

## Severe Earthquake Effects on the Nurses Working in the Neonatal Units in the Disaster Region

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### Abstract

This study aimed to explore the experiences of nurses in the Neonatal Intensive Care Unit (NICU) during an earthquake, their post-event emotions, and the subsequent impact on the NICU. The research is conducted in a Gaziantep private hospital, the qualitative research involved 15 NICU nurses with over 2 years of active experience. Data collection utilized a "personal information form" and an "in-depth interview form" for increased internal validity. Nurses' statements were categorized into "negative aspects of working in the earthquake," "positive aspects," "reasons for absence," "effects on the NICU," and "needs and expectations." Themes were further subcategorized, encompassing diverse opinions within each. Findings revealed that healthcare personnel, serving as both earthquake survivors and providers for survivors in hospitals, require assistance and support. This study emphasizes the importance of addressing the challenges faced by healthcare workers dealing with traumatic events and highlights the need for support systems in such situations.

**Keywords:** Disaster, Earthquake, Nurse, Care

### Introduction

The results of natural or man-made events that cause mental, physical, economic, social, and environmental losses for people, that affect communities by stopping or interrupting normal life and human activities, and that the affected community cannot cope with by using local means and resources are called disasters. Disaster is the result of an event rather than an event. In order for an event to be a disaster, human beings must be directly or indirectly affected.

On 6 February 2023, two earthquakes with magnitudes of 7.8  $M_w$  ( $\pm 0.1$ ) and 7.5  $M_w$  occurred nine hours apart, with epicenters in Pazarcık and Ekinözü districts of Kahramanmaraş, respectively. According to official figures, at least 50,96 people in Turkey and at least 8,476 people in Syria were killed and more than 122,000 people were injured as a result of the earthquakes. The earthquakes were followed by more than 22 thousand aftershocks with magnitudes up to 6.7  $M_w$  [1].

A study conducted in Argentina showed that nurses are one of the most important professionals involved in perinatal care and that the care given to newborns by nurses in the NICU is widely accepted. Another study conducted in the United States of America emphasizes that the neonatal nurse is the mainstay of the NICU, working with the physician in deciding on the treatment procedure, providing direct care of the newborn, and providing emotional support to family members.

In most of the nursing studies carried out after natural disasters, nurses were considered disaster nurses. The problems they experience while giving care to the disaster victims have been addressed, not the problems they experience in their branches. However, most of the nurses in the disaster area are earthquake victims and they have to work in order to continue their lives. This great earthquake has caused us to be concerned about whether neonatal nurses have a problem in maintaining patient care. Our curiosity about how the problems experienced by nurses as earthquake victims are reflected in the neonatal intensive care unit has led us to conduct this study.

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## Materials and Methods

### *Purpose of the study*

In this study, it was aimed to understand what the nurses working in the Neonatal Intensive Care Unit experienced as disaster victims during the earthquake, how they felt afterward and to determine the effects of these disaster experiences on the neonatal intensive care unit. This research was planned in qualitative design, which is one of the non-experimental research methods. The study was conducted in a level 3 neonatal intensive care unit with 35 incubators in a private hospital in Gaziantep province. The population of the study consisted of 50 nurses working in a level 3 neonatal intensive care unit with 35 incubators in a private hospital in Gaziantep, the epicenter of the great southeastern earthquake. Our study was conducted with 15 nurses who volunteered to participate in the study, who were actively working in the neonatal intensive care unit, and whose working experience in the NICU was over 2 years. In the study, purposive sampling was used following the qualitative research approach. The number of participants was determined according to data saturation and was based on the voluntary participation of 15 nurses. The data were obtained by using the "personal information form" and "in-depth interview form". In order to increase the internal validity (credibility) of the research, a conceptual framework was created by reviewing the relevant literature, and expert opinion was consulted while formulating the questions of the "personal information form" and "in-depth interview form".

