Original Article

Identifying the Challenges of Intensive Care unit Caregiving in the Face of COVID-19 Pandemic: A Qualitative Study

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Abstract

Background: The COVID-19 pandemic created an unprecedented challenge for intensive care units (ICUs) compared to other clinical wards. In addition, it caused stressful conditions due to the increased mortality rates in these wards.
Objectives: Since the identification of these challenges can serve as a road map for managers in future planning against crises, the present study aimed to identify the challenges of ICU caregiving during the COVID-19 pandemic.
Methods: This qualitative study used conventional content analysis and was conducted using unstructured deep interviews with an open question and several co-constructive questions in 2023. A total of 23 ward heads, head nurses, nurses of ICU wards, nursing managers, and supervisors of six teaching hospitals affiliated with Isfahan University of Medical Sciences and Yazd Universities of Medical Sciences were included in the study through a purposive sampling method. Data analysis was performed with MAXQDA10 using qualitative content analysis with a conventional approach.
Results: The challenges of ICUs in the COVID-19 pandemic were identified and categorized into six main categories and 14 sub-categories. The main categories included: inefficient management of resources, weaknesses in organization, challenges to laws and regulations/policies, structural challenges, weaknesses in educational processes, and mental challenges.
Conclusion: The findings of this study showed that it is possible to provide quality services to patients by identifying the challenges affecting the management and provision of nursing services and taking appropriate measures to improve the quality of nursing services in the intended wards.

Keywords: COVID-19, Intensive care unit (ICU), Hospital, Nursing service management, Qualitative study, Service quality

1. Background

The spread of the coronavirus was one of the most dangerous pandemics in human history that plagued the world in 2019 wherein the emergence of different types and mutations of this virus affected the lives of billions of people (1), leading to the daily increase in the number of infections and mortality caused by it (2). According to the latest statistics of the World Health Organization, by February 2023, more than 756 million people were affected by COVID-19, more than 6 million deaths were reported, more than 7 million people were infected, and 144,000 deaths occurred in Iran (3).

The COVID-19 pandemic challenged the national, regional, and global capacities for preparing and reacting to it, highlighting the necessity for crisis management (4). Among many components of crisis management in disasters facing an increase in morbidity and mortality rates, the most important role is undoubtedly, played by medical centers, especially hospitals, in treating patients (5, 6). In critical conditions, including the outbreak of COVID-19, hospitals should not only perform their routine tasks, but also be responsible for high number of patients and clients (6). As a result, it is necessary for hospitals to increase capacity in multiple components, including physical space, employees, facilities, strategies, etc. (7).

2. Objectives

Based on the studies conducted so far, due to the fact that hospitals usually are confronted with unpredictable conditions, to meet the needs of patients, they encounter challenges such as an insufficient number of personnel and financial resources, lack of equipment and supplies, and drug shortage, as well as stressful conditions (8, 9). With the spread of COVID-19 in Iranian hospitals, many clinical wards have been repurposed and dedicated to the hospitalization of patients with this disease. Many patients with COVID-19 needed special care due to life-threatening acute respiratory conditions. Given the highly infectious nature of this disease along with the lack of an effective vaccine against this virus, especially in the early peaks, the workload of intensive care units (ICUs) increased greatly. According to some statistics, almost 20% of patients with COVID-19 needed hospitalization (10), and 5%

of them were hospitalized in ICUs ([11]).

Consequently, The COVID-19 pandemic created an unprecedented challenge for intensive care units (ICUs) compared to other clinical wards. In addition, it caused stressful conditions due to the increased mortality rates in these wards ([12]). Consequently, identifying the challenges of ICUs from the point of view of medical staff and officials can be used as a road map for managers and health policy-makers for future planning against crises caused by pandemics. Given the importance of the topic under study, the present research was conducted to identify the challenges of ICUs during the COVID-19 pandemic.

3. Methods

The present qualitative study used conventional content analysis and was conducted using unstructured deep interviews in teaching hospitals affiliated with Isfahan University of Medical Sciences and Yazd University of Medical Sciences, Iran, in 2023.

