

## Identification of the Causes of Nursing Errors Based on Lived Experiences of Nurses

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### Abstract

**Introduction:** Identification of the causes of nursing errors based on the nurses' lived experience. Nursing errors have adverse consequences, including risk of health, death and disability, long treatment period, increased treatment costs, and increased disrespect for nursing system and treatment centers.

**Methods:** This research was performed qualitatively through a descriptive phenomenological method. Samples were selected from nurses of hospitals with the highest nursing errors reported. Purposive sampling was carried out in accordance with the benchmark and continued until saturation of information with ten people. Data gathering tool was an individual, in-depth, semi-structured interview; accuracy and robustness of data were confirmed by the standards of Lincoln and Guba (1985). The results were analyzed by Colaizzi method.

**Results:** The causes of nursing errors were classified into 7 clusters and 18 categories. The main clusters extracted included organizational, task, interpersonal, hardware, environment, individual, and diagnostic causes.

**Conclusion:** Nursing errors cannot be simply attributed to agency; the structure and context also contribute to it. There are suggestions for controlling and addressing the causes of error. This study showed that the nurses' experiences are an important source for identifying the causes of error; many factors that may not seem to affect nursing errors have been identified as an influencing factor which can reduce the incidence of nursing errors if understood by administrators and supervisors.

**Keywords:** Nursing errors, Causes, Lived experiences, Nurses.

### Article History:

Received: 30 May 2020

Accepted: 12 August 2020

### Please cite this paper as:

Ansari M, Sharifi S, Peikari HR, Etebarian Khorasgani A. Identification of the Causes of Nursing Errors Based on Lived Experiences of Nurses. J Health Man & Info. 2020; 7(3): 149-156.

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### Introduction

Patient safety is a key component of the quality of care and nursing (1). However, there are numerous errors in the field of medicine, mostly committed by the medical personnel, particularly nursing staff (2). Nursing errors have adverse consequences, including the risk of health and serious injury or disability, prolonging the course of treatment, increasing treatment costs, and discouraging people to trust medical personnel and health centers (3). Creating stress and ethical conflicts in nurses and cases such as severe injury to patients and even death can be irrefutable results of nursing errors (2).

According to recent studies of medical errors, more than 251,000 annual deaths in the US are caused by these errors. Medical errors are the third major cause of mortality. Error rates are much higher in the US than in other developed countries such

as Canada, Australia, New Zealand, Germany, and the UK (4). Phenomenological method is one of the methods used for identifying the errors.

Some recent studies consider high workload, inadequate number of nurses, fatigue, and stress as the causes of the nurses' medical errors (5-9). In the Computerized Physician Order Entry, workload has been considered as an error factor (10, 11).

Other factors mentioned in previous studies as the causes of human error include the nurses' age (12, 13), lack of knowledge (14), lack of proper skills and attitudes of nurses (15), physician and nurse communication failure and drug packaging (14, 16), operating system errors and features of specific technology fields (17, 18), environmental factors (6, 17), and poor management system and organizational guidelines (14, 18).

Through phenomenological methods, Lall mentioned the causes of medical errors as immediate

effects (psychological and physical responses), multiple causes of disturbance (cognitive dimensions), embedded challenges (health care system settings), organizational culture (in-situ / in-person), and reflective dynamism (looking forward) (19).

Since the nature of errors in the field of nursing and health is different from other errors and because of the lack of comprehensive research on the identification of the causes of nursing errors so far, taking action in this regard seemed necessary in order to help the management of errors. Therefore, this research aimed to identify the causes of nursing errors.

## Methods

### Design

In this study, qualitative research was used to identify the causes of nursing errors. Qualitative methods have the advantage that the world is considered from the minds of actors and their interpretation of their actions and behaviors. The factor studied in this research is human experience. Therefore, qualitative research methodology (Phenomenology) whose objective is to understand the main structure of human's experienced phenomena through analysis of oral explanations of participants was applied (20).

### Participants

This research was conducted in 2018. The statistical population of this study included professional and experienced nurses of social security organization hospitals in Isfahan. Elites were selected based on the following indicators: popularity among most colleagues, work experience in important hospitals, and a supervisory position in hospitals, especially hospitals where nursing errors were reported very high or very low. A criterion-based purposive sampling was used to select the sample. The names of the nurses with the above mentioned features

were obtained from the nursing office, after which they received written invitation to participate in the research.

Demographic features of participants are presented in Table 1.

