

A Qualitative Study of the Triage of Patients with Non-Traumatic Acute Abdomen

Zhongqing Yang[†], Juqing Ke^{*}, Huandi Zhao

Nanjing Drum Tower Hospital, Nanjing 210000, Jiangsu Province, China

[†]*First author:* Zhongqing Yang, meng1216@163.com

^{*}*Corresponding author:* Juqing Ke, 718003423@qq.com

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Abstract: *Objective:* To explore the work experience of medical staff in the emergency department of a general hospital in the triage of patients with non-traumatic acute abdomen to formulate corresponding intervention measures and branch evaluation tools. *Methods:* With descriptive phenomenology as the research method, semi-structured interviews were conducted with the medical staff in a tertiary hospital in Nanjing from February 1st to 10th, 2023, and Colaizzi seven-step analysis was used to analyze the data. *Results:* A total of 17 emergency medical staff were interviewed in this study. Four themes were derived from the analysis of the data: the etiology of acute abdomen is complex, so it is difficult to categorize them: acute abdomen requires immediate treatment, but the treat will be delayed if the categorization is inaccurate; the high pressure of nurses and the accuracy in categorizing the patients are problems that should be addressed. *Conclusion:* The categorization of patients with non-traumatic acute abdomen is challenging. Therefore, it is necessary to carry out corresponding intervention and formulate appropriate departmental evaluation tools to improve the accuracy of categorization of patients with acute abdomen.

Keywords: Emergency department; Non-traumatic acute abdomen; Abdominal pain; Triage; Medical staff; Qualitative research

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1. Introduction

Non-traumatic acute abdomen ^[1] (NTAA) refers to acute abdominal pain caused by the intra-abdominal area, abdominal wall, chest, or systemic diseases. The onset time for NTAA is less than 1 week, and emergency intervention such as surgery may be required. NTAA is a common disease in the emergency department, accounting for about 5%–10% of cases ^[2-4]. Acute abdomen is a critical illness with acute abdominal pain as the main clinical manifestation, and it is a complicated condition that progresses rapidly. Therefore, timely and accurate triage and correct treatment are very important. If the treatment is not timely, the patient's condition will deteriorate, which may lead to a life-threatening situation ^[5]. Because acute abdomen is a clinical syndrome with abdominal pain as the main symptom accompanied by other systemic reactions, it involves various specialties such as internal medicine, general surgery, and gynecology, and various organs of the body, and many patients do not have specific clinical symptoms ^[6]. The evolution of the disease is often complicated, and patients need to go through pre-examination and triage to be transferred to the corresponding departments from the emergency department. This is undoubtedly a challenge for the triage and evaluation of emergency care, and it requires highly capable nurses. There have

been many studies on the accuracy of triage of patients with acute abdomen [7-9], but they are still constantly seeking and exploring better evaluation methods to improve the accuracy of pre-examination and triage. In 2018, China issued the “Expert Consensus on Emergency Pre-examination and Triage” [10], which defined the standards for emergency pre-examination and triage. However, in China, pre-examination and triage are usually performed by nurses. There is no specific standard operating procedure for the pre-examination and triage of patients with acute abdomen, and most of the nurses are inexperienced. When the patient’s main complaint is unclear or the patient cannot articulate during the consultation process due to pain, it leads to inaccuracy in triage and delayed treatment, thereby affecting the patient’s outcome and causing medical disputes. In recent years, scholars have mainly focused on improving the accuracy of triage of patients with acute abdomen [11-13], and there is little information about the psychological experience of emergency medical staff on the triage of patients with acute abdomen. Therefore, a phenomenological research method was used in this study to understand the work experience of medical staff in the emergency department of a general hospital on the categorization of NTAA patients, so as to provide reference for the classification and triage process of acute abdomen and formulating corresponding intervention measures and evaluation tools.

