KEYWORDS: OPERATING ROOM, MEDICAL ERRORS, NURSE EMOTION.

UNDERSTANDING OR NURSES' REACTIONS TO ERRORS AND USING THIS UNDERSTANDING TO IMPROVE PATIENT SAFETY

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ABSTRACT:

The operating room can be home to many different types of nursing errors due to the invasiveness of OR procedures. The nurses' reactions towards errors can be a key factor in patient safety. This article is based on a study, with the aim of investigating nurses' reactions toward nursing errors and the various contributing and resulting factors, conducted at Kurdistan University of Medical Sciences in Sanandaj, Iran in 2014. The goal of the study was to determine how OR nurses' reacted to nursing errors with the goal of having this information used to improve patient safety.

Research was conducted as a cross-sectional descriptive study. The participants were all nurses employed in the operating rooms of the teaching hospitals of Kurdistan University of Medical Sciences, which was selected by a consensus method (170 persons). The information was gathered through questionnaires that focused on demographic information, error definition, reasons for error occurrence, and emotional reactions toward the errors. 153 questionnaires were completed and analyzed by SPSS software version 16.0.

"Not following sterile technique" (82.4 percent) was the most reported nursing error, "tiredness" (92.8 percent) was the most reported reason for the error occurrence, "being upset at having harmed the patient" (85.6 percent) was the most reported emotional reaction after error occurrence", with "decision making for a better approach to tasks the next time" (97.7 percent) as the most common goal and "paying more attention to details" (98 percent) was the most reported planned strategy for future improved outcomes.

While healthcare facilities are focused on planning for the prevention and elimination of errors it was shown that nurses can also benefit from support after error occurrence. Their reactions, and coping strategies, need guidance and, with both individual and organizational support, can be a factor in improving patient safety.

The goal of the study was to determine how OR nurses' reacted to nursing errors with the goal of having this information used to improve patient safety.

INTRODUCTION:

Every human is fallible and error occurrence appears in all tasks.[1] In some fields, like health care, the results of errors can be incredibly damage or even fatal.[2] An error is defined as a failure in completion of a planned intellectual and physical activity in order to reach the desired outcome and when it is not possible to link the failure to chance.[2,3] Medical errors are defined in two ways: an error is an inadvertent action which takes place because of negligence; or it is an action which does not lead to the desired outcome in medical practice. In other words it is a dereliction of duty or the commission of a mistaken act of planning or administration which actually, or potentially, caused an undesired result.[3,4]

In 2008, the total cost of measurable medical errors was 19.5 billion dollars in the United States.[4] Detailed information is not available for Iran. Errors in the health care system result in both measurable and unmeasurable costs. Measurable costs include healthcare costs, legal costs, and increased mortality rates. Unmeasurable costs, on the other hand, include the pain and long-term suffering experienced by the patient.[4,5]

Many patients are still harmed or do not survive procedures due to medical errors in spite of the significant development in

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technology and health care skills[5] and errors can happen regardless of a health care provider's practical skills.[5,6] Error prevention is not as simple as learning from past experience.[1] In a study of 393 hospital staff nurses at the University of Pennsylvania, 30% of nurses reported at least one error within 28 days.[7] Error rates in Iran are not clearly but it seem to be similar to those in other countries.[5,6] For example Joolaee et al. investigated reports of nurses' medication errors and reported that nurses had committed, on average, 19.5 errors during the three months studied.[9]

In the meantime, one of the important parts of hospital in which different kinds of errors, including medical errors, nursing errors, and medication errors happened is the operating room. The Swedish Ministry of Health and Social Affairs has estimated that every year about 100,000 patients are affected by preventable injuries and half of those took place during invasive surgical procedures.[3] Results of studies from 10 of the 15 Middle Eastern countries showed the medical error rate varied from 7.1 % to 90.5 % for writing of prescriptions and from 9.4 % to 80% for administering prescription medications.[10]

In the study of Khalooei et al. patients' safety conditions in the operating room reported 33.3% as inappropriate.[11] It has been reported in the study of Gorji et al. that between half and two thirds of all medical errors happened in the operating and emergency rooms of hospitals and more than half of them were considered preventable.[12] The operating room environment can, as a result, be a good location for studying the reaction to nursing errors.

