CLINICAL PRACTICE

Experience of non-ICU nurses and factors influencing the resiliency while working in ICU during the covid-19 pandemic in a tertiary hospital

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ABSTRACT

Background and objective: The coronavirus outbreak in 2019 has created unprecedented pressure on health care staff and material resources such as PPEs, Ventilators, Oxygen supplies, hospital beds etc. Ensuring an adequate supply of nurses to maintain a high standard of care and safe infective care practices in the phase of the increased patient load is a huge challenge for all stakeholders. Utilizing non-ICU nurses for ICU care is an option. However, factors that influence the optimal selection and coping behaviour (resilience) of a non-ICU nurse are not well examined. In this paper, we "adopt a mixed method design" to determine the suitable specialty staff for ICU attachment during a pandemic. I will emphasise the significance of educational training and preparation of critical care on non-ICU nursing staff in relation to their adaption and coping level throughout this study. The objectives of this study were (1) to explore experiences, perceptions and factors influencing resilience of non-ICU nurses during the COVID-19 pandemic and (2) to review the lived experience of non-ICU nurses after the critical care competency training programme.

Methods: After obtaining the comments from the Dissertation Review Board, the study adopted a mixed method study design. We selected 76 samples (eight males and sixty-eight females) by "non-probability convenient sampling". We used a survey for data collection lasting 8 weeks. We used descriptive (frequency, percentage distribution, mean and standard deviation) and inferential statistics to analyse the data collected.

Results: The study revealed that most of the staff (75%) met the prepared objectives of the orientation program. Approximately 90% of the staff agreed that they are able to take care of critically ill patients with minimal supervision. Further, 29% of the staff stated that psychological preparation & staff readiness are the first priorities to be considered before ICU attachment. We also evaluated the ability of the staff to bear the ICU workload, and 51% of the staff reported it being bearable. This number is similar to the number of staff who reported suitable health status to physical exertion needs of the ICU. Staff age, marital status, gender, qualification, area of experience, and years of experience did not influence staff coping mechanisms. However, the attachment staff with previous ICU exposure have effective coping mechanisms during their attachment in ICU.

Conclusions: In shortage of ICU staff in case of a pandemic, staff with neurology and neurosurgery background showed a higher confidence and coping level to ICU stressful environment. Furthermore, staff with other clinical backgrounds can work effectively during this circumstance with organized training, preparedness plan, effective clinical follow up and psychological support. All these factors facilitate the coping mechanism.

Key Words: Coronavirus disease 2019, SARS-CoV-2, Critical care, Staff nurses' allocation, Pandemic preparedness, Resilience

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1. INTRODUCTION

Background & review of literature

The new coronavirus COVID-19 outbreak has created unprecedented global pressure on healthcare systems.

During a pandemic, Intensive Care Unit (ICU) staffing ratios are usually not sustainable. It is necessary to increase the critical care personnel with the necessary supervision. Furthermore, prior and just-in-time training of supporting staff should be considered, and a list of staff outside the ICU with useful skills should be developed and maintained.[1] However, challenges should be considered before selecting of staff from other departments, since selecting a staff today means potentially not being able to select more suitable staff tomorrow. Carter and Notter (2020)[2] added that medical and nursing staff "becomes infected or exposed, quarantined and unable to work causing additional workforce pressures". In addition, hospital infrastructure needs to be adapted to respond to the increasing demands of oxygen, air and power supply and critical care equipment. Due to the novel and invisible nature of COVID-19, this acute challenge put a psychological strain on health care practitioners in the acute care setting of ICUs.[3]

The Ministry of Health in the Sultanate of Oman prepared a disaster response plan to enhance critical care preparedness and provide resources to develop strategies and implementation of the plan. In a tertiary hospital in Oman, a total of 117 nursing staff was pulled from different departments to support the ICU during the COVID-19 pandemic as preparation for the first wave. As a result, the significance of "educational training and preparation"[4] of critical care on non-ICU nursing staff had to be emphasized. All nurses included underwent a training period that ensures both theoretical and clinical orientation. The training program ensured staff awareness in regards of Infection control measures, especially during COVID- 19, Management of the critical care patient with invasive and non- invasive ventilation, medication administration in ICU, etc. Even though, staff had different orientation spans, the organization administrators had to select a new group of nurses secondary to pandemic situation. For this, all staff were recruited under an ICU experienced preceptor's supervision and training. In addition, clinical facilitators ensured clinical competency using an ICU competency checklist. Furthermore, clinical facilitators ensure continuous feedback and psychological support.

Choosing a critical care nurse is so challenging and should be based on their training, qualification, competency and interest.