3.1. Participants

The research population consisted of heads, head nurses, nurses of ICU wards, nursing managers, and supervisors of teaching hospitals affiliated with Isfahan and Yazd medical universities. The total number of participants was 23 people from six teaching hospitals. Hospitals with the most patients at the time of admission were selected. After referring to the Nursing manager of each hospital, the desired personnel were selected according to the subject of the study in the hospital. Inclusion criteria were: the participant's consent for participating in the research and employment in the ICU wards for at least one year. Sampling was performed using the purposive sampling method until data saturation was achieved.

3.2. Data Collection

Data was collected using unstructured deep interviews. The interviews started with the open-ended question: "State the challenges you had in the ICUs of the hospital during the outbreak of COVID-19". The co-constructive questions were raised based on the participants' answers to previous questions (co-construction technique) to clarify the concept under study. The mean duration of the interviews was 60 min.

3.3. Data Analysis

Data were analyzed using qualitative content analysis with a conventional approach. Data were collected through interviews and open-ended questions, and concepts were extracted after reaching data saturation. Data analysis was done by repeated reading of the texts; then, coding was done, and finally, the main categories were extracted. Coding was done at three levels: 1) first-level codes, which were intrinsic as they were the same words used by the participants, and 2) second-level codes in which the first-level codes were placed in a category or cluster based on their relevance forming the second-level code. In so doing, the codes of the second-level were obtained by compressing and summarizing the codes of the first-level, and 3) third-level codes that were obtained from combining and compressing the codes that were similar to each other in the second level. Finally, researchers and experts reached a common agreement on the meaning of the data, subcategories, and themes. The data analysis was run by MAXQDA10.

3.4. Data Strength

To increase the accuracy and strength of the data, the Guba & Lincoln ([13]) criterion was used. For data strength, the four criteria of Guba and Lincoln (1994), including credibility, transferability, dependability, and conformability, were considered by the researchers in the study stages. The researcher had a long-term relationship with the participants for the credibility of the data, and it was also tried have the necessary diversity among the participants in terms of knowledge, experience, work experience, age, and gender. By repeating the consecutive steps of data collection and analysis and using experts' insights, data dependability was increased. Moreover, in all stages of the work, to create more dependability, frequent interviews were conducted, and the details were recorded. To ensure conformability, after forming the initial codes, the participants' opinions were obtained for the correctness of the codes and interpretations, and in case of if inconsistency between the codes and opinions, necessary corrections and revisions were made. In addition, the method of expert control was used by two experts in the field of qualitative research, and consensus was reached on the selected codes and categorization.

4. Results

4.1. Demographic Characteristics of the Participants

The interviewees included 2(8.6%) hospital heads, 2(8.6%) managerial staff, 3(13.4%) nursing managers, 3(13.4%) clinical supervisors, 4(17.3%) ward managers, 4(17.3%) ward heads, and 5(21.7%) nurses. The mean age of the interviewees was 39 ± 14.8 years. Furthermore, 14(60.8%) participants were female and 9(39.13%) were male. Moreover, 19(39.13%) people had Bachelor's and Master's degrees, 3(13.04%) people were specialists, and 1(4.34%) person had a PhD. The mean working experience of the participants was 19.3 years ([Table 1]).

Table 1. Demographic characteristics of the interviewees participating in the study

Demographic characteristics	Frequency	Percentage
Sex		
Female	14	60.8
Male	9	39.13
Degree of education		
Bachelor's and Master's degrees	19	39.13
specialists	3	13.04
PhD	1	4.34
Organizational position		
hospital heads	2	8.6
managerial staff	2	8.6
nursing managers	3	13.4
clinical supervisors	3	13.4
ward managers	4	17.3
ward heads	4	17.3
nurses	5	21.7
Mean age	39±14.8 years	
Mean working experience	19.3 years	

4.2. Extraction of Categories and Subgroups

Based on the content analysis of the conducted interviews, six main categories and 14 subcategories were extracted. The main categories included: inefficient management of resources, weaknesses in organization, challenges to laws and regulations/policies, structural challenges, weaknesses in educational processes, and mental challenges.

