Barriers to Rapid Triage in Trauma Centers: A Qualitative Content Analysis

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Abstract

Background

Although specialized trauma care in the triage unit can significantly increase the chances of survival of the injured, the obstacles to rapid triage are still a dilemma. Identifying these barriers is quite essential for effective clinical decision-making and improving positive outcomes.

Objective

This study aimed to report the experiences of the physicians and nurses regarding the obstacles to rapid triage.

Method

A qualitative study was performed on twenty physicians and nurses working in the triage unit of Poursina Hospital in northern Iran in 2021 using semi-structured interviews. The experiences were analyzed by the content analysis method. Credibility, reliability, and validity were used for data accuracy and trustworthiness. Sampling continued until data saturation.

Results

A total of 5 categories and 28 subcategories were obtained including the challenges related to employees, physical resource limitations, disruptions in the processes of triage, controlling and monitoring challenges, and specific characteristics of the referred patients.

Conclusion

Hospital authorities need to eliminate the barriers to rapid triage of patients which are related to education, experience, training, and retraining of triage staff. Physical resources in these units should increase and the triage processes need to improve by proper leveling of the patients and creating a triage view. The lack of coordination between the pre-hospital emergency team and the triage unit should be improved. Finally, the triage staff can strengthen the therapeutic interaction with agitated patients and caregivers.

Introduction

Trauma is one of the leading causes of death worldwide (1, 2). It causes a wide range of injuries including those caused by traffic accidents, unintentional injuries such as falls, and intentional injuries
such as harm to self and others. The rate of each type of trauma and its associated mortality varies from country to country (3). According to the 2015 Global Burden of Disease Study, trauma is the cause of 8.5% of deaths and affects 4.7 million people (4). Providing specialized trauma care to severely injured patients significantly increases their chances of survival (1, 2). "Golden hour" is a well-known concept among the providers of trauma system services. It suggests that if traumatic patients do not receive definitive care within the first hour after injury, they will have higher morbidity and mortality (5).

Triage is used in emergency centers to determine the degree of urgency of an illness or injury for proper decision-making about patients' treatment, especially when there are many patients or casualties, and medical resources are scarce (6). During triage, shorter waiting times for emergency patients, managing less urgent cases, and increasing patient satisfaction is prioritized (6, 7).

In triage, both underestimation (under-triage) and overestimation (over-triage) lead to suboptimal treatment (1). In a cohort study of traumatic patients who died within 30 days following trauma, 14% of severely injured patients (ISS ≥ 16) were under-triaged (i.e. mistakenly transferred to a low-level trauma center) (2). According to reports in South Africa, despite using a triage scale, almost a quarter (24.4%) of cases were under-triaged (6).

To perform the triage process, the presence of both a triage nurse and a physician in the system is essential and can reduce hospital overcrowding as well as patient waiting time (6, 8). In a study where the triage was managed without the supervision of a specialist, the mortality rate was significantly higher (97%) thirty days after trauma (2). However, there is also evidence that trained emergency nurses are well able to manage the triage process (6). In one study, excellent reliability was obtained between the triage of nurses and physicians (8).

In Iran, triage is usually performed by nurses under the supervision of emergency medicine specialists with a five-level classification system. However, according to a report, the knowledge of triage nurses is often poor (9) while they need to have critical decision-making and thinking (10). Changing the methods of training to triage staff is recommended as providing direct observation and real-time feedback will be more effective (11).

In the United States, emergency nurses mentioned inadequate staff, language barriers, and burnout as the most important barriers to fast triage (12). Triaging can be very challenging for the staff due to insufficient medical resources, limited patient space, overcrowding, and "triage fatigue" (13). Triage nurses experience more stress than other emergency staff because they have to triage large numbers of patients accurately and quickly with limited space and resources (13, 14). The resulting burnout leads to incorrect triage and endangers the patient's health (14, 15). Therefore, a careful examination of the triage processes and identification of obstacles is essential for finding workable solutions (16). Although trauma is prevalent and the rapid triage of traumatic patients is highly important, a few studies have investigated the barriers to performing a rapid triage in a trauma centers. It is necessary to determine these barriers due to the importance of the issue for proper clinical decision-making. This can accelerate
the triage process and improve positive outcomes. Therefore, the present study was conducted to elucidate the experiences of physicians and nurses regarding the obstacles to rapid triage.