### *Personal information form*

It consists of 10 questions including the socio-demographic characteristics of the nurses who participated in the study after a literature review by the researcher. At the beginning of the form, the participants were given sufficiently clear and understandable information about the research, and the participants were informed about "The authors have obtained the informed consent of the patients and/or subjects referred to in the article" or "The authors have obtained the approval of the Ethics Committee for the analysis and publication of clinical data obtained routinely. The informed consent of the patients was not required because it was a retrospective observational study".

### *In-depth interview form*

In-depth interview questions were prepared in line with the literature and expert opinion was obtained. Before interviewing the participants, a pilot study was conducted with 3 nurses, and the effectiveness of the in-depth interview questions was evaluated and there were no questions that were not understood or changed as a result of the application. There are 20 questions in this form. The questions were designed to enable nurses to talk in detail and in-depth about their experiences, feelings, needs, suggestions, and expectations.

### *Data collection*

The interviews with the nurses were conducted in the training room. The training room is a one-person office where the training nurse conducts one-to-one trainings. The interviews were conducted by the responsible researcher one-on-one with the participant in the training room. For the nurses to express themselves comfortably and clearly in the interviews with the participants, the time was not determined and left open-ended. A recording device was used to collect the data. No guidance was given during the interviews and subjective judgments were avoided. In order to obtain participant confirmation, the participants were asked after the interview whether there were any issues they wanted to add or remove from the interview, and the answers were revised when necessary.

### *Analyzing the data*

Data analysis was carried out with the content analysis approach. In the first step, the audio-recorded interviews were transcribed into Microsoft Word program. In the second step, the interviews were read several times to understand the overall text. In the third step, codes were determined by reading the text line by line. In the fourth step, the codes were interpreted, compared in terms of similarities and differences, and sub-themes were formed. In the last step, the main categories that provide the integrity of meaning in the sub-themes were determined. The data were analyzed using NVivo 12 Pro Package (QSR International, USA).

### *Ethical principles of the research*

Necessary permissions were obtained from the Research Ethics Committee of Istanbul Nişantaşı University (Date: 15.03.2023;2023/11; E-53822972-108.01-3398) and the chief physician of the hospital where the research will be conducted (Number: 771/01/2019 Tuek Meeting Decision). Verbal consent was also obtained from the nurses who agreed to participate in the study.

### *Limitations of the Study*

The research is limited to nurses working in the Neonatal Intensive Care Unit of a private hospital in Gaziantep province, the epicenter of the 2023 Turkey-Syria major earthquake. The research findings are limited to the answers given by the participants to the questions in the research questions.

## Results and Discussion

According to the data obtained from the statements of the nurses, five themes were determined. These themes were grouped under the titles of "negative aspects of working in the earthquake", "positive aspects of working in the earthquake", "reasons for not coming to work", "reflections of working in the earthquake on the NICU" and "needs and expectations". These themes were then categorized and the opinions related to each category were included. Themes, categories related to themes, and sample opinions

**Tables 1-5** are given in detail.

There are six categories in the "Positive Aspects" theme expressed by the nurses. These are; *"empathy, stress management, team spirit, personal development, spiritual satisfaction and seeing oneself as valuable"*.

There are seven categories in the theme of "negative emotions" expressed by nurses. These are; *"fear, anger, compassion, anxiety, helplessness, burnout, fatigue"*.

There are four categories in the theme of "professional effects" expressed by the nurses. These are as follows: *"Responsibility to take care of loved ones, families' approach to work, the obligation to go to work and professional future"*.

There are 12 categories in the theme of "complaints and expectations" expressed by the nurses. These are; *"accommodation, food, communication, training, uniform, heating, forgetting that they are earthquake victims, number of employees, motivation, security"*.

There are 5 categories in the theme of "reflections on the neonatal intensive care unit" expressed by the nurses. These are; *"Work-centred work, infection, inability to concentrate on work, stethoscope, and increased workload"*.