Table 2. Categories and subcategories extracted as challenges of intensive care units in the COVID-19 pandemic.

Table 2. Categories and subcategories extracted as challenges of intensive care units in the COVID-19 pandemic

Category	Subcategory	Sample codes
Inefficient management of resources	Inappropriate facilities and equipment	- Breakdown of ward equipment - Failure to provide equipment on time -Inadequacy of personal protective equipment
	Improper management of human resources	-Excessive work shifts -Severe shortage of manpower -Restriction of personnel leave
	Lack of optimal allocation of financial resources	-Improper distribution of per case payment -Delay in the per case payment - Decreased hospital income and decreased per case payment
Weakness in organization	Poor extra-organizational cooperation (other organizations)	-Lack of support from cooperating and supporting organizations - Non-cooperation of private hospitals in the hospitalization of COVID patients
	Poor intra-organizational cooperation	-Conflicting decision-makings - Lack of interactions between wards - Inconsistency between paraclinic and treatment wards in patient admission
	Weakness of organizational supervision	- Lack of supervision of wards -Lack of shift supervisors
Challenges to laws and regulations/policies	Inconsistency in the content of the communicated protocols	-Circulations of conflicting protocols - Lack of involvement of stakeholders in developing protocols
	Lack of implementation guarantee of protocols/laws	-Lack of higher-order monitoring of protocols - Lack of implementers' knowledge of the protocols
Structural challenges	Inappropriate physical space	-Severe lack of physical space - Lack of proper ventilation system
	Inefficient management of hospital information	- Multiple data recording systems for COVID patients - Absence of a specific person responsible for recording data in the headquarters and hospital area
Weakness in educational processes	Weakness in the quality of training programs	-Closure of clinical training -Insufficient training to work in ICU wards - Virtual holding of courses
	Weakness in educational needs assessment	- Inadequacy of programs with personnel needs - Improper prioritization of programs
Mental challenges	Occupational burnout	- Conflict between the treatment staff and patients' companions -Severe fatigue caused by double workload
	Lack of emotional and organizational support	-Lack of appropriate incentive policy - Managers' lack of understanding of the working conditions of personnel

4.3. Inefficient Management of Resources
4.3.1. Improper facilities and equipment

From the viewpoint of interviewees, it is necessary to create suitable working conditions and provide quality personal protective equipment for the effectiveness of the performance of nurses in the field of care.

"...We had a shortage of personal protective

equipment. Every time we told them, they said that it was rationed. The interesting thing was that the masks or gowns that they gave us were of low quality; either the rubber or zippers would come undone, or the gowns would tear apart..." (Participant 10).

4.3.2. Improper management of human resources

From the perspective of the participants, the number of patients in the wards was increasing due to the spread of COVID-19 in the community. Due to the fact that many of them were ill and hospitalized in ICUs without the possibility of patient companions, there was a lot of pressure on nurses.

"...the staff had very heavy work shifts, they would stay late at night, it would be morning and night again and again, but, well, they were getting weaker; yet, there was no other way; the nurses truly cooperated, especially because the patients had conditions that they did not have a companion..." (Participant 18).

4.3.3. Lack of optimal allocation of financial resources

All healthcare systems in the world have limited resources, and fair allocation of sources should be a priority. According to the participants' opinions, another challenge was the lack of optimal allocation of financial resources during the crisis.

"...because these were critical circumstances and the hospitals did not have enough financial resources concerning crisis management, we had difficult conditions. Unfortunately, there was no proper management in allocating the limited financial resources...". *(Participant 2).*

4.4. Weaknesses in Organization
4.4.1. Poor inter-ward cooperation

The interviewees pointed out the extent of the presence of different and extensive executive stakeholders in this program and considered the organization and coordination between the organizations of the coalition to be important in achieving the goals; however, no effective cooperation was observed in the present study.

"... Other hospitals in the province, such as private and charity hospitals, did not cooperate in admitting COVID patients, though they had the facilities, and the burden was on the shoulders of governmental hospitals...". *(Participant 12).*

4.4.2. Poor intra-ward cooperation

From the viewpoint of the participants, the low intra-organizational cooperation between the service units and the interaction of ICUs was among the challenging issues in COVID-19 management.