**Method**

**Research Design**

This qualitative conventional content analysis was conducted using the Graneheim and Lundman approach (2004)(17). The study report was based on the Qualitative Study Checklist (COREQ) (18).

**Setting**

This study was conducted from May to October 2021 at Poursina Teaching Hospital in Rasht, Guilan which is a referral hospital for the triage of all injured patients with severe trauma in this province.

**Participants**

Participants were purposefully selected and met the following inclusion criteria: physicians and nurses who performed or supervised the triage of trauma victims for at least one year or had the role of coach at the center. The participants had the following roles; triage nurse, triage supervisor, head nurse, triage nursing coach, triage emergency medicine specialist, and physician working in the triage unit.

**Sampling**

Sampling continued until information saturation, i.e. the point when no new categories and subcategories were discovered. The researchers attempted to include participants with diverse characteristics in the study in terms of sex, occupation, work experience, field, and level of education to maximize the diversity and richness of theoretical information by considering different experiences.

**Data collection**

Data were obtained from semi-structured interviews using open-ended questions. The questions were prepared by the research team in a group meeting and then a field test was conducted in the first four interviews to validate the study tool. Field testing for instrument content validation is a method that determines whether the instrument is suitable for measuring what it is intended to measure or not (19). In this guideline, the research question was slightly changed several times. The objectives and necessity of conducting this research were explained to the participants and they were assured that their names would not be written in the interviews. In case of willingness to participate, written consent was obtained. The research question was, “What obstacles do you experience in triage?”, “What do you think slows down the speed of triage?”, “How do these obstacles affect your performance?”, and “Is there anything else you would like me to know?”. To understand the deep experience further, exploratory questions such as “Can
you explain more why?" were asked. The research data were recorded with a mobile recorder and verbal permission was obtained from the participants beforehand. The interviews lasted from 45 to 60 minutes.

**Data analysis**

Analysis was performed simultaneously with data collection according to Graneheim and Lundman's (2004) approach using an inductive method with three main steps: preparation, organization, and reports (17, 20).

**Preparation:**

In order to achieve the goal of close exposure to the data, to discover the participants' experiences, and to feel what they had experienced, the sounds were listened to several times immediately after each interview and then written down word by word. The resulting text was re-read several times, and the ambiguities were corrected by double-checking the sounds.

**Organization:**

Coding of the specific features of the data was done systematically in the entire dataset. Then, we found and sorted the data related to each code in the dataset.

**Reports:**

Categories and subcategories were revised several times to prepare the final report.

**Trustworthiness**

In the present study, the Lincoln and Guba criteria including confirmability, credibility, dependability, and transferability were used for data trustworthiness (21).

Member reviews are usually used to strengthen the credibility or validity of a study (22). The member review process allows participants to provide feedback on what they have expressed as well as research analysis (23). Non-verbal cues for example facial expression and eye contact were used to supplement the verbal reports (24).

In this study, to ensure credibility, member check, peer check, and long-term contact with the data were used. Three EMS specialists and three triage nurses were asked to give their opinions about the codes (member check). All members of the research team participated in the process of coding and revisions (peer check).

**Dependability And Confirmability:**
There are various ways to achieve the dependability of data analysis. Independent coding-rewriting, peer review, dialogue between co-researchers, roundtable discussion, and face validity (17), were used for the dependability of the data, description of the method, the presentation of textual and audio data, and coding of concepts and themes. In addition, three members of the research team separately reviewed and coded the findings and then discussed them in a group meeting to increase dependability after resolving the resulting disagreements.

Confirmability was demonstrated by taking all necessary measures to avoid introducing selection bias in the findings and results of the study (25). To ensure confirmability, the coded data were given to the participants to confirm the accuracy of the extracted categories and subcategories.

Transferability in qualitative methods means that the results can be usefully applied to different or wider contexts (26). The researchers increased the transferability of the results by describing precise details about the characteristics of the participants, how to conduct interviews and the methods of data collection and analysis along with providing statements in the participants’ language. The participants were selected according to the research objectives and without bias. As soon as the data collection was completed, they were provided to the researchers to inform them of the progress of the research.