**Table 1.** "Positive aspects" theme, categories, sample opinions

	"After all, she has a baby, I wouldn't have left her either...(H1)
<b>Empathy</b>	"I understand those who don't come, I understand them when I put myself in their shoes..." (H8)
<b>Stress management</b>	"Some friends panicked at first...Then we pulled ourselves together, we said "We need to calm down, these babies need us" and we made a work plan, otherwise we couldn't work" (H11)
<b>Team spirit</b>	"What I and a few of my friends observed is that we supported them. If there was a deficit, we helped them where they could not reach. Because that person is a girl, I still say God bless them. They did not go home, they slept here. In other words, we supported them where they had difficulties, and we worked shoulder to shoulder." (H2)
<b>Personal development</b>	"Feeling death on my neck affected me a lot. I realized how unnecessary our ambitions and ego are." (H2) "This world is temporary... you shouldn't be bad. It's not worth it... it's not worth offending anyone for this false world" (H6)
<b>Moral fulfilment</b>	"Which is a plus for me. Because it saves their lives, we were doing that in the normal process, but in this earthquake process, it is much more effective, in fact, it is more. It is more than the previous babysitting, doing, making..." (H7)
<b>Seeing yourself as valuable</b>	"I'm proud of myself for coming that day. I mean, I got up. It's a proud thing. I mean, I got up and came from there. If it wasn't for my brother, maybe I wouldn't have been able to come again. I mean, if there wasn't someone to drop me off, maybe I wouldn't have been able to come again, or I wouldn't have been able to come again because the hospital wouldn't take me. But at least I was able to come at that moment with my means. I think it's a proud thing." (H3)

**Table 2.** "Negative emotions" Theme, Categories, Sample Opinions

	Categories Sample Opinions
<b>Fear</b>	We were so scared. Let me put it this way. I'm scared, but my friends are looking at me. I have to be brave. My friend Ayşe was very scared. She started crying. I said, "Don't be afraid, it will pass." I mean, it was very bad. (H19)
<b>Anger</b>	"Very painfully, I have friends who leave and run away like this, who don't care, who don't come to their shift, who still don't come to their shift. I mean, you feel like a fool and get angry. I mean, you expect the same sacrifice from him. Because we are all in the same conditions. There is death for me and death for you." (H12)

<b>Compassion</b>	"The families wanted to come and see. They wanted to talk. They were crying and talking. We were informed that the parents of some babies coming to our unit from neighboring provinces were under the cave-in. A mother hugged me and said; "my child is entrusted to you"... I will never forget that moment when I said, "This is too much". Should I feel sorry for my mother, the babies, or their families? I have already forgotten myself." (H3)
<b>Anxiety</b>	"And my first child is still young. In a way I cannot understand, a strange feeling of anxiety never leaves me. It is as if something will happen to him." (H2)
<b>Despair</b>	"Our house is gone. We are thankful that we saved our lives. While I was on watch here, our house collapsed. I came off guard duty; there is no house I can go to. Can't a person not have a house?" (H9)
<b>Burnout</b>	"I mean, I thought I was strong, but I can't stand it anymore. I realized this better last night. Last night I thought an earthquake had started. I got up in the night and slept next to the sofa to protect myself. When you woke up in the morning, I was lying on the floor in the foetal position. My suppressed emotions come out more at night." (H14)
<b>Fatigue</b>	"I get weak and tired, my work gets complicated. I look after your patient, I do treatment, care, whatever, I finish my job. But because I am not psychologically healthy and comfortable, because I am not mentally healthy and comfortable, I do something wrong, or even if I don't do it wrong, I look at what I did right and I realize that there is a snag and my patient is a mess. I say, how could I not pay attention to this?" (H10)

**Table 3.** "Professional Effects" Theme, Categories, Sample Opinions

<b>Responsibility for caring for loved ones</b>	"Also, my daughter was here with me. That's why I was able to work. I mean, I couldn't leave her and come back. I guess I worked because she was with me. I didn't leave her again, I brought her with me." (H2)
<b>Families' approach to work.</b>	"My mum said "quit work". She said, "We don't want you to go, our minds will stay with you." (H1)
<b>Obligation to go to work</b>	"My husband and I have been sleeping in the car since the first night. My husband did not go to work for a week, but I continued to work, so I had to. Only I didn't come to my shift on the first day. After that, I had to come." (H2)
<b>Professional Future</b>	"I want to take a course and become a beautician, I don't want to retire from nursing." (H2)