### Data Collection

A semi-structured, in-depth, personal interview was used to collect the data. Before interviewing, the participants were informed about the importance and purpose of the research, and were assured about the confidentiality of the interview, freedom to leave the study at any time, and also observance of ethical principles; the interview was conducted and recorded in a quiet and private environment with open questions. Then, the recorded material was carefully listened and written down. Each participant was interviewed only once and the interview time was 45-75 minutes.

### Data Analysis

The data were analyzed using Colaizzi's method. In the method of phenomenology, analysis is descriptive rather than inferential (21). Accordingly, based on the Colaizzi's method, the concepts inferred from the participants by the interview were put into 51 codes. Then, there was an attempt to put the extracted codes into specific subject categories. To this end, the subsets were first created, after which they were merged to form sub-categories, and then the combination of several sub-categories ultimately led to the main concepts of the research.

The interviews continued until data saturation; in other words, after 10 interviews, no new data was obtained in the subsequent interviews (2 interviews). In this research, Lincoln and Guba assessment method was used, which is equivalent to the validity and reliability in quantitative research. For this purpose and based on this method, four criteria of

**Table 1:** Demographic features of participants

Number of participant	Gender	Age (years)	Education	Job Position	Work Experience (years)
1	Male	44	MSc	Head nurse	22
2	Male	43	BSc	Head nurse	25
3	Male	43	MSc	Nurse	22
4	Female	42	MSc	Nurse	21
5	Female	45	BSc	Nurse	24
6	Male	44	MSc	Nurse	21
7	Male	48	BSc	Head nurse	27
8	Male	43	MSc	Nurse	23
9	Female	47	MSc (PhD student)	Head nurse	26
10	Female	46	MSc	Nurse	25

reliability and validity (credibility), transferability, dependability, and conformability were considered for evaluation.

**Results**

All recorded interviews were first converted to written texts in order to analyze the data. Then, all field notes and extracted texts were re-evaluated. At this stage, the researchers tried to gain a general look at the data through their review. Next, important and relevant phrases were identified using the sentence-by-sentence strategy. The researchers then tried to formulate the extracted expressions in terms of meaningful concepts by integrating similar items and eliminating repetitive cases, and finally categorized them in different clusters according to the concepts. The results of this study showed that the causes can be categorized in terms of organizational, task, interpersonal communication, hardware, environment, individual, and diagnosis. Each of these items includes sub-categories. Table 2 shows the summary of the main categories and sub-categories extracted from the research. Each category is described in detail below .

*1. Organizational Causes*

In general, each organization has a structure that needs to be adequately monitored in order to achieve the scheduled objectives.

*1.1. Generalized Other-Control and Fear of Punishment*

Failure to adequately supervise, failure to report the error to physician, and punishment in

the organization may result in individual error. Accordingly, participant No. 4 suggests:

“When we are performing a sensitive task in ICU, we act according to our individual taste and there’s no supervision at all! Another issue is that when we commit an error, physicians and officials have such a bad behavior that we don’t dare to report.”

*1.2. Disruption of the Personnel Schedule*

The organization may cause individual errors with incorrect plans such as inadequate number of nurses, a wide range of tasks, imposed unrelated and unnecessary work, lack of good guidelines and proper instructions, and lack of instructions on how to work with equipment. In this regard, participant No. 8 suggested:

“The number of nurses is not enough and is indeed out of the established standards, while every nurse works as much as three persons! Sometimes, we perform tasks that are not our duty at all!”

Also, as to, the absence of proper guidelines and instructions, as well as the lack of instructions on how to work with equipment participant NO.6 stated:

“Many of our errors are due to the lack of complete instructions on how to perform tasks or work with equipment. The newly arrived personnel do not know how to work with the equipment or the hospital provides new devices that are different from our previous ones, while there are no written instructions for their use!”

*1.3. Excessive Centralization*

Centralization refers to the structure of

**Table 2:** Main categories and sub-categories extracted from the research

Main categories	Sub-categories
1 Organizational Causes	Generalized Other-Control and Fear of Punishment Disrupting the Personnel Schedule Excessive Centralization
2 Task-based Causes	Involuntary Workload Performance Failure
3 Communication Causes	Reduction of Intra-Organizational Social Capital Nurse – Patient Communication
4 Hardware Causes	Function Application
5 Environmental Causes	Permanent Environmental Causes Temporary Environmental Causes
6 Individual Causes	Psycho-Mental Physiological Causes Lack of Motivation Demographic Causes Causes Associated with Knowledge and Skill
7 Diagnostic/Perceptual Causes	Medication Identity

administrative process of the organizational affairs such as parallel work and paperwork, which leads to the lack of focus on the work and ultimately individual error. According to participant No. 5:

“The point is that several people are told to perform several tasks at the same time, which is really annoying. Sometimes, we need a series of tools, but we have to write letters and do a lot of paperwork! Paperwork is very important for them; as a result, we cannot focus on our core tasks.”