2. Objects and methods

2.1. Interviewee

Interviews were conducted with medical staff from the emergency department of a tertiary hospital in Nanjing from February 1st to February 10th, and the interviewees were selected through purposive sampling. Inclusion criteria: (i) doctors with a master’s degree or above, and nurses with a college degree or above; (ii) attending physicians or nurses or one who possess professional titles; (iii) physicians that have worked in the emergency department for 5 years or more; (iv) nurses that have worked in the emergency department for 5 years and above and were responsible for pre-examination and triage work; (v) doctors or nurses who signed an informed consent and were willing to accept interviews. Exclusion criteria: Those who quit the interview due to various reasons. The sample size was based on the principle of data saturation and the interviews ended when no new topics emerged. In the end, a total of 17 medical staff were interviewed, including 4 males and 13 females; 10 nurses (numbered N1–N10), 7 doctors (numbered D1–D7), aged 34.12 ± 8.75 years old, with an average working experience of 10.76 ± 8.71 years. As for their education background, 2 graduated from junior colleges, 8 had a degree, 4 had a master’s degree, and 3 had a PhD. In terms of titles, 10 had junior professional titles, 4 had intermediate professional titles, and 3 had senior professional titles. The general information of the interviewees is shown in **Table 1**.

Table 1. General information of interviewees ($n = 17$)

Serial number	Age (years)	Gender	Job title	Highest academic qualification	Working experience in the emergency department (years)
N1	36	Female	Nurse in charge	Bachelor’s degree	15
N2	29	Female	Nurse	Bachelor’s degree	6
N3	32	Female	Nurse in charge	Bachelor’s degree	9
N4	25	Female	Nurse	Junior college	5
N5	27	Female	Nurse	Bachelor’s degree	6
N6	35	Female	Nurse in charge	Bachelor’s degree	10
N7	43	Female	Nurse in charge	Junior college	23
N8	27	Female	Nurse	Bachelor’s degree	6

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Serial number	Age (years)	Gender	Job title	Highest academic qualification	Working experience in the emergency department (years)
N9	32	Female	Nurse	Bachelor's degree	6
N10	29	Female	Nurse	Bachelor's degree	6
D1	30	Female	Doctor	PhD	5
D2	35	Female	Deputy chief physician	PhD	10
D3	30	Male	Attending physician	Master's degree	5
D4	36	Female	Deputy chief physician	Master's degree	10
D5	30	Male	Doctor	PhD	5
D6	42	Male	Attending physician	Master's degree	18
D7	62	Male	Deputy chief physician	Master's degree	38

2.2. Research methods

2.2.1. Data collection

Data were collected using semi-structured interviews. After reading domestic and foreign literature and relevant guidelines of emergency triage in China, and consulting experts, the interview outline was determined. Before the formal interview, two medical staff were selected for a rehearsal, and the interview outline was revised to form a formal interview outline. Interview outline: (i) How should NTAA patients be divided into different department? What is your basis? (ii) Do you think that relevant training on acute abdomen should be carried out before the staff are allowed to perform pre-examination and triage? (iii) What do you think are the challenges in classifying patients with acute abdomen? What happens if the classification is inaccurate? (iv) How do you think we can improve the accuracy of classification by nurses, or what could make triage quicker and easier? (v) Do you have any other suggestions for the categorization of acute abdomen patients, or what needs to be improved? Before the interview, the purpose of the interview was explained, and the interview was recorded with the consent of the interviewee. The location was a quiet and independent room in the emergency department. The interview process was carried out step by step. During the interview, the facial expressions and gestures of the interviewees were observed and recorded. The duration of the interview ranged from 20–40 minutes. The interview was stopped when no new information was obtained. A total of 17 medical staff were interviewed.

2.2.2. Data analysis

After the interview, the interview recordings were transcribed verbatim and sentence by sentence by two researchers within 24 hours. The Colaizzi 7- step analysis method ^[14]: (i) All transcription data were carefully analyzed, (ii) significant statements were extracted, (iii) recurring viewpoints were marked and coded, (iv) coded viewpoints were compiled into topics, (v) a detailed and exhaustive description was written, (vi) similar points of view were summarized, (vii) the data obtained were returned to the interviewee for verification.

2.2.3. Quality control

Before the interview, the purpose of the interview was explained to potential candidates, and the candidate

would decide whether to accept the interview. The interviews were carried out step by step, and the interviewees were guided to talk about their real experiences and feelings; The team members who participated in the interview were clinical frontline nurses or clinicians who had worked in the emergency department for more than 5 years. The collation of the data was carried out by two people at the same time, one of whom was inputting and the other was checking. We had experience in emergency triage and qualitative research; thus, the credibility of the data can be guaranteed; after the analysis of the data, we reviewed the data and checked its credibility and integrity again.