Nurses contribute to patient safety through their practices, by recognizing errors, and by working to reduce the complications of errors. Because of this role their reactions toward errors also has an impact.[8] Nurses are often the first line of defense when dealing with clinical errors.[13] It is generally agreed that in order to prevent errors from occurring we requiring recognition, and a plan, before taking an action to prevent future lapses and errors.[14] The lack of studies related to nurses reaction to errors prompted researchers to conduct this study with the aim of investigation of nurses' reactions toward nursing errors, and the resulting actions, in operating room of teaching hospitals of Kurdistan University of Medical Sciences.

METHODS:

This was a cross-sectional descriptive study conducted from February to August of 2014. The studied population comprised employed nurses in the operating rooms of the teaching hospitals of Kurdistan University of Medical Sciences, and 153, of a possible 170, nurses participated in the study.

Data was gathered through "Perioperative Nurse Questionnaire" which was to be completed via self-report. The fivefold questionnaire contains demographic data (gender, age, education, job position, etc.), and then collected information on the nurses' definition of error (15 items), causes of error occurrence (10 items), coping with error occurrence (16 items), and outcomes (15 items). Following creation of the questionnaire it was translated and then provided to 10 individuals who provided feedback on face and content validity and compliance. Comments were compiled and applied to the questionnaire before it was utilized. Its reliability was measured through Cronbach's Alpha, using responses from 20 nurses, and the result was 0.89.

The questionnaires were made available to 170 subjects and 153 questionnaires were completed and returned. After the insertion of research data in SPSS version 16 software, the data have been analyzed through the use of descriptive statistics (Frequency, mean, standard deviation and the study variables (definition of error, type of error, causes of the occurrence of error and reaction toward error) have also been analyzed.

RESULTS:

The study results showed that 66.7 percent of subjects were women and

60.1 percent were married. On average the age of the subjects were 33.32+_10.16. The level of education of 39.2 percent of THE subjects was Associate of Science (A.S.), 53.6 percent Bachelor of nursing (BSN), and 7.2 percent master of nursing (MSN). The average work experience, in their current job, was 6.69 years and the average work experience in the operating room was 8 years.

The findings showed that "Not following sterile technique "(82.4 percent), "incorrect counts of surgical gauze" (81 percent), "incorrect counts of surgical tools" (78.4 percent), and "leaving a foreign body in the patient" (73.9 percent) were chosen as the most common in their experience.

Nurses reported that the main causes of nursing errors in the operating room were "tiredness" (92.8 percent), "incorrect or insufficient information" (89.5 percent), "distraction" (88.9 percent), "impaired concentration" (88.2 percent), and "lack of staff" (88.2 percent). See Table 1.

Information on nurses' reactions to nursing errors in operating room was gathered from three perspectives: emotional reactions after error occurrence; coping with error occurrence; and the result of reactions toward error. The results showed that the most experienced emotional reactions were "being upset at having harmed the patient" (85.6 percent), "feeling guilty" (83.7 percent), "self-anger" (69.3 percent) and "feeling embarrassed" (67.3 percent). See Table 2.

In reporting on how nurses cope with to error occurrence the most reported reaction was "making the decision to do better next time" which was reported by 97.7 of study participants. Other commonly reported coping reactions were "preventing these feelings from affecting other actions" (86.9 percent), " doing the action with greater effort" (86.9 percent), "creating a new plan and following it next time" (85.6 percent), and "apologizing" (79.7 percent). See Table 3.

The most reported outcomes, in reaction to nursing errors, were "Paying more attention to detail" (98 percent), "listening to patients more carefully" (95.4 percent), "following guidelines and procedures more accurately" (94.1 percent), "keeping better patient records" (93.5 percent), and "better monitoring of patients" (92.8 percent). See Table 4.

DISCUSSION:

This study obtained valuable feedback from nurses in relation to perceived causes and responses to error.