**Table 4.** "Complaints and Expectations" Theme, Categories, Sample Opinions

<b>Categories</b>	<b>Sample opinions</b>
<b>Accommodation</b>	"I expected hospital staff to be provided with a service such as arranging a container or a tent near their hospitals. But no, I did not receive such a service. I mean, I was completely left to my means. We tried to hold on to life and come on watch with our means. Everything happened with our means."(H2)
<b>Food</b>	"We couldn't eat in the cafeteria. We have lunch with only one soup and one bread. In the first days there was only cheese and dry bread."(H14)
<b>Contact</b>	"You know, no one knows about anyone else and what anyone else is doing. Such miscommunication, what he says A, the other says B, what he knows B, the other knows C." (H5)
<b>Education</b>	"I think I have never experienced an earthquake before. That's why I don't know what to do in case of an earthquake. How should we protect the babies at that moment, should we take them in our arms and run away?" (H6)
<b>Uniform shortage</b>	"We sent our jerseys with the babies' sheets and stuff. They washed with them. I mean, because you wear them all the time. The odor inevitably appears. We had to wash them there. We dried them and then I had my shift in the morning...It was wet, but I had to wear it. I had to wear a wet jersey..." (H1)
<b>Warming up</b>	"There was no natural gas anywhere in the city, I worked shivering during working hours."(H14)

<b>Forgetting that you are an earthquake victim</b>	"We're so hungry. I mean, we are working. We go down to eat. Earthquake victims also come from outside, of course, there are those who take refuge in the hospital. So, there was mostly no food left for us." (H15)
<b>Number of employees</b>	"We have to pull a nurse from other floors to the newborn. This time we have to teach her work, we try to give her training. She does as much as she can. Again, we complete what she lacks." (H15)
<b>Motivation</b>	"We work so hard and sacrifice so much. If there was a motivating wage in return. It is obvious that we need it."(H12)
<b>Security</b>	"If I feel that I am in a safe environment, I would already do that care properly. I need to be sure of the hospital's construction. I mean, I need to feel the confidence that I will not be harmed in the aftershock."(H6)
<b>Transport</b>	"My supervisor wanted me to come. But I can't go, no buses, no taxis. And my house is an hour's drive from here. If I say I will walk, I can't. So I can't go." (H1)
<b>Lack of organization</b>	The hospital should have food and nappies in stock. They should be given to us when we need them. You know, we shouldn't be responsible for everything, we shouldn't say "find whatever you can find". Because we are already in a difficult situation, we are earthquake victims too. How can we find it? (inadequate organization)(lack of resources and materials) (H1)

**Table 5.** "Reflections on the Neonatal Intensive Care Unit" Theme, Categories, Sample Opinions

<b>Categories</b>	<b>Sample Testimonials</b>
<b>Work-centred work</b>	"I said to my friends, "Friends, let's silence all the crying babies, let that be our first goal, and let's feed and change the diapers of the others in turn." (H12)
<b>Infection</b>	"There was an increase in eye infection. " (H4)
<b>Inability to concentrate on work</b>	"Mistakes started to increase in the team and this was making us angry. In other words, we had a very argumentative day. And everyone had arguments with each other. " (H10).
<b>Stethoscope</b>	"When there is an earthquake, if you are at home, you look at the chandeliers; when there is the slightest shaking or noise, we immediately look at the stethoscopes hanging over the incubators. To see if it is shaking... (H3)
<b>Increased workload</b>	"Many babies were referred from other hospitals due to the earthquake, even our spare incubators and ventilators were full. We started to hurt each other due to the increased workload" (H12)

The nurses who participated in the study expressed the fear of working during a successive, large, small, and destructive earthquake. Healthcare workers do not feel safe while working in multi-storey hospital buildings and this situation frightens them. Working in fear brings with it feelings of anger and helplessness. They considered it "unfair" that their teammates did not come to their shifts while they were working without security of life and this situation caused them to feel anger. Traumatic events are so unexpected that the individual does not have enough time to get used to this new process. The individual is defenseless in the face of the trauma and cannot do anything to prevent the trauma [2]. The feelings of anger, fear, anxiety, and obligation brought about by this helplessness were clearly expressed by the nurses in our study.