3. Results

3.1. The etiology of acute abdomen is complex and difficult to categorize

3.1.1. Insufficient consultation due to lack of time

There are many causes of acute abdomen, and the clinical manifestations are also different. The short 2–5 min triage upon presentation to the emergency department should not only distinguish the priorities, but also divert the patients to the correct department. In order to speed up the diversion of patients and allow patients to seek medical treatment as soon as possible, there is not enough time for consultation, which makes it difficult to determine the department that the patient needs to be transferred to. N5 said: “there is not much time for a proper triage, and the patients often cannot express themselves clearly, so the description of symptoms is incomplete. It is possible that many internal medicine patients will be assigned to the surgical department.” N7 said: “When the patient comes to the clinic, he/she is in a hurry and just wants to register to see a doctor immediately. There is not much time to understand their medical history in detail.” D1 said: “We have limited time. Sometimes, there is only one patient, but sometimes there are many. If we take too long, the patients in line would make a fuss.”

3.1.2. The patient’s complaint is affected by acute pain

Patients with acute abdomen usually visit the doctor because of acute abdominal pain, and the pain makes the patients and their family anxious. Besides, each person’s pain tolerance is different, which affects the patient’s chief complaint and makes the process of patient transfer more challenging. N4: “Some patients may not be able to locate the source of their pain, which might mislead us.” N6: “The patient’s description of the pain and the location of the pain is unclear; for example, they would tell me that it’s their upper abdomen, but they would tell the doctor it is the lower abdomen. As a result, the patient might be assigned to the wrong department.” D6: “Abdominal pain in any part may require surgery. Pain in the right upper abdomen may be due to perforation of the digestive tract or cholecystitis, and pain in the left upper abdomen may be due to a stomach problem, some growth, or intestinal obstruction. The patient’s description is often inaccurate. D1: “Some patients may cry loudly at the slightest pain and say that they are going die, but the result of the examination such as a CT or something showed that it might just be a stomach cramp.”

3.1.3. Subjective experience dominates patient classification

Most of the interviewees believed that experience is very important, and as they deal with more patients and gain more experience, the triage would be more accurate. N6 said: “When I first started working, I often made mistakes in the triage, and I became better after working for some time.” N7 said: “The more triage you perform, the more experience you have. For example, if lower abdominal pain is very severe and it radiates to the perineum, or if there are symptoms of lumbago, it may be kidney stones.” D7 said: “In fact, there are no standards that we can refer to for pain, and it is largely based on experience. For example, there are more people with sudden severe pain, ureteral calculus, acute cholecystitis, or fecal stones in the appendix on rainy days or in the middle of the night; if there is no weather change in the recent period, frequent abdominal pain accompanied by hyperactive bowel sounds may be caused by abdominal enteritis

infection, which is under internal medicine."

3.2. Acute abdomen requires immediate treatment, and inaccurate classification delays treatment

All interviewee said that the patient's condition would be affected if they are transferred to the wrong department due to the long waiting time and delayed treatment. Besides, many patients were told that they would not be affected much even if the treatment was delayed. N2 said: "If the patient was referred to the wrong department, the patient would have to wait longer; whereas if the patient was assigned to the correct department, the doctor would not even need to ask for a consultation." D1 said: "If the acute abdomen patient is in shock, there may be bleeding in the stomach, and they need to be sent to the resuscitation room immediately. Therefore, it would be better if the patient comes early so that their problems can be detected in time and surgery can be performed. A patient I had found out that he/she was not feeling well, so I measured his blood pressure and found that it was low, so he/she was rushed to the resuscitation room. The patient might have experienced respiratory and cardiac arrest due to low blood pressure had he/she been treated a little later, and it could have been very dangerous. He had always been healthy. N1 said: "Internal and external gynecologists have different inclinations, so the patient's treatment might be delayed if he/she is transferred to the wrong department." D6 said: "Many patients will be assigned to the internal medicine department, which might cause delayed treatment, because the internal medicine department does not know what kind of situation to consult, and the treatment usually ends up with giving the patient an infusion. In this case, the patient might feel better after an infusion, but it may be due to the use of painkillers. However, the patient might be suffering from intestinal obstruction but was misdiagnosed because he/she was in the internal medicine department, resulting in delayed treatment, aggravated condition, and the he/she would have to undergo surgical interventions.