Hospital and nursing managers must prioritize their efforts in order to create a positive climate and modify organizational planning and structure of administrative affairs, so that these factors are eliminated and the incidence of nursing errors is reduced.

## 2. Task-based Causes

This concept includes two subsets of workload and work process.

### 2.1. Involuntary Workload

Involuntary workload means long working hours, long and continuous shifts, and forced overtime work. Accordingly, participant NO.1 states:

“They set our work time so badly that we don’t have any leisure! We have really long work hours, so that sometimes we are sick of it. Actually, we work like a robot. Although I don’t need the extra work, they tell me “you have to!”

### 2.2. Performance Failure

This concept refers to any failure in the process of affairs such as failure to observe job descriptions and interruption of tasks. Accordingly, participant NO.3 states:

“Some co-workers fail to perform their duties and others have to compensate.”

Moreover, participant NO.6 believed that:

“One of the problems we have is that we are, for example, giving medicine to a patient. Suddenly, the doctor comes to the ward and we have to follow him to see what the orders are. When we come back, we sometimes do not remember if we have given the medicine to the patient or not! We have a lot of interruption in the middle of our work.”

Standard planning can be helpful to eliminate the task-related causes.

## 3. Communication Causes

It means interpersonal communication which is, in fact, communication between colleagues as well as between patients and nurses. Accordingly, the nurses

may make errors in communication with other nurses or doctors or because of the incomplete nature of the physician’s instructions or the unreadable nature of the handwriting of doctors or nurses. They may also make mistakes because of the constant requests and referrals of patients (persistent complaints), and failure to properly communicate with the patient.

### 3.1. Reduction of Intra-Organizational Social Capital

Participant NO.2 stated that:

“Our colleagues look at us like a competitor and most of co-workers are used to backbiting. They are not united, so we always worry that our colleague is now telling others something about us.... Sometimes, they don’t finish the tasks properly and don’t tell the one in charge of the next shift what they have done and what should be done. Once my colleague did the injection, but she forgot to record, and I did another injection.... Sometimes, physicians behave so badly that no one dares to speak. Once I had a question about the reactions of a patient to a specific medicine, but I knew the doctor wouldn’t address my problem; therefore, I didn’t raise my question and administered the medicine to the patient again. The patient suddenly experienced low blood pressure and ....”

### 3.2. Nurse – Patient Communication

Participant NO.10 said:

“Some patients speak another language or accent not understandable for nurses, and they cannot establish the proper communication. For example, a patient only spoke Kurdish. The doctor prescribed Cotrimoxazole, while the patient was allergic. He told the others, but no one could understand. The patient thought it was another drug and took it and my God.... Sometimes the patients complain too much and expect us to call on them more!”

To eliminate these problems, there is a need to educate ethical principles and communication skills and promote organizational culture. Moreover, this problem can be significantly reduced or eliminated by monitoring and controlling the process of professional and occupational communication in health centers and hospitals.

## 4. Hardware Causes

This concept includes function and application subsets.

### 4.1. Function

Function means the nature of hardware such as qualitative failure of equipment or access to old equipment. In this regard, participant NO.2 stated:

“Most of the time, the devices are problematic; they are not set or they are too old and low quality. For example, once the blood test device had a problem and indicated the blood sugar of the patient lower than the real level; consequently, the patient lost his eyes.”

#### 4.2. Application

Application means the issues associated with the use of hardware such as technical failure of the equipment or lack of required equipment. In this regard, participant NO.8 stated:

“We don’t have sufficient equipment. For instance, in ICU we did not have enough wave mats and two patients suffered bed sore.”

Providing and updating the equipment and their regular service can be effective in solving hardware causes.

#### 5. Environmental Causes

This concept includes permanent and temporary causes.

##### 5.1. Permanent Environmental Causes

Permanent means conditions and factors which are fixed and continuous such as insufficient ventilation, lack of natural light, lack of a view, and physical structure of the ward. Accordingly, participant NO.3 stated:

“The rooms are not standard at all; the walls have cracks, the doors are old, and the atmosphere is totally dull. Sometimes, there is such a bad smell that we cannot stand it! We are just waiting to finish our shift and come out of such a place sooner!”

