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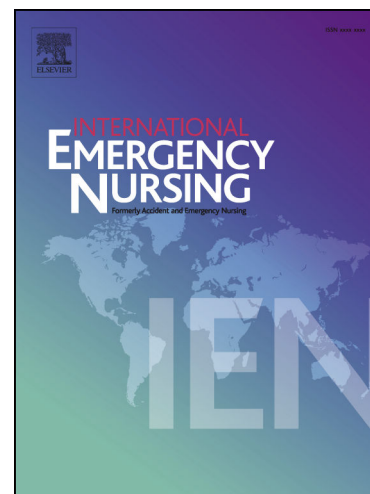
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## Work experience of triage nurses in emergency departments during the prevalence of COVID-19

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### **ABSTRACT**

**Objective:** In December 2019, the global outbreak of Corona Virus Disease 2019 (COVID 19) was reported. As of March 8, 2020, more than 90,000 cases were

reported worldwide, resulting in a shortage of global medical resources. The purpose of this study was to understand the working experience of triage nurses in the emergency department (ED) of a large teaching general hospital in Shenzhen (Guangdong province, China) during the COVID-19 epidemic. This will provide a basis for improving the emergency nursing strategies and the epidemic response capabilities of triage nurse.

**Methods:** Ten triage nurses were selected as subjects by objective sampling for in-depth interviews, and the data were analyzed by the Colaizzi seven-step analysis method.

**Results:** There were four themes in the working experience of triage nurses, including fear of infection and transmission, job stress, gratitude, and expectations of managers.

**Conclusion:** During the COVID-19, the work experience of triage nurses mainly included the fear of infection and transmission, the high work pressure, the sense of team strength and the care of leaders. It was suggested that nursing managers should ensure the human resources of triage nurses, increase training, strengthen emergency drills, improve emergency nursing countermeasures, and improve the response capability of triage nurses during the epidemic.

[Keywords] COVID-19; emergency department; Triage nurse; Work experience; Pandemic; healthcare managers

## 1. Introduction

Since December 2019, several cases of pneumonia of unknown cause have been identified in hospitals in Wuhan (Hubei province, China), attracting the attention of the global medical community [1,3]. On January 7, 2020, the Chinese center for disease control and prevention identified the cause of the disease as the novel coronavirus (2019-ncov). Subsequently, Guoyuan Zhang *et al.* [2, 4-5] performed gene sequence analysis and developed a nucleic acid detection method. On February 11, the World Health Organization (WHO) announced that the pneumonia infection caused by the new coronavirus was named “COVID-19” [3]. Compared with SARS-CoV and MERS-CoV, COVID-19 has more infectious. Its early symptoms mainly include fever, cough, and other upper respiratory symptoms [4,12]. As of March 6, 2020, there were 80,718 confirmed cases in Chinese mainland, including 3,045 deaths (3.78%) and 53,842 cured individuals (66.70%). According to data from the Chinese center for disease control [5], as of February 11, 2020, among the 422 medical institutions providing medical services for COVID-19, a total of 3,019 medical workers have been infected and five have died. Shenzhen people’s hospital is a large grade A teaching hospital with a daily ED volume of about 900 cases. During the COVID-19 epidemic, the emergency department has been responsible for the treatment of patients with a fever in the hospital. Triage, mainly undertaken by nurses, is an important link in the treatment of critically ill patients [6,10]. It is particularly important to isolate and treat suspected cases in the early stage. During the epidemic period of infectious diseases, triage nurses in ED are the first line of defense [7]. Under great pressure and in urgent need of attention, their experience is of great value to the formulation of nursing strategies. In this

study, 10 nurses who engaged in triage work in the emergency department in the Shenzhen municipal people's hospital during the COVID-19 epidemic were interviewed in-depth to explore their work experience during the epidemic period. This study may provide a basis for improving nursing countermeasures and triage nurses' ability to cope with the epidemic.

## **2. Subjects and Methods**

### **2.1 Study design**

From December 31, 2019 to February 14, 2020, 10 triage nurses working in the emergency department (ED) of the Shenzhen municipal people's hospital during the COVID-19 epidemic period were selected as subjects for in-depth interviews through the objective sampling method.

### **2.2 Recruitment**

Inclusion criteria: (1) triage nurses; (2) emergency work experience  $\geq 2$  years; (3) good language or communication skills; (4) working time during the epidemic period  $\geq 4$  weeks.