3.3. Nurses are under great pressure

3.3.1. Nurses are worried about conflicts between doctors, nurses, and patients

Most nurses said that they had more or less experienced dissatisfaction from patients, family members, and even doctors after because they transferred patients to the wrong department. N7 said: "Doctors, especially physicians, takes this issue more seriously." N2 said: The patients will definitely be dissatisfied if they are referred to the wrong department, and they would say that we refer all internal medicine patients to the surgical department, making them go back and forth" N10 said: "Some patients are unaware that they had history of gallbladder stones because they have never undergone any examinations. However, after the patient is assigned to the internal medicine department, it was found that the patient should have been under the surgical department. In these cases, we would be questioned about why the patient was sent to the internal medicine instead of the surgical department.

3.3.2. Nurses are afraid of delaying the patient's condition

The respondents said that because of the complexity of acute abdomen, they worried that incorrect triage would have adverse effects on patients. N3 said: "The cause of acute abdomen is often unclear. For example, a patient with acute left abdominal pain may have pancreatitis, so he/she is transferred to the surgical department. The surgical department is not a specialized department, so the patient's treatment might be delayed while waiting for further examinations." N5 said: "If the classification is inaccurate, it will delay the patient's treatment. If some patients are assigned to the internal medicine department when they should have been in the surgical department, gastroenteritis might be ruled out. Although the blood test results might be fine, some serious diseases might not be reflected in the first round of examinations because they are not very specific."

3.4. Suggestions and requirements for improving the accuracy of division

3.4.1. Targeted training

Solid and rich theoretical knowledge is the cornerstone of competent pre-examination and triage. Most of the respondents indicated that targeted training is needed to improve the accuracy of patient divisions. N7 said: "I don't think I've undergone any formal training on this, I just watched a video on how to use the division system. However, a nurse with 5 years of work experience will be qualified for this position. For example, nurses who have worked at the in the infusion room/emergency room/ward for 5 years will have different abilities and experiences." "N5 said: "Targeted training for abdominal diseases is definitely needed, such as the location or nature of the pain. This will help us to make a faster distinction between internal medicine and surgery, including possible consideration of gynecological problems."

3.4.2. Creating relevant assessment tools

In the event where the emergency department is crowded and there is an urgent need for rational allocation of medical resources, it is impossible to rely on the nurses' subjective triage alone. Good and effective triage tools can the process more efficient and patients can be treated more quickly. N1 said: "A specific comparison table or chart for abdominal pain can be created, so that the pain can be classified more accurately, which includes the following: location of the pain, what kind of condition is suitable for which department, or related pain scores and blood pressure. N7: "It is better to have a system that guides us on the symptoms, signs, and some manifestations related to abdominal pain, and help us determine the department that the patient needs to be referred to, whether it is internal medicine, surgery, or gynecology."

3.4.3. Strengthening the communication between doctors and nurses

Good communication can not only prevent conflicts among medical staff, but also enrich one's own knowledge and ability, which will be helpful during the patients' consultation. N4 said: "If the emergency department is not sure, I may consult the internal medicine or surgical department first and ask them if the patient or the disease belongs to their department. D7 said: "We can improve ourselves by communicating with patients or understanding the examination results from the surgical department or the internal medicine department."

4. Discussion

4.1. The challenges in patient classification and the impact of inaccurate classification

Pre-examination and triage are the first and most crucial part when a patient presents to the emergency room. The speed and accuracy of the divisions are directly related to the timeliness and effectiveness of the treatment, and it affects the patient's safety, the nursing quality, the rational use of medical resources, and the patient's satisfaction^[15-17]. NTAA has the characteristics of rapid onset, rapid change of condition, complex etiology, and it is difficult to make a diagnosis. This study found that it is difficult for nurses to refer the patients to the correct department because of insufficient consultation due to time constraints, the variation in patient complaints, and subjective experiences, which is similar to the results of Chang^[18] and Ponsiglione *et al*^[19]. Therefore, considering the aspects above, the management should consider the difficulties and needs of triage nurses and formulate corresponding improvement measures. For example, considering the time constraints and insufficient consultation, should we carry out corresponding consultation skills training and related consultation procedures? How do we manage and evaluate the decision-making of triage nurses? How do we improve the accuracy of divisions? Most of the interviewees said that experience and knowledge are very important, so it is crucial to improve the knowledge and abilities of triage nurses. Emergency room congestion has become a global problem. This is because many non-emergency patients are occupying the medical resources of the emergency department. As a result, real