Moreover, participant NO.10 mentioned:

“Some rooms don’t have windows and there is a need to turn on the lights from the morning .... Or there is a good deal of green space out, but there are no windows to enjoy the view; it’s almost like a prison!”

##### 5.2. Temporary Environmental Causes

These causes refer to conditions and factors which change over time and are not continuous, such as too much commute in the wards, presence of companions, crowded wards, and too many visitors. In this regard, participant NO.7 stated:

“There is too much commute in our ward, or sometimes patients get together and make the ward crowded.... The visitors are another problem, because they make too much noise and sometimes a lot of people come to visit the patients!!! We cannot concentrate on our work at all.”

The construction and renovation of medical facilities in accordance with modern architecture, decoration and lighting, and observance of international standards will enable the nurses to spend more time in peace and reduce the environmental causes of error significantly.

#### 6. Individual Causes

This concept includes five subsets of psychomental, physiological, motivational, demographic factors, as well as knowledge and skill.

##### 6.1. Psycho-Mental

This concept refers to family problems, stress, mental fatigue, and virtual immigration of mind; virtual immigration means that the body is present, while the mind is absent. Accordingly, participant NO.5 mentioned:

“One of our colleagues both studies and works. He has a lot of problems for his vacations, and when he has exams, he is here physically, but he is not concentrated. His mind is busy with his lessons and work, so he cannot concentrate at all. Another one is totally busy with family problems. She has a sick baby, and she is divorced, too. She is mentally tired because, despite her problems, she has to work overtime.”

##### 6.2. Physiological Causes

This means physical issues such as physical fatigue or physiological illnesses. In this regard, participant NO.7 stated:

“One of our colleagues suffers from migraine and cannot attend the shifts at night, but he has to!”

##### 6.3. Lack of Motivation

Motivation means motivational issues and personal satisfaction which can cover concepts such as lack of motivation, occupational dissatisfaction, and lack of interest in the field of study and the job. As participant NO.7 stated:

“I didn’t like my major and job from the beginning. Unfortunately, I was forced to enter this profession. There is no welfare or motivational facilities! When I get up in the morning, I don’t have real motivation to attend my work place.”

##### 6.4. Demographic Causes

This factor refers to issues associated with age and gender. According to participant NO.9:

“I feel I have become older since I forget a lot of things. When I compare myself with some years ago, I find that my memory has weakened! Another issue is that female nurses are more precise and patient

compared to their male colleagues. When some patients complain too much, I ask one of my female colleagues to deal with them.”

### 6.5. Causes Associated with Knowledge and Skill

This concept is related to individual experience, knowledge, and skills such as lack of professional experience, lack of enough knowledge, or lack of sufficient skills. In this regard, participant NO.2 stated:

“My colleague was in charge of changing the rhythm of the device at the time of recovery, but he didn’t do it because of lack of experience and .... another one didn’t have the required skill for intubation and sent the tube into the patient’s stomach and ....”

Awareness of the value of human resources leads to the maximum output. Therefore, with the attention and valuation of human resources, recognition of their needs and addressing them, one can avoid the errors caused by individual causes.

## 7. Perceptual Causes

This concept includes medication and identity subsets.

### 7.1. Medication

It refers to the individual perception or recognition of the medication. Accordingly, individuals may commit errors because of similarities in the names or shapes of the medications.

Participant NO.5 mentioned:

“Some medications such as BuPROPion and BusPIRone have similar names and sometimes our colleagues administer them mistakenly. Once, one of my co-workers made a mistake because of the similarity in the shape of the serums. When I took over the shift, I found out what had happened!”

### 7.2. Identity

It refers to the individual perception or recognition of the patient’s identity. Accordingly, nurses may suffer errors because of similarities in the names of patients or their information.

As participant NO.3 stated:

“We had two patients with similar first and last names. My colleague didn’t ask their fathers’ names and gave the wrong medication! Once, they didn’t ask complete personal information and sent the blood samples of two patients with similar names. Consequently, the test results were sent mistakenly.”

Hospital administrative and health care managers can hold regular training courses (pharmacological

similarities, etc.), as well as courses on increasing concentration and mind control to prevent and eliminate diagnostic/perceptual causes.

## Discussion

This study identified the causes of nursing errors and categorized them in 7 categories including organizational, task, communication, hardware, environmental, individual, and diagnostic/perceptual dimensions.