Hospitals are institutions that have to provide service 24 hours a day, 7 days a week. In order for the service to be continuous, employees must work in shifts or on-call systems, public holidays, weekend holidays, disasters, and extraordinary situations. Nurses who choose their profession by considering all these conditions and accepting them start to question their professional choices when natural disasters such as earthquakes happen to them. In our study, many nurses stated that they decided to change their profession after the earthquake and it was observed that having to come to work even in extraordinary situations caused them to compare their profession with different professional groups. Studies have shown that working in shifts and 24-hour service system has negative effects on the physiological and psychological health of individuals and this situation negatively affects the safety of both employees and patients [3]. Nurses' long working hours, physically poor working conditions, time pressure, excessive workload cause physical and psychological wear and tear [4].

On the other hand, it was stated that 20% of the nurses had the desire to change their profession at the first opportunity. In the same studies, the reasons for not continuing in the profession were shown as high workload and risks, limited social opportunities, and lack of respectability of the profession in society [5, 6].

On the other hand, these reasons were stated as dissatisfaction with management, low wages, poor working conditions, lack of advancement opportunities, and length/length of working conditions.

In our study, many nurses reported that they did not come to work especially in the first days of the earthquake because of their family responsibilities. In addition, it was observed that the families of the nurses did not welcome them to go to work in case of a disaster [7]. The study showed that one of the main reasons for leaving the profession was family reasons. In the study, it was observed that marriage, having children, unwillingness of the spouse, and pregnancy were among the answers to the open-ended question [8]. Family reasons ranked fourth among the reasons for leaving the profession [9]. In a study conducted in Turkey, it was found that nurses' having young children was a harbinger of leaving the profession. In a study conducted in our country, it was determined that nurses frequently experienced family problems such as carrying work home, not being able to take care of their spouse and children sufficiently, and disrupting their responsibilities at home [10]. It is understood that experiencing these problems would be an effective reason for leaving the profession. In a similar study conducted in Sweden, similar results were reported under the heading of personal reasons such as 'family reasons, pregnancy and childcare' [11]. On the other hand, in another study conducted in Sweden, it was stated that childcare was not effective in the decision to leave due to the care facilities provided [12]. In our study, some nurses stated that they would not be absent from work if a suitable environment was prepared in the hospital where they could stay with their families or if there was a place where they could entrust their children.

The earthquake survivor nurses who participated in our study stated that they could not find food, especially in the first days of the earthquake; they stated that there was no food left for the hospital staff because the earthquake survivors outside the hospital came to the hospital for food, they forgot that they were earthquake survivors and they were perceived as robots doing work. In intensive care units where instant and critical decisions are taken for the care and treatment of life-threatening patients and where even a small mistake can result in death, it is of vital importance to ensure adequate nutrition of nurses providing health services and thus to keep their concentration at the highest level [13]. In addition, it has been revealed as a result of research that people's eating habits affect their stress levels [14]. The view that nutrition contributes to emotional well-being is increasingly recognized. It is known that deficiencies in various nutrients not only lead to impaired cognitive functioning and depressed mood but also to aggressive behavior [15].

In our study, most of the nurses stated that their houses were damaged in the earthquake and that they could not concentrate on work because of thinking about their families who were homeless in the cold. In addition, due to the damage to natural gas lines in the earthquake, there was a heating problem in the region and the nurses stated that they had to work in the hospital by feeling cold. Providing sustainable health services in disaster periods is only possible by meeting the needs and expectations of health personnel. It should not be forgotten that health personnel working in hospitals in the earthquake zone are also earthquake victims. For the sustainability of health services, the needs of health personnel such as security, communication, psychological support, accommodation, hygiene, transport, and nutrition should be met [16]. The provision of physical security and shelter services are among the most basic needs of a disaster victim [17]. Studies have shown that the turnover rate of mother nurses working in hospitals with nurseries decreases [18]. Nurses who have a shelter to go to when their shift is over and know that their family is safe will work more comfortably.