"...we had multiple problems with para-clinical services, physiotherapy, and ICU nutrition; at the beginning of Corona, none of them were willing to come because of Corona. The mental aspect is very important for staff and patients. *(Participant 5).*

4.4.3. Weaknesses of organizational supervision

According to the participants, the absence of continuous organizational supervision or the presence of weak supervision from the macro levels to the lower levels can be associated with a decrease in the quality of services provided to patients.

"...because we had a crowd of patients in the ward and sometimes all our in-patients were critically ill, and co-workers were working under stressful conditions, there was a real need for the matron and the patient safety and infection control units to come and monitor much more in the ICUs ....". *(Participant 18).*

4.4.4. Challenges of laws and regulations/policies

Inconsistency in the content of the communicated protocols

From the viewpoint of the participants in the COVID-19 crisis, the circulation of multiple and sometimes contradictory protocols led to confusion and the impossibility of making correct decisions in some cases.

"... Protocols were coming from different parts, and we didn't know which one to implement. They were coming from the vice president of treatment and the health center. The protocols were coming continuously....". *(Participant 9).*

4.4.5. Lack of implementation guarantee of protocols/laws

From the participants' viewpoints, executive guarantee and continuous monitoring of the communicated protocols is of great importance, especially in times of crisis.

"...nothing is going to happen by merely issuing a protocol. It should go for the exact implementation. It is really difficult to implement the protocols accurately in a crisis...." *(Participant 21).*

4.5. Structural Challenges
4.5.1. Inappropriate physical space

From the perspective of the participants, the inappropriate physical space increases the time of service provision, in addition to the lack of proper management of patients, ultimately leading to dissatisfaction among patients and staff.

"In the ICU in which we began to hospitalize COVID patients, we did not have visibility to all patients. The first and most important standard that should be in the physical space of an ICU is that the nursing station should be located centrally and have visibility to all patients..." *(Participant 4).*

4.5.2. Inefficient management of hospital information

The participants considered the frequent registration of patients' information in different systems, the resulting waste of time, and the scattering of reports as their other challenges during the COVID-19 crisis.

"… The multiplicity of systems for recording the information of Corona patients was really a challenge. I used to enter data as a matron in one system; the supervisor of health education entered them in another system, and still, the statistics manager in another…". *(Participant 14)*.

4.5.3. Weaknesses in Educational Processes
Weakness in the quality of training programs

With respect to holding training classes, the importance and goals of these programs, the educational content, and also the course instructor play an essential role in improving the quality of clinical services, especially during a crisis.

"….they employed the ICU staff in COVID ward without evaluating their skills and receiving the necessary training, and sometimes they were transferred to different wards by the supervisor…" *(Participant 16)*.

4.5.4. Weakness in educational needs assessment
The participants addressed the lack of attention to the educational needs in the management of COVID-19 patients by the educational supervisor and the lack of prioritization of their required courses/programs as other challenges.

"…. We only think about filling the beds and earning income, while if the needs of nurses were assessed during COVID and they were trained according to the needs, we would not have so many challenges and even deaths in the field of treating patients…".*(Participant 2)*.

4.6. Mental Challenges
4.6.1. Occupational burnout
The stress caused by COVID-19 is associated with the incidence of mental disturbances. Factors such as the difficulty and pressure of work, the lack of incentives and rewards, and the high load of tasks are influential in the occurrence of occupational burnout.

"…that we didn't know what to do, that we could never go out and had to bear this nasty mask, all these have complications, there is depression, the staff became aggressive…". *(Participant 17)*.

4.6.2. Lack of emotional-organizational support
From the perspective of the participants during the COVID-19 crisis, due to the increase in workload and stress in ICU wards, more attention should be paid to this category by managers.

"…They used to come to visit our ward a lot in the beginning; that made the fellow workers feel encouraged, but when some time passed, we didn't see any of the officials anymore…" *(Participant 15)*.