In the study of Khalooei et al. the safety conditions of patients have been reported 33.3 percent unqualified.[11] In the study of Gorji et al. it has been mentioned that between 50 to two thirds of medical errors have happened in operating and emergency rooms of hospitals and that more than half of them are preventable.[12] As a result operating rooms

Table 1: Subjects' Definition of Nursing Errors and Perception of the Causes

Disagree		Neutral		Agree		Survey Choices
Percentage	Number	Percentage	Number	Percentage	Number	NURSING ERROR
10.5	16	7.2	11	82.4	126	Not following sterile technique
13.1	20	5.9	9	81	124	Incorrect count of surgical gauze
13.1	20	8.5	13	78.4	120	Incorrect count of surgical tools
14.4	22	11.8	18	73.9	113	Leaving a foreign body in the patient
17.6	27	9.8	15	72.5	111	Inappropriate positioning of patient
13.1	20	14.4	22	72.5	111	Incorrect patient diagnosis
16.3	25	12.4	19	71.20	109	Incorrect selection of surgical site
16.3	25	12.4	19	71.2	109	Inappropriate use of electrosurgical pads
11.8	18	18.3	28	69.9	107	Incorrect use of equipment
13.1	20	17.6	27	69.3	106	Incorrect calculation of medication dosages
13.1	20	20.9	32	66	101	Lack of knowledge regarding a patient allergy
21.6	33	16.3	25	62.1	95	Lack of appropriate equipment
26.1	40	14.4	22	59.5	91	Unknown surgical site
20.9	32	26.1	40	52.9	81	Unknown surgical side
19	29	32	49	49	75	Patient reaction to blood or blood products
						REASON FOR ERROR
2	3	5.26	8	92.8	142	Tiredness
3.9	6	6.5	10	89.5	137	Incorrect or insufficient information
5.2	8	5.9	9	88.9	136	Distraction
5.9	9	5.9	9	88.2	135	Impaired concentration
6.5	10	5.2	8	88.2	135	Lack of staff
5.9	9	6.5	10	87.6	134	Need to do different tasks simultaneously
9.8	15	7.2	11	83	127	Lack of appropriate tools and equipment
5.9	9	12.4	19	81.7	125	Unfamiliar with the procedure
9.2	14	9.8	15	81	124	Not following the standards of procedures
3.3	5	15.7	24	81	124	Lack of job orientation
5.9	9	15.7	24	78.4	120	Wrong decision making
6.5	10	19	29	74.5	114	Error evaluating the situation
8.5	13	17.6	27	73.9	113	Not paying attention to warning signs
3.9	6	22.2	34	73.9	113	Error resulting from a flaw in the system
15	23	12.4	19	72.5	111	Miscommunication among surgical team members
7.8	12	21.6	33	70.6	108	Acting out of duty
15.7	24	19	29	65.4	100	Quick decision making
8.5	13	29.4	45	62.1	95	Trusting others' judgments
19	29	19.6	30	61.4	94	Insufficient supervision by managers
13.1	20	35.9	55	51	78	Not following hospital policies
5.9	9	12.4	19	40.5	62	Responsibility of other team members

NURSES' REACTIONS (cont.)

provide an ideal study environment for obtaining nurses reactions and awareness of these reactions can be used to plan to prevent them in future.

One of the important factors in prevention of error occurrence has been always the identification of its cause.[15] The nurses who participated in this study proposed "fatigue" as the most important cause of nursing errors in the operating room. Many researchers have shown the relation between fatigue and the occurrence of clinical errors.[16,17] Tiredness can have an impact on the emotional and physical state of the individual which can have a negative effect on performance and lead to errors.[18] Awareness by department heads and managers, as well as a prioritizing around this issue, can have an impact on patient safety.

"Incorrect or insufficient information", "distraction", "impaired concentration", "lack of staff" were reported, respectively, as the most common causes of nursing errors in the operating room.

Lack of knowledge among health care providers has been proposed as the most widespread cause of the occurrence of medical errors.[19] Therefore, as nurses regard the lack of sufficient information as the cause of occurrence of some of their errors so managers should have been reassured of the sufficient knowledge and their experiences in the field of operating room before the determination of the work place of nurses in room part. In addition, periodical investigation of the extent of this knowledge and constant instruction can be effective.