**Results**

A total of twenty people were interviewed, with the majority of participants being 13 women (65%). Most of them were emergency medicine specialists (8 specialists and 2 residents), two general practitioners and seven nurses (5 bachelor’s and 2 masters) and one was a nursing instructor (master) (Table 1).
Table 1
Demographic characters participants (n = 20).

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EM: Emergency Medicine GP: General Physician

The experiences of nurses and physicians are presented as obstacles to a rapid triage in 5 categories and 28 subcategories as follows:

1. **Challenges related to triage staff**

1-1- **Insufficient knowledge**

Participant 6

“Lack of training to triage staff makes them obtain the detailed history of the patients and keep them waiting instead of following the accurate fast triage protocol”.

1-2- **Insufficient experience**

Participant 1
“Lack of experienced staff is important, for example, a patient with low blood pressure and pulse rate was simply considered to be in good general condition and misdiagnosed only because s/he could sit, communicate and talk”.

1-3- Insufficient retraining

Participant 8: Lack of retraining for the nursing staff and unpreparedness of nurses and other staff: it is important to choose an educational strategy to prepare the physicians and nurses for a fast triage. For example, in ATLS programs, the learner is immersed in real practice, though the program has never been held like this in Poursina Hospital.

1-4- Insufficient expertise

Participant 14: “There are no specialists present in the fast track section to consult with them in cases where we have doubts about determining the level of triage so that a more accurate triage can be performed”.

1-5- Insufficient number of the triage staff

Participant 5: “Lack of staff, for example, when two cars with many passengers collide or a bus overturns, a large number of patients enter triage at the same time when there is not enough staff to triage all patients. This can delay visiting of patients by physicians”.

1-6- Insufficient number of supporting staff

Participant 19: "... and there is no proper information center at the entrance of the hospital to help clients with irrelevant questions and guide them properly in order not to take the time of the triage nurse."

7-1- Endangering the health

Participant 17: “The triage of patients with levels three to five should not be fast at all. The patient can wait. We should also be careful about the exhaustion of the staff and their health, which is in danger. Why triage level 5 patients in 10 minutes”?

2- Limitations of physical resources

2-1- Improper location of triage

Participant 12: “The triage is located in a blind spot which is not visible to the police and where they sit. Given that many referrals to Poursina Hospital are cases of assault and violence, usually hospital police officers arrive after the fights, when the triage staff is attacked and there are screams and cries. All this slows down the triage process”.

2-2- Small and unsuitable triage space
Participant 12: “Another problem is the small physical space of the triage room because Poursina Hospital is a crowded hospital and sometimes several ambulances bring patients at the same time. As a result, patients should wait”.

2-3- Lack Of Space For Outpatients

Participant 19: “There is no suitable space for keeping patients until they are transferred to the ward, a space where the triage nurse can supervise to consult an emergency physician residing in the fast track center if any problem exists”.

2-4- Lack Of Medical Facilities And Equipment

Participant 18: “It has happened that some cases of head injuries, for example, a patient with a high level of triage due to hitting his/her head on the cupboard, seem fine. We discharge the patient, although there is still a small likelihood of bleeding even in cases that seem fine. Brain. Triage should also provide services to these patients”.

2-5- Lack Of General Equipment

Participant 20: “The number of printers should match the number of triage staff. The lack of chairs, office cabinets, and other non-medical equipment should be considered because these can bring more comfort and less concern to nurses”.

2-6- Defective equipment

Participant 19: “Sometimes the equipment such as sphygmomanometers, pulse oximeters, and monitoring devices for quick evaluation of patient’s vital signs are defective. The safety of the equipment plays a very important role in the accurate triage of patients”.

3- Disruption of triage processes

3-1- Issues related to patient triage-leveling

Participant 7: “Leveling problems are both due to insufficient training of the staff and the priority of legal issues. For example, a patient in a postictal phase is admitted. We know it is not an emergency case at the moment but due to low GCS (Glasgow Coma Scale), the patient should be transferred to the CPR room which fills its capacity”.