In our study, nurses stated that they had transportation problems and could not come to the hospital because they could not find a car or they had to sleep and get up in the hospital. Health institutions should be able to provide needs such as transportation of hospital personnel, heating of the hospital, and providing clean work clothes for the health personnel working in the hospital [19]. In our study, nurses mentioned that they could not find clean uniforms to wear while working and that the uniforms they wore were so dirty that they smelled. Healthcare workers do not hesitate to ignore their life safety in order to protect the health of patients and save their lives. The provision of clean uniforms is a part of the process of ensuring safety, meeting the needs, and supporting the nurses who work at the front line in disaster periods [20]. Hospitals need to be self-sufficient in the first 72 hours and even more. In a study conducted in 31 hospitals in Ankara in 2006, the existence of disaster (emergency) plans of hospitals and their disaster preparedness were investigated. In the findings of this study, it was found that the disaster plans of the hospitals were not sufficient and they were not prepared for disaster [21]. The nurses stated that they wanted to know that the hospital in which they worked was intact and they wanted to feel safe during the disaster process in which aftershocks continued. Pan American Health Organization (PAHO) and World Health Organization (WHO) define the concept of a safe hospital as "hospitals that do not collapse in disasters, do not kill patients and staff, can continue to provide services and serve as a critical community facility when badly needed, and can organize the health workforce to maintain network activities".

In our study, nurses stated that they did not receive disaster training and therefore they did not know how to approach sick babies during an earthquake. Studies have shown that the perceptions of nurses who have received disaster training about disaster preparedness are higher than those who have not received training.

In our study, it was observed that nurses were emotionally exhausted due to the increase in workload during the earthquake process, that they had to work in a work-centered rather than patient-centered way due to the decreasing number of nurses, that they could not concentrate on work due to the fear caused by the great earthquake and the ongoing aftershocks, and that this situation affected the department and the patients.

Excessive workload, on the other hand, is defined as the fact that the roles of the employees in the workplace are more than the normal level and that they perform jobs that strain their capacity and wear them out physically and mentally [22]. In the literature, the relationship between the workload levels of employees and different variables has been discussed and it has been stated that excessive workload affects employees negatively in many ways. In our study, nurses stated in the category of "looking at the stethoscope" that they constantly checked whether the stethoscope hanging at the head of each incubator was shaking or not. This is an indication that their attention was on the earthquake and their concentration on the patients was constantly interrupted. Psychological and physical relaxation of nurses is a part of disaster programs in order to relieve them from the fears related to the great earthquake and aftershocks and to enable them to focus on their work with a clear mind.

## Conclusion

The findings of this study showed that healthcare professionals who are both earthquake victims who have been exposed to earthquake trauma and who are trying to provide healthcare services to earthquake victims in hospitals need help and support. Although the 2023-Turkey earthquake had positive effects on healthcare professionals such as "empathy, stress management, team spirit, personal development, spiritual satisfaction, and self-esteem", it was forgotten that healthcare professionals were disaster victims in this earthquake as in many disaster situations, and they were expected to provide uninterrupted healthcare services despite the traumas they were experiencing.

The study also revealed that in-service trainings on disasters should be given routinely in the hospital, joint studies and trainings should be carried out with other public institutions providing services in the field of disaster, drills should be organized, mutual aid agreements covering issues such as eating, drinking and sheltering in case of disaster should be organized, and research and development activities on determining disaster hazard and risk and reducing disaster damages should be prioritized. Meeting the necessary shelter and nutrition needs not only for healthcare workers but also for their families will ensure that healthcare workers have a comfortable psychology and focus on their work. In addition to all these, it was concluded that cooperation between hospitals and organizing drills, establishing volunteer teams operating in the field of disaster, encouraging these teams and supporting their work, and supporting health personnel involved in various organizations (UMKE, volunteer firefighting, etc.) will increase hospital disaster preparedness.

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