Exclusion criteria: (1) non-registered nurses; (2) During the epidemic period, the continuous time of not working in the hospital was more than 2 weeks.

Finally, 10 nurses were selected in this study, all of whom volunteered to participate. The basic information of the 10 interviewed nurses were shown in Table 1.

### **2.3 Data collection**

Following a thorough literature review, we discussed and designed the interview

outline with 1 Doctoral supervisor, 1 Master's supervisor, and 2 head nurses from the ED. The interview included 4 aspects: during the epidemic period, how did you feel when triaging the patients with fever and cough? Any special experiences? What concerned you? What advice did you have for managers? The interviewers included 3 charge nurses from the ED (working years  $\geq 5$  years). Comprehensive and systematic training was conducted on qualitative research methods and interview skills before the interview. The interviewers and the interviewed nurses have been colleagues for 3–7 years. Some of the nurses had participated in the triage of patients with SARS and human-infected H7N9 avian influenza together. The interviewers and interviewees had a high degree of trust. Before the interview, all the interviewees understood the purpose and significance of this study, and they were ensured confidentiality and anonymity. The interview was conducted in an independent, private office. After obtaining written consent, the interviewers were recorded synchronously in a one-to-one and face-to-face semi-structured manner. The interview time was limited to 30–45 min.<sup>[8]</sup>

#### 2.4 Data analysis and quality control

After each interview, the interviewer listened to the recording material carefully. Interview material was then transcribed and saved in Word. The Colaizzi seven-step analysis method [8,9] was used to analyze the text materials previously obtained. At the same time, four researchers analyzed the data to eliminate personal judgment and subjective factors, and to ensure the authenticity and reliability.

### 3 Results

#### 3.1 Fear of infection and transmission

### 3.1.1 Perception of individual infection risk

Most interviewed nurses said that they worried about being infected at work, especially when they were treating patients from places such as Wuhan.

Nurse 1: *“COVID-19 is transmitted by droplets, contact, and other means, which is stronger than SARS, and cannot be prevented (sigh)”*; Nurse 4: *“I am afraid to be infected. When the infection condition is serious, it may lead to death (sad).”* Nurse 7: *“I am very worried about infection. There are many patients with fever in the emergency department, and the risk of triage infection is high.”*

With the domestic COVID-19 epidemic gradually under control, the nurses' fear gradually abated.

Nurse 1: *“I treated a large number of patients with fever and cough every day, so I was not so worried”*;

Nurse 8: *“I have experienced SARS, H7N9 and other outbreaks. Emergency is to face all kinds of infectious diseases, and I feel more and more relaxed”*;

Nurse 10: *“I have experienced H7N9. Now I have met several patients from Wuhan. Just relax.”*

### 3.1.2 The protective equipment was uncomfortable but increased the sense of security

According to the “guidelines on the protection of people at different risk of new coronavirus infection in China”, it is recommended that emergency triage personnel must wear protective equipment, such as disposable isolation clothing, medical respirator, and protective face screen or goggles [10]. All the interviewees thought that it was difficult to adapt to the personal protective equipment:

Nurse 1: “*Wearing a respirator is very stuffy, lack of oxygen, hearing loss, and really uncomfortable (helpless)*”; Nurse 3: “*Isolated garment is airtight and stuffy. Although wearing for a while, whole body was sweaty. wearing goggles was easy to form fog, and I can’t see clearly*”; Nurse 9: “*The communication with patients is affected during the triage of respirator. The face is compressed, resulting in injuries.*” The wearing of personal protective goods was not convenient and the process was complex. Nurse 5: “*We need to take off protective equipment when we leave the work area, and the process is cumbersome with waste a lot of time.*”

Personal protective equipment affected activity sensitivity and reduced work efficiency.

Nurse 2: “*Wearing protective mask is low voice, and often need to repeat, affecting triage efficiency*”; Nurse 7: “*It affects speed of operation to moving slowly. Originally skilled skill becomes clumsy.*” Personal protective equipment can improve the sense of security for triage nurses and form an isolation barrier between patients with COVID-19 and nurses to effectively prevent viral invasion. Nurse 10: “*I am very satisfied with the current protective equipment, so that I can safely contact with my family after work.*”

### 3.1.3 Fear of transmission to family and friends

More than 80% of the respondents worried about infecting their family members or friends with COVID-19.