Several studies have been performed on the causes of error (6-9, 13-15, 17, 18, 22-24). According to the experiences of nurses that indicate organizational factors as the causes of error, Abdullah et al. (2017) and Svitlica et al. (2017) indicated that insufficient number of nurses could be effective factors in the incidence of error. Some studies have associated the nurses’ experiences of medical errors with difficulties in nursing education process to report medical errors, and adjusting workload of the nurses in the emergency ward (24) and fear of error reporting (16). Lin and Lee (2016) also considered lack of medical management guidelines, accident reports, lack of medical check-ups by medical management as the causes of medication errors.

Another factor that, according to the experience of nurses, has been mentioned as the cause of error is the task factor. Abdullah et al., (2017), Alomari et al. (2018) and Johnson et al. (2017) mentioned work overload as important causes of error. Moreover, Fathi et al. (2017) mentioned too much workload and the type of the shift. Lin and Lee (2016) indicated the failure to comply with the operating standards of medical management and Björkstén et al. (2016) mentioned lack of compliance with laws as the fundamental causes of error.

Communication factor has been mentioned as other causes of error, according to the nurses’ experience. Some studies have associated the nurses’ experiences of medical errors with nurse – physician communications, pharmacy processes (16), communication with the physician (vague orders) (9), communication failure (incorrect prescription by the physician (32.8%) (25), and incorrect medical orders (18).

According to the nurses’ experiences, hardware factor is the causes of error. Accordingly, Debono et al. (2017) described the environmental resources and background (accessibility and computer features on the wheel), and technology features of specific fields as the causes of error. Moreover, Lin and Lee (2016) indicated operational system errors (time to switch the page, low network speed, computer crashes and so on) as important causes of error.

Another factor that, according to the experience of nurses, has been mentioned as the causes of error is the environmental factor. Chiang et al. (2017) believed that environmental factors were among the main causes of medical error. Alomari et al. (2018) also considered physical environment, lack of space, and frequent interruptions for processing as the causes of medication errors.

Individual factors have been mentioned as other causes of error according to the nurses' experience. Some studies have associated the nurses' experiences of medical errors with fatigue and burnout (23); lack of proper skills and attitude (15); job satisfaction (6); issues of translation (16); fatigue, stress, and poor physical health of nurses (9, 25); negligence, forgetfulness or lack of attention and lack of knowledge (14); work experience and the time of drug administration (night or day) (13); and lack of medical information (24).

The nurses' experience also indicate diagnostic/perceptual factor as the causes of error. Accordingly, Hammoudi et al. (2017) and Svitlica et al. (2017) described the drug packaging as the causes of error.

### Limitations

The present study was an attempt to obtain information about nursing errors from the nurses' experience without nursing evaluation. However, it is possible to comment on the management issues and even external factors. In this research, orientation has been avoided. In addition, it is necessary to consider the generalization limit due to the qualitative analysis in this study. This study was conducted in public hospitals and should, therefore, be considered as a precautionary measure for generalization to other hospitals. Personality factors were not considered in this study either, and more attention has been paid to organizational and environmental factors. Obviously, looking at the personality factors of nurses requires more detailed and in-depth studies. It is also suggested that researchers should attempt to categorize the factors affecting the nursing errors based on one of the well-known models of the causes of error in their future research.

### Conclusion

This research has incorporated the day to day experiences of nurses in their daily work and identified the factors that had not been addressed in previous studies which could increase the level of nursing knowledge to deal with errors. The individual dimension was considered as one of the important factors in this division, which comprehensively took

into account the dimensions of the individuals in the occurrence of an error. Another important factor was the diagnostic factor, which was mentioned as one of the common causes of nursing errors due to problems in proper recognition of medication or identity of patients.

The present study, with the identification of the causes of nursing errors, can help the nursing managers, hospital administrative, Ministry of Health, and managers of insurance organizations to predict the probability of nursing errors and deal with them by considering the environmental conditions as well as technological and human issues in each hospital. Also, it is possible to provide necessary solutions and required training in order to reduce and deal with the errors according to the relevant classification for each of the categories.

### Ethical Considerations

The study was approved by Islamic Azad University-Isfahan(Khorasgan) Branch with Approval ID:IR.IAU.KHUISF.REC.1397.222 on 2019-01-16.

### Acknowledgement

The authors would like to thank the head of the Social Security Organization of Isfahan Province, the management of the social security hospitals in Isfahan, and all the nurses who cooperated in this research.

**Conflict of Interest:** None declared.

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