5. Discussion

The present study was conducted to investigate the challenges of providing nursing services during the COVID-19 crisis from the perspective of officials and nurses working in hospitals to offer insights and helpful solutions to officials and policy-makers to prepare for similar situations.

One of the main challenges mentioned in this study was the inefficient management of resources. Equipment and facilities are characteristics of the physical environment that affect the effectiveness and efficiency of nursing programs and services [14]. The lack of personal protective equipment, discrimination in the provision of protective equipment, and the lack of diagnostic tests were issues that have been addressed as challenges in other studies, which are consistent with the results of the present study [9, 15-17]. These problems have occurred in epidemics due to the increase in demand, poor management of resource distribution, and lack of preparation in crisis management; if the equipment is not provided on time, it puts nurses at risk of contracting COVID-19.

Corona epidemic in Iran and many other countries exposed hospitals to challenges such as an increasing number of patients and a lack of nursing staff [9, 18-20]. In this situation, improper management of human resources can lead to poor implementation of hospital missions through unfavorable performance in providing services to patients [14]. Consistent with the results of the present study, Nantsupawat et al. and Ghavidel et al. stated that the lack of personnel, high workload, and long working hours led to high exhaustion of nurses, resulting in increased errors and reduced patient safety which is consistent with the results of the present study [14, 21]. In a similar study, Magro et al. aimed to identify the main challenges of subspecialty hospital management in Italy during the COVID-19 pandemic; they reported that "flexible workforce allocation" is one of the most important factors affecting the hospital's ability to properly manage services during the COVID-19 pandemic which is consistent with the results of the present study [22]. Therefore, the flexible reassignment of employees to different wards of the hospital based on need and access is one of the ways of getting eliminating the challenge of human resource management and lack of workforce.

Lack of financial resources and inappropriate allocation of available resources were among other challenges. The challenge of insufficient resources during the epidemic has put nurses in many countries at risk [9, 14, 18, 20, 23]. The decrease in non-emergency patient visits and in the specific income of governmental hospitals, accompanied by the dramatic increase in the costs of hospitals to treat COVID-19 patients, are among the reasons for creating such a problem. Therefore, in addition to the need to increase the budget allocated to the hospital in health crises, the hospital management needs to formulate a plan to effectively use the available resources and prevent the waste of resources.

In the face of crises related to the health sector, organizing the health system and the cooperation of other organizations and wards will be very helpful; this was a challenge in the present study. Intra-ward cooperation can be more coherent in the form of freeing the staff in less crowded parts of the hospital, transferring them to the corona wards (24), interdisciplinary cooperation, and more comprehensive teamwork. Nonetheless, in their study, Ghavidel et al. considered the existence of discrimination in different treatment wards as the reason for the reduction of interdisciplinary cooperation and teamwork in hospitals which is consistent with the results of the present study and one of the possible causes of which is that due to the importance and emphasis on the role of the nurse in the time of COVID-19; other departments, including paraclinics, did not have strong intra-departmental collaborations (14). However, hospital nursing service managers must identify innovative ways to reorganize and provide a nursing workforce in emergencies.

The challenges identified in the field of laws and regulations included the non-uniformity of the content of the circulated protocols and their implementation guarantee. Similarly, in China, different interpretations of organizational processes and "personal protective equipment" protocols have led to confusion among nurses (25). In the study by Nyashanu et al., from the perspective of the participants in the research, the lack of policies and protocols for epidemic control and management in England caused the lack of preparation in the caregiving wards (26). Similar to the present study, the existence of variable and sometimes contradictory protocols was a challenge reported by the American Health and Human Services Organization (27). Furthermore, the lack of implementation guarantee of the medus operandi in a Chinese study, caused people not to follow the guidelines for preventing the transmission of contamination outside the corona wards in hospitals (25).