Nurse 1: “*In case of infection, I may transmit the virus to my son. He has to take the high school entrance examination this year*”; Nurse 3: “*It’s ok for*

*me to be infected, but my daughter is only 3 years old. If she is infected, it will be my fault”; Nurse 7: “Grandparents and I live together, and they are older. If I am infected, they may have bad luck”; Nurse 9: “I live with my high school classmate. If I infect her, others will blame me.”*

Take measures, such as bathing immediately after returning home and keeping a distance from family members, to reduce transmission.

*Nurse 4: “After coming home from work, take a bath first and then play with my son”; Nurse 3: “Keep a safe distance of more than one meter from my daughter”; Nurse 10: “There are old people and children in my family. I have been renting a house outside for a month. I will not return home until the epidemic is over.”*

### **3.2 High triage pressure**

#### **3.2.1 Social pressure**

During the COVID-19 epidemic, all sectors in society paid high attention to the treatments of such patients [2,5,11]. Emergency triage was under the supervision of many parties, and the pressure on nurses was very high. Nurses worried that triage errors would lead to the spread of the epidemic or cross-infection.

*Nurse 5: “I am worried about being blamed by leaders for triage errors and being punished by hospitals or government departments”; Nurse 8: “If the wrong triage results in a cross infection, I will certainly be punished.”*

#### **3.2.2 Work pressures**

After the COVID-19 outbreak, the number of patients with fever in the ED increased

significantly. Triage nurses required to register all patient information in detail, which placed a high burden on nurses. Some nurses interviewed said that during the epidemic period, the nursing staff was very scarce, and the workload was large.

Nurse 5: *“Due to the shortage of manpower, the patient with fever had to fill in a lot of information. The workload is too large.”* Nurse 6: *“For two consecutive weeks, I only have one day off every week. I often can’t get off work on time, and I need to work for about an hour.”* To speed up the treatment of patients with a fever, an increase in the number of patients meant that the end of work for the nurses was often delayed.

### 3.2.3 Physical and mental health of nurses was affected

During the epidemic, the work pressures were increased, bringing harm to the physical and mental health of nurses.

Nurse 2: *“If the patient’s epidemiological history is not inquired in detail, I worry that it may lead to triage errors”*; Nurse 9: *“Sometimes, there are too many patients. If I don’t pay attention to those patients, I may miss the key information of the patient, resulting in cross-infection. I feel very stressed.”*

These stresses endangered the physical and mental health of nurses. Nurse 4: *“I have been dreaming all night about the triage, I feel so tired”*; Nurse 7: *“The protective clothing is not comfortable, and some people say many times or do not listen to. Sometimes I want to hit people, go home with the family quarrel more.”*

Nurses with low seniority, low educational background, and low professional titles were under great pressure.

Nurse 2: *“I have not encountered similar situations, and sometimes I feel helpless. I don’t know if I have made a mistake”*; Nurse 4: *“I encountered a highly suspected single mother to be isolated, and no one to take care of the son 2 years old. I do not know how to comfort and how to help them.”*

### 3.3 Gratitude

#### 3.3.1 A sense of occupational nobility

Triage nurses felt that their values were reflected when an accurate detection of suspected patients was recognized by colleagues.

Nurse 3: *“Doctor, go to the triage desks and give me a thumbs up. You are great. That patient is indeed highly suspected of COVID-19 infection! At that moment, full of sense of accomplishment”*; Nurse 4: *“A patient with severe fever is accurately triaged by me during triage, and the patient was timely treated, which reflected the value of triage nurse.”*

Participated in the treatment of COVID-19, got good exercise, and rapidly improved the specialized ability.

Nurse 1: *“People all over the country are fighting COVID-19 epidemic, so we are proud to be fighting on the front line”*; Nurse 10: *“This outbreak has made me grow up a lot. There is nothing to fear.”*

#### 3.3.2 Team strength

Although in recent years, SARS-CoV, human infection with the H7N9 avian influenza and other infectious diseases have appeared to different degrees [12], the outbreak of COVID-19 makes triage nurses feel that the strength of the team and the care of the

managers have improved.

Nurse 3: *“Compared with H7N9, our colleagues are more friendly and cooperate with each other. We are a team”*; Nurse 6: *“Triage group is a team, we are five fingers to have the length of each other, complement each other”*; Nurse 8: *“There is a nurse who does not ask whether the patient have been to the epidemic area, and the leader does not scold her and encourage her to work well, feeling warm”*; Nurse 9: *“During the epidemic period, the night shift nurse is wounded by a drunken patient, the leader follows up the whole process of the treatment results, the offender is detained. We feel that we have a strong backer.”*

### **3.4 Expectations of managers**

#### **3.4.3 Pay attention to humanistic care**

During the period of COVID-19 epidemic, triage work is high risk and high pressure, and nurses hope that the hospital would provide various types of support and care.