3-2- Issues of patients with lower triage level

Participant 18: “An important point is that it is not possible to provide services for outpatients with triage levels 3 and 4. For instance, a patient who needed a Ketorolac injection was referred to another center”.

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3–3. Registration Time

3–3. Registration time

Participant 6: “The low quality of software used for the registration of patients, the time-consuming process of electronic registration, and non-user-friendly software prolong the triage process”.

3-3- Electronic system malfunction

Participant 5: “Sometimes patients have trouble getting the medical record number due to system disconnection so a patient visited by the doctor who is referred for laboratory tests and radiography cannot proceed with his/her paraclinical process due to lack of a number”.

3-4- Addressing irrelevant issues in triage

Participant 8: “Another point is that the triage staff, due to the expectations of the headquarters and the nursing affairs office, have to consider other irrelevant issues instead of focusing on their duties so their motivation and sense of responsibility are reduced and fast triage will not be a priority for them”.

3-5- Feeling insecure in triage

Participant 15: “The security guards do not monitor the units properly at all and have not received proper training. We indeed do not feel safe in the triage unit which is the frontline of the hospital and even things may be stolen or they may be harmed physically so we do not have financial security as we would be responsible for such damages. One or two anti-social people are enough to disrupt the situation and the triage process of patients. Unfortunately, the guards just arrive after the medical staff are insulted or sometimes even after the physical fight. When they are present, they do not have the right attitude to manage tense situations”.

3-6- Not having a triage view

Participant 17: “We should define the triage process for the nurse who plays a critical role in this process and explain the view of triage to him/her in order to avoid either over-triage or under-triage as it complicates the treatment. It will be very difficult if all patients are triaged as the second level”.

3.8. Lack Of Therapeutic Interaction

Participant 4: "Triage is an important place to make decisions about the patient’s health and effective therapeutic interaction with patients is very important and should be strengthened."

4- Controlling and monitoring challenges

4-1- Lack of coordination between the pre-hospital emergency team and triage unit
Participant 17: “Monitoring is incomplete, there is no coordination between the pre-hospital emergency room and the triage center which is going to admit the patient. Therefore, the triage nurse is unaware of the critical condition of the patient to prepare the CPR room and other prerequisites”.

4-2- Lack of supervision over referrals

Participant 1: “Excessive and unnecessary referrals of patients in addition to insufficient staff prolong the triage process”.

Participant 16: “Poor public information on cases which need emergency visits and the improper choice of hospital wastes triage time and prolongs the process”.

4-3- Lack of supervision over dispatch from near cities

Participant 16: “High patient flow due to the lack of hospitals or equipment in near cities causes overcrowding in the triage room”.

4-4- Lack of algorithm

Participant 16: “There is no algorithm for triage nurses to help them facilitate the triage process and increase coordination”.

4-5- Lack of supervision of the equipment

Participant 12: “When we take the patient to the CPR room, due to the lack of a security guard, in many cases, the equipment needed for triage, such as pulse oximetry and thermometer, are stolen”.

5- Specific characteristics of triage patients

5-1- Being aggressive and agitated

Participant 12: “Aggression of the patient and his/her companions prevents the accurate examination of the patients and slows down the triage”.

5-2- Lack of information

Participant 11: “Lack of awareness of the patient's companions during the initial visit, not providing the accurate history of the patient, and sometimes even changing statements show that most of them do not understand the importance of giving the accurate history of the patient, which delays the triage process”.

Discussion

One of the most important barriers to rapid triage in the experiences of nurses and physicians in the first category was the challenges of triage staff. Insufficient training, experience, expertise, and retraining of triage personnel were important subcategories. In a similar Iranian study, the professional training of triage nurses was unsatisfactory and they did not have enough information about patient prioritization.
and diagnosis (27). In another study, there was a significant relationship between participation in training courses and triage skills of pre-hospital emergency personnel (28).

Insufficient experience of triage staff was also raised. Roudbari and Mirhaghi found that triage decisions were more reliable for people with more than 2 years of triaging experience (29). In a study conducted by Varndell et al. (2019), nurses must have at least 2 years of emergency nursing experience with competency in all clinical fields in ED before being selected for triage task (30).