Different factors can cause "distraction" and "impaired concentration" so this needs further research and identification in order to be useful. Distractions may be due to personal issues or organizational issues. Each individual has unique issues that can affect his/her

Table 2: Subjects' Emotional Reactions to Errors

Disagree		Neutral		Agree		Survey Choices
Percentage	Number	Percentage	Number	Percentage	Number	
6.5	10	7.8	12	85.6	131	Being upset about having harmed the patient
8.5	13	7.8	12	83.7	128	Feeling guilty
26.1	40	4.6	7	69.3	106	Self-anger
18.3	28	14.4	22	67.3	103	Feeling embarrassed
22.9	35	26.1	40	51	78	Believing they did the right thing
30.7	47	22.2	34	47.1	72	Fear of others' reactions
32.7	50	23.5	36	43.8	67	Feeling angry toward others on the team
34.6	53	26.1	40	39.2	60	Feeling depressed
39.2	60	23.5	36	37.3	57	Feeling inefficient
77.8	119	11.8	8	10.5	16	Nonchalant and dispassionate

In Chard (2010) responsibility toward harm to the patient determined the perception of operating room nurses toward the error.

level of performance.[20] It can be beneficial to watch for and identify distracting factors, either from a personal angle or through a systemic/organizational issue, as distraction and interruption at work can cause impaired concentration and lead to real mistakes.[21]

Nurse responses also reported that lack of staff is a key factor in nursing errors in the operating room. There is research showing that nurses, on a global scale, are carrying a heavier work burden due to staffing issues.[22] This is a global problem but it does, however, need to be addressed on a local level. The challenge lies with nursing managers and department supervisors to find ways to manage this issue in the current healthcare environment.

Nurses can show different reactions toward nursing errors which can depend on different factors and will vary depending on the type of error.[23] In the study of Celopas et al. hypothetical errors were divided in to various classes by nurses and reactions differed toward each class.[24] Becker showed that nurses have some benchmark for making decisions about errors and that some occurrences may or may not be considered errors by different nurses.[25] The findings of the research showed that the most important emotional reactions of nurses after error occurrence in operating room were "being upset at having harmed the patient", "feeling guilty", "self-anger", and "feeling embarrassed". All emotional reactions of nurses can affect their behaviour after the occurrence of the error.

In Chard (2010) responsibility toward harm to the patient determined the perception of operating room nurses toward the error. It has been reported in this study that when the nurses did not talk at all about the error it was mainly because the error did not cause any harm to the patient.[1] Generally after having dealt with an error health care staff from all areas experience a complex range of feelings such as guilt, self-doubting, embarrassment, disappointment, self-blaming, feeling insufficient, and fear. Involvement in a damaging error can cause insomnia, reduction of job satisfaction, and anxiety for other patients should the error occur again in the future.[26] Therefore the feelings after error occurrence can have different effects on the personal and professional lives of healthcare workers. In the study by West et al. it was reported that the emotional effects of error can lead to a reduction in the physician`s quality of life.[27] These feelings can remain for months or years and lead to significant stress.[26]

Nursing managers should, in addition to working to reduce the cause and effects of errors, be aware of the nurses' feelings, and provide psychological

Table 3: Subjects' Responses to Errors

Disagree		Neutral		Agree		Survey Choices
Percentage	Number	Percentage	Number	Percentage	Number	
0.7	1	2	3	97.7	149	Making the decision to do better next time
3.3	5	9.8	15	86.9	133	Doing the action with greater effort in future
4.6	7	8.5	13	86.9	133	Creating a new plan and following it next time
1.3	2	13.1	20	85.6	131	Apologizing
5.9	9	14.4	22	79.7	122	Hoping for the elimination of a situation or for it to not occur again
3.3	5	19.6	30	77.1	118	Accepting sympathy and understanding others' feelings
10.5	16	15	23	74.5	114	Talking with others about one's feelings
13.1	20	15.7	24	71.2	109	Self-criticism and self-blame
25.5	39	10.5	16	64.1	98	Requesting support or advice from a friend
16.3	25	25.5	39	58.2	89	Becoming preoccupied with the possibility of future errors
19.6	30	22.9	35	57.5	88	Tired of keeping feelings to his/her self
30.1	46	31.4	48	38.6	59	Trying to forget the whole incident
43.8	67	17.6	27	38.6	59	Trying to keep others from realizing the magnitude of the error or results
37.3	57	29.4	45	33.3	51	Avoiding challenging situations
77.8	119	11.8	18	10.5	16	Behaving as if nothing happened