Nurse 6: *“I hope the leadership to pay more attention to the needs of triage nurses, so that they can work at ease.”*

#### **3.4.1 Increase human resources**

During the period of COVID-19 epidemic, the ED had a heavy triage workload, which required the close cooperation of several nurses. The respondents all indicated that there was a shortage of human resources for triage nursing during the epidemic period.

Nurse 6: *“during the epidemic, in addition to patients with fever, we also need to treat ordinary emergency patients. There are too many patients and*

*the nurses are not enough”*; Nurse 10: *“Someone got sick, so we all had to cover the shift and didn’t get enough rest, which affected the quality of work.”*.

### 3.4.2 Increase training education and emergency drills

Training, education, and emergency drills are important ways to improve the technical levels of triage nurses. Nurses with few years of experience and low educational background suggest that hospitals should carry out more education, training, and drills on COVID-19 treatment.

Nurse 4: *“During the epidemic period, the concentration was reduced, the department could not concentrate on training, the training on triage and treatment of COVID-19 were insufficient, and the process was not clear”*;

Nurse 6: *“I did not participate in the department’s treatment drill for critically ill patients suspected of COVID-19 infection, and I did not know how to deal with such patients”*; Nurse 7: *“During the epidemic period, emergency drills should be carried out in the triage table more often, and patients suspected of COVID-19 infection will not be nervous.”*

## 4 Discussion

### 4.1 Concern for the safety of oneself, family, and friends

During the period of COVID-19 epidemic, most nurses felt a fear of being infected and spreading the virus to family and friends. Studies have shown that the main transmission routes of COVID-19 are the respiratory tract and close contact [13]. There is also the possibility of aerosol transmission, which makes COVID-19 more infectious than SARS-CoV and MERS-CoV [14]. A triage nurse may become infected

with COVID-19 if he is careless while working. The survey showed a significant drop in concern among nurses who had done triage work with SARS or H7N9. There was also the suggestion that the managers should choose emergency nurses who had experienced with the SARS or H7N9 human infection with avian influenza nursing. For those who participate in triage work during the outbreak, the hospitals should consider offering free influenza vaccines, antiviral drugs or antiviral medicine granules, screening for fever, cough, and other respiratory symptoms and other measures to nurses and their families. This would reduce the psychological burden of nurses, so that they could devote themselves to work.

#### **4.2 Triage is a heavy task under great pressure**

The COVID-19 epidemic has attracted global attention [1,15], and emergency nurses are faced with many pressures during triage. Since the outbreak of the epidemic, the ED of our hospital has received about 900 patients per day, including about 100 patients with a fever. There are many patients in the ED in an urgent condition, which makes triage difficult. In addition, the intensive work has adverse effects on the physical and mental health of nurses. Ling Binfang *et al.* [16] found that 43.04% doctors and 57.28% nurses showed post-traumatic stress syndrome after treating major infectious diseases. It is interesting to note that nurses score higher than the doctors. In this study, respondents indicated that a series of abnormal phenomena, such as anxiety and insomnia, often appeared during the epidemic. Therefore, it is suggested that nursing managers should take a variety of measures to continuously improve the hospital support system to create a good working environment and relieve the psychological pressure of nurses.

#### **4.3 Feel the strength of the team and the care of the leader**

In the interview, all the nurses believed that participating in emergency triage during the period of COVID-19 epidemic was a special working experience, and the nurses could truly feel the noble nursing professionalism. Spaulding *et al.* [17] showed that during the epidemic period of major infectious diseases, the care of leaders is crucial and can boost the morale of front-line medical staff. In this study, 8 nurses reported that they could feel the team's strength and the leader's care during the epidemic. It is suggested that nursing managers should regularly affirm the value of triage nurses involved in the treatment of COVID-19 patients, give commendations, and further mobilize the enthusiasm of nurses.

## **5 Implications for emergency nursing**

### **5.1 Ensure adequate human resources**

During the COVID-19 epidemic, the number of patients with a fever in the ED was increased. Therefore, it was necessary to gather more information about the patients. In addition, the ED also undertook the treatment of other critically ill patients. The workload increased dramatically, and the pressure on triage nurses was great. During the interview, all the nurses believed that their triage workload was large and that available human resources were seriously insufficient, which is consistent with the study by Chen Junhua *et al.* [18].