2. METHODS

2.1 Study design, setting and sampling

After obtaining the comments from the Dissertation Review Board, the study adopted a mixed study design. The study was conducted in a large tertiary hospital in Muscat, Oman: Khoula Hospital with a bed capacity of 600. A total of 76 participants were selected from non-ICU nurses attached to the ICU between the periods from 29th March 2020 to 30thApril 2021 by non-probability purposive sampling method. Nurses were selected irrespective of their age, gender, years and areas of experience. However, nurses who had less than 2 months of the attachment period in ICU were excluded. Omani staff nurses (interns) with less than one year of experience in the clinical area and those who refused to provide consent were also excluded. A well-structured questionnaire was provided for the samples to explore their perception about ICU and to measure their stress and coping level.

2.2 Research tool

A well-structured survey questionnaire was used to measure stress level. "The questionnaire used to explore the perception developed by Kandeel and Ahmed in 2019" was adopted after getting their permission. Modifications of the tool were done based on review of literature, clinical experience, and discussion with the peer-group. After modification, validation of the tool was done by clinical experts from varied specialties before its use and by pilot study conducted among 10% of the samples and these participants were excluded from the main study.

The research tool consisted of three sections. Section I included demographic data consisting of age, qualification, years of experience, area of experience, attachment period in ICU & marriage and offspring; Section II: Perceptions regarding ICU training programme among the ICU attachment staff. The items in this section were arranged under three themes with a 5-point Likert scale: Nurses' perception regarding training and learning experience of ICU Placement, nurses' perceptions regarding emotional wellbeing during pandemic of COVID 19, and nurses' perceptions regarding challenges experienced during ICU placement. Section III is the Modified Lazarus Coping Scale which examines staff coping levels from various aspects of ICU environment, such as confidence level, tension, fatigue, mental frustration and coping strategies adopted by the staff. A copy of the questionnaire is attached in "Appendix 1".

2.3 Scores interpretation

Theme number 1 of the questionnaire (Nurses' perception regarding training and learning experience of ICU Placement) consists of 19 statements with a maximum score of 5 and the

minimum score of 1. The total score is 95. Those who scored between 0-19 were considered as strong disagreement to the training and learning process of ICU placement, between 19-37 considered as disagreement, between 38-56 considered as uncertainty, between 57-76 considered as agreement and 77-95 considered as strong agreement to the training process. Theme number 2 of the questionnaire (Nurses perception regarding emotional wellbeing during pandemic of COVID 19) consists of 13 statements with a maximum score of 5 and the minimum score of 1. The total score is 65. Those who scored between 0-13 were considered as strong disagreement that the pandemic of COVID-19 had an effect on the emotional wellbeing, between 14-26 considered as disagreement, between 27-39 considered as uncertainty, between 40-52 as agreement and between 53-65 as strong agreement. Theme number 3 of the questionnaire (Nurses perception regarding challenges experienced during ICU placement) consists of 9 statements with a maximum score of 5 and the minimum score of 1. The total score is 45. Those who scored between 0-9 were considered as strong disagreement that there were challenges in ICU placement, between 10-18 considered as disagreement, between 19-27 considered as uncertainty, between 28-36 as agreement, and between 37-45 as strong agreement. The Modified Lazarus Coping Scale was interpreted into three main categories: inadequate coping (scale from 13-25), moderate coping (scale of 26), and adequate coping (scale from 27-39).

Data Analysis. Qualitative and quantitative data were collected concurrently in this study. Data was analysed using "conventional content analysis".[5] This method allows to compare findings from qualitative and quantitative data sources. Integration was done through reading and coding the qualitative data as well as the quantitative data. Data was assessed using parallel constructs. Both types of data were separately analysed. Both descriptive and inferential statistics were used to analyse the data. SPSS was used to analyse the data and p value were calculated for each data to analyse its level of significance in the study.

2.4 Ethical Approval

The study was approved by the ethical committee of Khoula hospital. Participants voluntarily signed informed consent before the participation in the study and were assured that they have the right to do voluntary withdrawal at any point during the study.

3. Results

Seventy-six ICU attachment nursing staff (eight males and sixty-seven females) consented to participate from different specialties. The majority of participants were 30-40 years old (53%), 25% were above 40 years and 22% of them were 20-30 years. Table 1 presents a summary of demographic characteristics of the respondents of the study.