The management of nursing services during the COVID-19 era was faced with structural challenges, including inappropriate physical space and inefficient management of hospital information. A study by Fan et al. in China confirms the above challenge. Because in some wards, the special closets of healthcare personnel were located right outside the patient's room due to the limited space in the ward, and the limited layout of the hospital interfered with the management of space for using "personal protective equipment". Improper placement of devices in the environment created potential risks for the treatment staff (25), which was not reported in the current study among the categories. Ghavidel et al. also pointed to the physical factors of the environment (e.g., noise, crowding, inappropriate light) as a challenge (14), which is consistent with the results of the present research. Therefore, in many hospitals,

inpatient wards became special wards that had no proper ventilation for COVID-19 patients.

Weaknesses in educational processes, including poor quality of educational courses and educational needs assessment, were among other reported challenges. Consistent with the findings of the current study, Ghavidel et al. reported the management's lack of attention to holding regular and quality training sessions for nurses (14). Weakness in educational processes was also reported as a challenge by nurses in Sweden in a study by Bergman et al. Nurses who were transferred to ICU needed proper training and were often not supported by such trainings (28). In China, the lack of training on the correct use of personal protective equipment was a big challenge that exposed healthcare personnel in the workplace to the risk of COVID-19 transmission (25), consistent with the results of the present study. In some studies, along with technical skills, non-technical skills such as communication and decision-making, cognitive skills (28), problem-solving and violence control (14), and how to deal positively with stressful factors have been suggested to improve nurses' performance.

Another focus of attention in the current study was mental challenges, which included lack of emotional and organizational support and occupational burnout. This finding is consistent with previous research that examined the psychological impact of work during the pandemic on nurses and other healthcare professionals (29,30). Studies of occupational burnout due to fatigue and physical illness have reported reduced flexibility, increased experiences of anxiety, depression, and stress as a result of working during the COVID-19 pandemic (29,30). Considering this issue, a hospital in Italy provided a group of psychologists for its employees from the onset of Corona to receive free remote counseling services regarding their work stress problems. Additionally, this hospital reduced the work shifts from 8 h to 6 h to diminish the physical fatigue of nurses during the COVID era due to high number of patients and the difficulty of wearing special COVID protection clothes (22).

The nurses participating in the present study described the inefficiency of the organization in supporting them as another important challenge in the Corona era. Consistent with the results of the present study, Ghavidel et al. (14), Moradi et al. (9), and Sezgin et al. highlighted the lack of attention to staff's welfare, salaries, and extra payments of careers in Iran and Turkey, and incriminate it as the culprit for diminished job satisfaction and inclination for work leave by nurses.

5.1. Limitations of the Study

Limiting the current study to the emergency wards and ICUs of a few selected hospitals in two provinces of Iran may limit the transferability of the findings. Thus, future studies could examine the

views of other treatment groups and hospital wards in other provinces of the country.

6. Conclusion

The present study depicted a clear picture of the challenges of providing care in ICUs from the perspective of working nurses during the COVID-19 pandemic crisis based on their experiences. The results of this study showed that it is possible to provide quality services to patients by identifying care challenges in the field of providing nursing services and taking appropriate measures to ameliorate the quality of nursing services in the relevant wards. A deep understanding of these challenges in the current critical situation can help healthcare service managers to take appropriate measures to solve these challenges, provide healthcare facilities, support the health workforce, provide accurate and evidence-based information, and conduct psychological interventions about how to deal with these challenges.

Acknowledgments

Footnotes

Conflicts of Interest: No potential conflict of interest was reported by the authors.

Authors' Contributions: RA, NH, NB: concept and study design. NH, HGH, ZR: data collection. AE, NB, RA, MH: analysis. AE, NB, RA: writing the article. RA, OS, NB: critical revision of the article. AE, NB: statistical analysis. RA, NH, NB, HGH, ZR, OS, MH, AE: final approval of the article.

Ethical Approval: This article was the result of a research project approved with code of 13086 by the Research Council of the Clinical Research Development Center of Shahid Rahnemoun Hospital, Yazd, with Code of Ethics: IR.SSU.SRH.REC.1401.001. First, the purpose of the study was explained to the participants, and their informed consent was obtained. If they refused, the interview was not conducted. Further, permission was obtained to record the participants' voices, and at the beginning of each interview, participants were assured of anonymity and confidentiality of the information.

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