emergency patients could not get medical help in time. Therefore, healthcare and medical institutions should educate the public on emergency admission and popularize the concept of emergency triage, so as to reduce the abuse and waste of medical resources of the emergency department, reduce the conflict between patients and medical staff, improve the efficiency of triage, and improve the medical treatment of patients. Zan *et al.*,^[22] also found that of the lack of professional knowledge, incomplete medical history, and patients' own factors were the main reasons for triage errors. They adopted six sigma management method, which reduced the rate of error of each department from 9.92 % to 2.80 %. Chen^[23] found that triage is not only related to the timeliness of the patients' diagnosis and treatment, but also has a great impact on patients' prognosis, attitude towards the treatment, and other aspects. In Chen's study, the Taiwan Triage and Acuity Scale (TTAS) was applied to patients with acute abdomen, which shortened the waiting time and sped up the diagnosis of patients, and improved the accuracy of divisions and the success rate of treatment.

4.2. Paying attention to the psychological pressure of triage nurses

4.2.1. Rational arrangement of rotations and flexible allocation of human resources

Most of the respondents in this study said that pre-examination and triage work is difficult and demanding. Pre-examination and triage are the window of the emergency department, which is not only related to the safety of patients, but also represents the quality of emergency medical services. The etiology of acute abdomen is complicated, and the triage nurses expressed that they are under a lot of pressure in terms of the classification of patients. They are not only worried about causing conflicts and disputes between doctors, nurses and patients due to wrong divisions, but also about delaying the patient's treatment, especially when there are too many patients and insufficient manpower. When there is not enough manpower, patients would complain because they have been waiting for too long and they are in pain. Studies have shown that the burden of having to make accurate decisions increases work stress, which is in this case classifying patients based on incomplete information within a specific time frame^[24]. Some studies^[25-26] also showed that long-term exposure to stress not only affects a person's health, but also their decision-making process, thereby affecting patient outcomes. Studies by Persson^[27], Pignatiello *et al.*^[28] showed that in complicated and urgent situations, nurses often face doubts and uncertainties that will affect their decisions, and they will end up feeling guilty and blaming themselves. Therefore, the job rotations should be arranged properly to avoid errors in decision-making caused by high stress. Moreover, more staff should be allocated when there are too many patients, and junior nurses should be assigned to assist in triage, so as to improve the efficiency and accuracy of triage, and improve the satisfaction of medical staff and patients.

4.2.2. Strengthen communication between doctors and nurses to improve patients' satisfaction

Effective communication between doctors and nurses ensures harmony between doctors and nurses and a comprehensive understanding of patient information, which is conducive to improving the satisfaction of doctors, nurses, and patients^[29]. A study by Hwang *et al.*^[30] showed that unpredictable situations often occur in emergency rooms, and conflicts between medical staff are inevitable. This situation will bring great pressure to triage nurses, so effective communication is necessary, which is consistent with the findings of this study. The nurses we interviewed said that they would be questioned by the doctors when they assign a patient to the wrong department. Of course, the doctors also said that they do express their dissatisfaction with the nurses sometimes. Nurses and doctors are the core providers of patient care. Effective communication and cooperation between them can significantly improve the health of patients, and it may also affect the decision-making process by triage nurses^[31]. Therefore, in order to ensure accurate triage and classification of patients, it is necessary to strengthen communication and cooperation

among doctors and nurses, and managers should do a good job of coordination to improve patient satisfaction.

4.3. Strengthening triage education and training and developing assessment tools

Regardless of the nurse's experience, triage training is required prior to assuming triage responsibilities [32]. The lack of trained and professional staff can affect decision-making upon the patient's presentation to the hospital [33]. Therefore, it is crucial to improve the decision-making ability of triage nurses through training [34]. Chang *et al* [18] also believe to strengthen the professional knowledge and decision-making skills of nurses and improve their knowledge and ability in emergency department triage, in-service training and nursing education are needed, so that the effectiveness of emergency department triage can be improved, which is consistent with the wishes and needs of the respondents in this study. The interviewees all indicated that knowledge is very important, and relevant training on department division is essential to improve the accuracy of triage. Of course, a suitable assessment tool by department can also help speed up triage and prevent subjectiveness, making the division process more scientific and standardized. Therefore, hospital administrators, nursing educators should address this issue and provide triage nurses with well-designed triage training courses to improve their judgment and decision-making ability.