Interviewees also mentioned that it seemed unfair that other clinical departments in the hospital with fewer patients affected by the epidemic had sufficient human resources. Continuous overwork leads to physical and mental exhaustion and job burnout, which affects the quality and efficiency of triage. Therefore, the management should allocate nursing flexibly according to the development of the epidemic, and fully guarantee the triage nurses human resources to ensure they get adequate rest. It

is suggested that hospital administrators support the work posts of ED triage by establishing a “nursing task force” and other forms of support during an epidemic period of major infectious diseases, to ensure the normal development of emergency work.

### 5.2 Increase training and education on infectious disease protection for triage nurses

The competency of emergency triage nurses directly affects the accuracy of triage [19]. Emerging infectious diseases such as COVID-19 have high protection requirements, and the process is complex. With their existing knowledge and skills, the triage nurse cannot meet the demand of the outbreak. Working during an outbreak is intense, and providing centralized training can be difficult. Therefore, for triage nurses with insufficient knowledge of infectious diseases, training could be distributed through network teaching, training manuals, and other forms of teaching to strengthen triage nurses' knowledge of COVID-19. In the interview, the nurses with low seniority and no experience in treating SARS or human infection with the H7N9 bird flu indicated that they had insufficient knowledge of infectious disease nursing and low confidence. They indicated that they needed to further improve their triage capability for infectious diseases. The 10 nurses interviewed all expressed different training needs and hoped that the hospital would provide more training opportunities related to COVID-19 treatment. It was suggested that hospital managers should carry out extensive training of the knowledge and skills related to infectious diseases for triage nurses in the ED as a next step [20].

### 5.3 Emergency drills on epidemic diseases should be held irregularly

Emergency drills for suspected COVID-19 infected patients to test triage nurse response capacity and development of a contingency plan for different scenarios in

emergency triage were suggested, especially for COVID-19 combined with other diseases [21]. In the interview, the nurses suggested that the manager should organize emergency drills to remind the participants of their work responsibilities and effectively improve the knowledge, skills, and psychological state needed by triage nurses during the epidemic of COVID 19. This would also improve the emergency response capability of nurses and lay a solid foundation for the response to the epidemic [8].

## **6. Limitations**

There are also some limitations in our study. First, the number and flow of patients in other hospitals may be different from this one hospital, resulting in insufficient breadths. Second, the sample size was small (10 nurses), and the last one to participate in the interview were department personnel, which may have introduced supervisor factors.

## **7 Conclusion**

In this study, 10 triage nurses who worked in the ED during the COVID-19 epidemic were interviewed. It was found that the working experience of nurses mainly manifested in the fear of infection and transmission, high triage pressure, and a feeling of team strength and care from leaders. It is suggested that going forward, management should fully ensure adequate human resources for triage in the ED during an epidemic of infectious diseases. This may be provided through rational human resource deployment, increased training efforts, strengthening of emergency drills, improving emergency nursing countermeasures, and improving the response capability of triage nurses.

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### **Ethical statement**

This study was approved by the ethics committee of the Shenzhen Municipal People's Hospital (ll-ky-2020065).

### **Declaration of Competing Interest**

The authors declare that they have no known Competing financial interests or personal relationships that could give the appearance of influencing the work reported in this paper.

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### Highlights

1. During the COVID-19 pandemic, four themes emerge from the description of ED triage nurse experiences includ the fear of infection and transmission, the job stress, the gratitude, and the expectations of managers.
2. Nursing managers should improve the response capability of triage nurses during the epidemic.

**Table 1. Basic information of interviewed nurses**

Number	Gender	Age (year)	Working fixed number of years (year)	Education	Title
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1	Female	39	17	Bachelor	Nurse-in-charge
2	Male	26	3	Bachelor	Nurse practitioner
3	Female	35	12	College	Nurse practitioner
4	Female	28	4	Bachelor	Nurse practitioner
5	Female	33	9	Bachelor	Nurse-in-charge
6	Male	26	6	Bachelor	Nurse practitioner
7	Female	28	5	Bachelor	Nurse practitioner
8	Female	38	16	Bachelor	Nurse-in-charge
9	Female	34	6	Master	Nurse-in-charge
10	Male	33	7	Bachelor	Nurse practitioner