Table 1. Distribution of Demographics

The Variable	Total (%)
Staff Age Group:	
20-30 years	17 (22)
30-40 years.	40 (53)
Above 40 years.	19 (25)
Staff Gender:	
Male	8 (12)
Female	68 (88)
Staff Qualification:	
Diploma in Nursing.	39 (51)
Bachelor Science in Nursing.	33 (43)
Master of Science in Nursing.	2 (3)
Others.	2 (3)
Years of Experience:	
Less than 5 yrs.	13 (17)
5-10 yrs.	21 (28)
10-15 yrs.	24 (32)
More than 15 yrs.	18 (24)
Area of Experience:	
Critical Care Unit (operation theatre, neonatal intensive care, Burn Intensive Care and Accident and emergency)	27 (36)
Orthopaedic Ward	12 (16)
Neurology & Neurosurgery	9 (12)
Maternity	7 (9)
Plastic Surgical	8 (11)
General Surgical	12 (16)
Paediatric Surgical.	1 (1)
Marriage and Offspring:	
Married with Children.	52 (68)
Married without Children.	8 (11)
Unmarried.	16 (21)

*Rounded to the nearest decimal.

The analysis of the questionnaires distributed to the staff resulted in capturing their experiences and perceptions regarding the ICU training program and staff coping behaviors in the ICU during the COVID-19 pandemic. In terms of the orientation program, the study revealed that most staff (75%) met the prepared objectives of this program. Almost three-fourths of the respondents believed that the orientation program was well-structured and organized to meet their learning needs, with approximately 20% who strongly agreed with this statement. Table 2 below illustrates staff perception about the theory program sessions.

The clinical placement in ICU is determined through many aspects. About 18% strongly agreed that they received a clear explanation of the objectives and duration of ICU attachment

with about 15% strongly disagreeing with this statement. Some of them suggested to "inform prior" to placing the staff in critical areas. A majority of the staff almost 83% is agreed and strongly agreed that the ICU setting gave them a great chance to learn and gain lots of critical learning aspects. The majority of the staff 75% also agreed and strongly agreed that the competency checklist was provided with clear guidance (kindly refer to appendix 2 for ICU Orientation checklist). However, almost 35% disagreed or were uncertain about the feedback with regards to their clinical performance. With regard to the availability of preceptor and/or clinical facilitator for guidance and support of the attachment staff, 75% of the respondents' agreed it was available whenever needed. However, 17% of them disagreed. In terms of being able of taking care of critically ill patients with a minimal supervision, approximately 90% agreed in being to do so. They added that each preceptor must be with their preceptee in the initial 2 months at least to acquire critical care nursing skills. 53% of participants stated strongly that the evaluation methods were clearly explained.

Table 2. Staff perception about theory session

The Variable	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Theory Session Prior to ICU Posting.					
Met the identified objectives.	11 (15%)	46 (60%)	9 (11%)	5 (7%)	5 (7%)
Well-Structured and Organized.	15 (20%)	41 (54%)	10 (13%)	6 (8%)	4 (5%)

*Rounded to the nearest decimal.

Table 3. Staff perception results about ICU clinical placement

The Variable	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Clinical Placement in ICU.					
The Objectives and Duration of ICU Attachment were Explained Clearly.	9 (18%)	27 (36%)	14 (18%)	15 (20%)	11 (15%)
Competency checklist and clear guidance about the checklist.	18 (24%)	39 (51%)	9 (12%)	7 (9%)	3 (4%)
Availability of Preceptor/Clinical facilitator to guide whenever needed.	17 (22%)	40 (53%)	6 (8%)	12 (16%)	1 (1%)
Ability to take care of one critically ill and ventilated patient with minimal supervision.	28 (37%)	41 (53%)	3 (4%)	2 (3%)	2 (3%)
Evaluation methods of training & learning in ICU were explained clearly.	8 (10%)	40 (53%)	12 (16%)	12 (16%)	4 (5%)
Feedback of Preceptor/Facilitator/In charge about clinical performance of the staff.	14 (18%)	35 (46%)	10 (13%)	15 (18%)	2 (3%)
The intensive care setting was a good learning environment.	20 (26%)	43 (57%)	6 (8%)	5 (6%)	2 (3%)

*Rounded to the nearest decimal.

Table 5 shows that staff age, marital status, gender, qualification, area of experience and years of experience did not influence staff coping mechanisms. However, 84% of staff with previous ICU experience having a good coping mechanism during their attachment.