5. Conclusion

In this study, the medical staff in the emergency department of a tertiary hospital in Nanjing were interviewed to understand their experiences in the triage of patients with NTAA. As pointed out by Ponsiglione *et al.* [19], management intervention should arise from a deep understanding of the organizational context and decision-making situation, with the aim of fine-tuning the relationship between individuals and contextual resources and constraints. This study summarizes 4 main points of the divisions of patients with acute abdomen. Firstly, the complex etiology of acute abdomen makes it difficult for making accurate divisions. Secondly, acute abdomen is an emergency and inaccurate divisions delays treatment. Thirdly, nurses are under great pressure in terms of classifying patients. Lastly, some suggestions were made to improve the accuracy of divisions. At the same time, the management should pay attention to the psychological pressure of triage nurses, arrangement of job rotation, allocation of human resources, strengthening communication between doctors and nurses, strengthening triage education and training, etc. In this way, the nurses can be more efficient, the satisfaction of patients and medical staff will be improved, and quality of emergency medical services will be improved.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Ma Y, Liu S, 2021, Expert Consensus on Early Analgesia for Adults with Non-Traumatic Acute Abdomen. *China Emergency Medicine*, 2021(01): 17–23.
- [2] Chen Z, Zhao B, 2017, Interpretation of the Basic Clinical Practice Guidelines for Acute Abdomen in 2015. *China Medical Journal*, 52(6):9–13.
- [3] Matz K, Britt T, Labond V, 2017, CT Ordering Patterns for Abdominal Pain by Physician in Triage. *Am J Emerg Med*, 35(7): 974–977.
- [4] Cervellin G, Mora R, Ticinesi A, et al., 2016, Epidemiology and Outcomes of Acute Abdominal Pain in a Large Urban Emergency Department: Retrospective Analysis of 5,340 Cases. *Ann Transl Med*,

4(19): 362.

- [5] Zhou J, 2017, Discussion on the Application Value of Laparoscopy in the Diagnosis and Treatment of Acute Abdomen. *Clinical Medicine Research and Practice*, 2(05): 145–146.
- [6] Fagerström A, Paajanen P, Saarelainen H, et al., 2017, Non-Specific Abdominal Pain Remains as the Most Common Reason for Acute Abdomen: 26-Year Retrospective Audit in One Emergency Unit. *Scand J Gastroenterol*, 52(10): 1072–1077.
- [7] Zaboli A, Ausserhofer D, Pfeifer N, et al., 2021, Acute Abdominal Pain in Triage: A Retrospective Observational Study of the Manchester Triage System's Validity. *J Clin Nurs*, 30(7–8): 942–951.
- [8] Teo A, Wang C, Wilson RB, 2019, Time is of the Essence: Evaluation of Emergency Department Triage and Time Performance in the Preoperative Management of Acute Abdomen. *ANZ J Surg*, 89(9): 1102–1107.
- [9] Parker R, Bedwell GJ, Hodkinson P, et al., 2021, Managing Acute Abdominal Pain in the Emergency Centre: Lessons from a Patient's Experience. *African Journal of Emergency Medicine: Revue africaine de la médecine d'urgence*, 11(4): 483–486.
- [10] Shi D, 2018, Expert Consensus on emergency Pre-Examination and Triage.
- [11] Li J, You Q, Yan H, 2022, Application of Behavioral Decision-Making System Model in Emergency Patients with Acute Abdomen. *Qilu Journal of Nursing*, 28(02): 1–3.
- [12] Sun X, Gao W, Chen T, et al., 2019, The Application of Mind Mapping in Standardizing the Emergency Pre-Examination and Triage Process of Acute Abdomen. *Journal of Nurses Training*, 34(24): 2244–2247.
- [13] Li H, Tang J, Wang L, 2019, Application Value of Failure Mode and Effect Analysis Model in Patients with Acute Abdomen. *Laboratory Medicine and Clinic*, 16(03): 417–419.
- [14] Liu M, 2019, The Application of Colaizzi's Seven Steps in the Analysis of Phenomenological Research Data. *Journal of Nursing Science*, 34(11): 90-2.
- [15] Abualenain J, Almarzouki A, Saimaldaher R, et al., 2018, The Effect of Point-of-Care Testing at Triage: An Observational Study in a Teaching Hospital in Saudi Arabia. *West J Emerg Med*, 19(5): 884–888.
- [16] Huang X, Xu H, 2021, Application Value Analysis of Emergency Pre-Examination and Triage Nursing Process in the Diagnosis and Treatment of Acute Abdomen. *Health Advice*, 15(25): 82–83.
- [17] Abdelwahab R, Yang H, Teka HG, 2017, A Quality Improvement Study of the Emergency Center Triage in a Tertiary Teaching Hospital in Northern Ethiopia. *Afr J Emerg Med*, 7(4): 160–166.
- [18] Chang W, Liu H, Goopy S, et al., 2017, Using the Five-Level Taiwan Triage and Acuity Scale Computerized System: Factors in Decision Making by Emergency Department Triage Nurses. *Clin Nurs Res*, 26(5): 651–666.
- [19] Ponsiglione C, Ippolito A, Primario S, et al., 2018, Configurations of Factors Affecting Triage Decision-Making. *Management Decision*, 56(10): 2148–2171.
- [20] Chen N, Wei W, Zhu X, et al., 2014, Research Progress on the Causes, Consequences and Mitigation Plans of Emergency Department Congestion. *Chinese Journal of Nursing*, 49(10): 1238–1242.
- [21] Mo Q, Lu Z, 2017, Current Situation and Countermeasures of Overcrowding in Emergency Departments of General Hospitals. *Journal of Clinical Emergency Medicine*, 18(01): 76–79.
- [22] Zan H, Xie X, Tan X, et al., 2020, The Application Effect of Six Sigma Management Method in Reducing the Error Rate of Emergency Abdominal Triage. *Chinese Journal of Practical Nursing*, 2020(10): 757-8-9- 60.