It is evident that reducing the possibility of re-occurrence, by providing support and training for those involved in a surgical error, can provide the foundation for improved patient safety.

support. Nursing managers can create a consultant system for supporting the health care providers involved in error. These consultant systems can be official or through the use of other co-workers in a more informal way. Part of this support involves the creation of a culture of acceptance in fields where error occurrence is a risk. All consulting support should include the consultation with those privy to legal issues.[28] In addition the findings have shown that "making the decision to do better the next time" was the most important way of nurses' coping with error occurrence. "Prevention of the effect of feelings on other tasks", "duplicating the effort for doing tasks", and "planning programs and following them" were the other ways of nurses' coping with the occurrence of nursing errors in the operating room.

It is evident that reducing the possibility of re-occurrence, by providing support and training for those involved in a surgical error, can provide the foundation for improved patient safety. The study by Nikhbakht Nasrabadi et al. showed that the nurses were trying to increase success, and prevent error occurrence, by improving on their performance of a procedure, updating their knowledge, and communicating with their colleagues on patient status or risk of error.[29]

The responses of nurses as to how they would react, following a nursing error, were "paying more attention to detail," "listening to patients more carefully," "following the guidelines and procedures more accurately," "keeping better patient records," and "better monitoring of patients." These reactions will quite naturally lead to a prevention of future errors. It is unlikely that error occurrence will ever be eliminated entirely in the health care profession and so healthcare professionals must, therefore, focus on the best possible systems for the reduction of errors.[30] It

Table 4: Results from the Subjects' Reactions to Errors

Disagree		Neutral		Agree		Survey Choices
Percentage	Number	Percentage	Number	Percentage	Number	
1.3	2	0.7	1	98	150	Paying more attention to detail
1.3	2	3.3	5	95.4	146	Listening to patients more carefully
1.3	2	4.6	7	94.1	146	Following guidelines and procedures more accurately
0	0	6.5	10	93.5	143	Keeping better patient records
0.7	1	6.5	10	92.8	142	Better monitoring of patients
1.3	2	7.2	11	91.5	140	Asking colleagues about their actions in the same situation
2	3	7.8	12	90.2	138	More accurate reading of patient charts
10.5	16	17.6	27	71.9	110	Looking for the advice of others
32	49	24.8	38	43.1	66	Working more slowly and carefully
28.1	43	34	52	37.9	58	Being more worried
44.4	68	20.3	31	35.3	54	Avoiding similar patients, procedures, or both
33.3	51	35.3	54	31.4	48	Less trust in others' capabilities
54.9	84	20.9	32	24.2	37	Trying to hide error as much as possible
59.5	91	19.6	30	20.9	32	Less self-confidence at work
64.7	99	14.4	22	20.9	32	Thinking about leaving the job

Patient monitoring is one of the most important ways to detect and prevent potential errors.[31]

seems also that contributing factors include various personal contributors such as heedlessness, low motivation, carelessness, negligence, and inadvertence,[13] and so nursing managers should prioritize increasing nurse motivation and pride in their job. According to studies an increase in motivation can also result in an increase in safety results.[15,28,29]

Patient monitoring is one of the most important ways to detect and prevent potential errors.[31] Re-training courses about the complications of errors are, therefore, recommended in intensive care units.

Among the limitations of the present study were the defined concepts of error and pre-selected causes of occurrence. Nurses may have had other reasons that were not present on the list of choices given to study participants. One of the other limitations of this, and other studies related to errors, is that results can be biased by the participant's own willingness (or lack thereof) to admit to errors and their concern for privacy/anonymity. It is suggested, therefore, that a wider study be conducted, regarding nursing errors and nurses' reactions to errors, using a broader range of research questions and answers. A more in-depth investigation of possible support tools for nurses, with the goal of reducing errors, would also be beneficial.

CONCLUSION:

The findings of the present study have shown that operating room nurses were able to recognize operating room errors and their causes. The information gathered suggests a benefit to additional management support being provided to benefit nurses and improve patient safety. Nurses need support after error occurrence but they also need the ability to find ways to prevent future errors.

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