at hospital communicate to staff that patient safety is a high priority2. Department/unit acts on reported information related to medical errors (near miss, incident, and sentinel event) to improve patient safety3. Work in an environment where I can openly communicate to opinions about patient care practices.4. New technologies available in hospital are fully utilized to help prevent medical errors5. New technologies, such as electronic medical records or Pyxis, are creating a safer environment for patients in hospital.

According to the association between socio- demographic characteristics and strategies improve reporting of medication errors, the present study observed statistical significant differences between the place of hospitals, nurse's age, working departments and strategies improve reporting of medication errors. P=0.00, 0.02 and 0.04,respectively). Nurses in Assiut hospitals were more supported strategies improve medication errors than those in Taif hospitals p≤0.00. Nurses with age group ranged between 20<40 ys are more encouraging strategies improve medication errors than other groups, this result may be due to this age group is more interest in use of technology in work. Nurses working in the emergency, surgical, medical, and intensive care units were agreed to use strategies improve medication errors a**s shown in table 6 and 7,** these results may be due to new technology improve accuracy and patient safety, reduce time consumer, help nurse to safe effort, cover shortage of nurse as well as allow nurses to spend more time on direct patient care.

V. Conclusion

Medication administration errors result from different factors. The results of this study indicated that the highest perceived barriers to MAE reporting were administrative factors, followed by fear from consequences of reporting, and then factors related to the process of reporting from the nurse's opinion in both Taif and Assiut hospitals. Also the study indicated that new technology ,open communication with health team and feelings safe about working environment were the most strategies of reporting medication errors .It found statistical significant differences between nurses socio-demographic characteristics such as age , years of experience , working departments and their responded barriers and strategies for reporting medication errors.

VI. Recommendations

Based on the findings of this study, the following recommendations were made: Program orientation must be done for new nurses about medication errors' assessment, reporting and the organization must give the staff a feedback on what he/she can report. Designed in-service training program for all nurses about processes of medication errors reporting through lectures, projects, simulation methods, practice and use of a computerized system for the reporting of errors and training the nursing staff to use it; also Further studies should be conducted to investigate best strategies to prevent medication errors.

Acknowledgements

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