- [23] Chen P, 2019, Application of Emergency Triage System Based on TTAS Standard in Patients with Acute Abdomen. *Nursing Practice and Research*, 16(01): 141–142.
- [24] Shen Y, Lee HL, 2020, Improving the Wait Time to Triage at the Emergency Department. *BMJ Open Qual*, 9: e000708.
- [25] Shirey Mr, Ebright Pr, Mcdaniel Am, 2013, Nurse Manager Cognitive Decision-Making Amidst Stress and Work Complexity. *J Nurs Manag*, 21(1): 17–30.
- [26] Hatami Z, Sarkhani N, Nikpeyma N, 2022, Decision Fatigue in Nurses in the COVID-19 Pandemic: A Commentary. *Nurs Open*, 9(1): 4–5.
- [27] Persson E, Barrafreem K, Meunier A, et al., 2019, The Effect of Decision Fatigue on Surgeons' Clinical Decision Making. *Health Econ*, 28(10): 1194–1203.
- [28] Pignatiello GA, Martin RJ, Hickman RI, Jr, 2020, Decision fatigue: A Conceptual Analysis. *J Health Psychol*, 25(1): 123–135.
- [29] Liu X, Hou Y, Li H, et al., 2019, Research Status of Communication Between Chinese Medicine and Nurses in Emergency Rescue Situations. *Medical Theory and Practice*, 32(24): 3968–3970.
- [30] Hwang S, Shin S, 2022, Factors Affecting Triage Competence Among Emergency Room Nurses: A Cross-Sectional Study. *J Clin Nurs*, 32(13–14): 3589–3598
- [31] Wang Y, Wan Q, Guo J, et al., 2018, The Influence of Effective Communication, Perceived Respect and Willingness to Collaborate on Nurses' Perceptions of Nurse-Physician Collaboration in China. *Appl Nurs Res*, 41: 73–79.
- [32] Hardy A, Calleja P, 2019, Triage Education in rural Remote Settings: A Scoping Review. *Int Emerg Nurs*, 43: 119–125.
- [33] Wolf LA, Delao AM, Perhats C, et al. 2018, Triaging the Emergency Department, Not the Patient: United States Emergency Nurses' Experience of the Triage Process. *J Emerg Nurs*, 44(3): 258–266.
- [34] Ghazali SA, Abdullah KL, Moy FM, et al., 2020, The Impact of Adult Trauma Triage Training on Decision-Making Skills and Accuracy of Triage Decision at Emergency Departments in Malaysia: A Randomized Control Trial. *Int Emerg Nurs*, 51: 100889.

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