Other studies have confirmed this finding (31, 32). In contrast, several studies have shown no significant relationship between experience and decision-making skills in triage (33, 34).

Insufficient staff was also one of the most important limitations of the categories. The nursing shortage has been confirmed which increases the workload and fatigue causing patient dissatisfaction and reduced quality of services (35).

The second important category was the limitations of physical resources. Similarly, in a study in Iran, the first and most important determining factor in triage was the supply of equipment such as wheelchairs, stretchers, telephones, glucometers, stethoscopes, sphygmomanometer, thermometers, and pulse oximeters (36). In addition, in another study, more than 50% of the subjects mentioned the importance of the number of wheelchairs and stretchers in hospital emergencies (32). Aloyce et al. also accentuated the importance of equipment for measuring blood sugar, arterial blood oxygen saturation, blood pressure, and pulse in the triage of patients (37).

In other studies, the availability of communication tools such as telephone and other facilities needed for patient transfer has been reported to be effective in improving service quality and patient satisfaction (38, 39). Therefore, it seems that the availability of equipment and facilities is one of the most important factors influencing the decision-making process in the triage unit and prioritization of care so that nurses in emergency centers can comprehensively evaluate patients.

Disruption of triage processes is included in the third category, one of the most important subcategories was patient leveling issues, with many being admitted to the second level. It has previously been reported that in Tanzanian hospitals, most triage nurses, over-triage, or under-triage the patients due to insufficient knowledge (37). In an Iranian study, despite a triage accuracy of 80%, under-triage was a problem for patients with acute myocardial infarction (40). In addition to the acute condition of the patient, several other factors are effective in the leveling of the patient including the various relationships between different staff, patients, and even department managers (41). A qualitative research examined the timing of registration where triage nurses considered several questions relevant but not urgent in triaging patients, and some questions completely irrelevant. These nurses believed that other triage activities could be delayed and that the triage process should be simplified as much as possible (10). Compatible with the experiences of our participants, a recent study in Denmark suggested that a prompt clinical evaluation is a more accurate predictor of mortality of patients in the emergency than a more formal
triage evaluation (42). In an Iranian study conducted in Yazd, triage was more theatrical, ambiguous, and experimental, and escaping responsibility was an issue that arose from all categories (43).

The fourth cause of disruption to rapid triage was the challenge of control and supervision. In a similar study, the second category of triage challenges was related to emergency management, which included challenges related to human resources, and structural and functional management. Emergency managers can improve the effectiveness and quality of patients' triage by resolving structural problems in triage units (44).

After all, the last category that resulted in rapid triage was the specific features of triage clients. In the Iranian study, similarly, patients and their companions, led to a wrong decision about the level of triage by the nurse because they argued and insisted that their patient was an emergency case needing admission (45). The triage unit in the emergency department of a hospital is a very stressful environment and triage nurses, in addition to enduring the daily physical and psychological pressures, are exposed to other challenges such as an unpredictable number of patients, and fast and critical changes in patients' conditions.

Therefore, the psychological empowerment of triage employees against job stress has an important role in improving their quality of professional life and consequently the quality of care provided by them (44, 46). Therefore, according to the special characteristics of patients and companions of traumatic patients, which greatly affect triage, nurses with enough training and experience and high psychological capabilities should be selected for effective, prompt triage.

Conclusion

For a quick triage in the trauma centers, the authorities need to solve the problem of professionalism by selecting a sufficient number of specialized, experienced, and trained staff. Triage staff should receive periodic retraining. The deficiencies and monitoring problems should be resolved and necessary actions should be taken for improving the triage process, and the satisfaction of the injured and their companions.

Declarations

Ethical Approval

The study was performed by the Declaration of Helsinki and approved by the Institutional Review Board of Deputy of research and Health Technology, Guilan University of Medical Sciences with the number (IR.GUMS.REC.1400.269 ).

Consent to participate

Informed written consent was obtained from the participants.
Consent for publication
Not applicable

Competing interests
No conflict of interest has been declared by the authors.

Author's contribution
“N.K. and B.Z. Wrote the main manuscript and N.K. and B.M. did analyzed and B.M and F.H. collected data and L.K. prepared tables. All authors reviewed the manuscript.”

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