4. Discussion

This study was conducted to determine the factors affecting resiliency of non-ICU staff while working in ICU during COVID-19 pandemic in order to provide recommendations for suitable staff for ICU attachment during a pandemic. This study revealed that the majority of the staff experienced stress during placement because of many reasons and there was no significant relationship between areas of experience (specialty) with staff coping behaviors. Most staff who scored good coping behavior were from neurology, neurosurgery, orthopedics, and general surgery. Clinically, it was observed that staff who were with neurology and neurosurgery backgrounds coped very well with the ICU stress environment than other specialty. This can be because most of hospital ICU admissions were neurology and neurosurgery cases. Staff from Neuro-units were more cooperative and showed team spirit. "Staff coping level is higher when working in the similar environment".[6]

Table 4. Staff perception results about challenges experienced during their attachment

Challenges experienced during ICU posting	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Psychological preparation for ICU clinical practice.	9 (12%)	14 (18 %)	18 (24%)	22 (29 %)	13 (17%)
Staff general health status suitability with ICU physical exertion	8 (11%)	32 (42%)	14 (18%)	14 (18%)	8 (11%)
Ability of staff to bear ICU workload.	10 (13%)	29 (38%)	19 (11%)	15 (20%)	3 (4%)
Ability to integrate knowledge into practice	16 (21%)	50 (66%)	8 (10%)	0 (0%)	2 (3%)
Adequacy of Resources	12 (16%)	29 (38%)	19 (11%)	10 (13%)	6 (8%)
Staff in ICU were cooperative and supportive	18 (24)	41 (54%)	15 (20)	1 (1%)	1 (1%)
Training period was adequate to practice in ICU	18 (24)	42 (55%)	14 (18%)	1 (1%)	1 (1%)
Nursing leaders were helpful and supportive	18 (24)	42 (55 %)	14 (18%)	1 (1%)	1 (1%)

*Rounded to the nearest decimal.

Table 5. Summary of staff coping ability based on different variables Lazarus coping scale

Variable	Moderate Coping	Adequate Coping	Total	*p* value (less than .05)
Years of Experience:				
Less than 5 yrs.	4 (31%)	9 (69%)	13	3.93
5-10 yrs.	8 (38%)	13 (62%)	21	
10-15 yrs.	4 (62%)	20 (83%)	24	
More than 15 yrs.	7 (84%)	11 (61%)	18	
Total	23 (30%)	53 (70%)	76 (100%)	
Area of Experience:				
Critical Care Unit (operation theatre, neonatal intensive care, Burn Intensive Care and Accident and emergency)	9 (33%)	18 (67%)	27	0.30
Orthopaedic Ward	3(25%)	9 (75%)	12	
Neurology & Neurosurgery Wards	2 (22%)	7 (78%)	9	
Maternity Ward	4 (57%)	3 (43%)	7	
Plastic Surgery Ward	1 (13%)	7 (87%)	8	
General Surgery Ward	4 (33%)	8 (67%)	12	
Paediatric Surgery Ward	0 (0%)	1 (100%)	1	
Total	23 (30%)	53 (70%)	76 (100%)	
Prior ICU Experience:				
Yes	5 (16%)	26 (84%)	31	0.023
No	18 (40%)	27 (60%)	45	
Total	23 (30%)	53 (70%)	76 (100%)	
Staff Gender:				
Male	2 (25%)	6 (75%)	8	0.30
Female	21 (31%)	47 (61%)	68	
Total	23 (30%)	53 (70%)	76 (100%)	
Staff Age Group:				
20-30 yrs.	8 (47%)	9 (53%)	17	5.14
30-40 yrs.	8 (20 %)	32 (80 %)	40	
Above 40 yrs.	7 (37 %)	12 (63%)	19	
Total	23 (30%)	53 (70%)	76 (100%)	
Staff Qualification:				
Diploma in Nursing.	13 (33%)	26 (67%)	39	0.61
Bachelor Science in Nursing.	9 (27%)	24 (73%)	33	
Master of Science in Nursing.	0 (0 %)	2 (100%)	2	
Others.	1 (50%)	1 (50%)	2	
Total	23 (30%)	53 (70%)	76 (100%)	
Marriage and Offspring:				
Married with Children.	15 (28%)	37 (71%)	52	0.3
Married without Children.	2 (25%)	6 (75%)	8	
Unmarried.	6 (43%)	8 (57%)	16	
Total	23 (30%)	53 (70%)	76 (100%)	

*Rounded to the nearest decimal.

In terms of investigating the correlation between prior ICU exposures with coping among the attachment staff of DGKH, a significant result found between prior ICU experience with coping behaviors than those with no ICU experience. Our study showed that 84% staff with previous ICU experience having a good coping mechanism during their attachment. These results were similar to the study of Carter and Notter (2020)[2] who stated that those with previous critical care experience are preferable for ICU Attachment. In addition, Martland (2020)[7] suggested to identify staff with prior critical care experience as an alternative staffing resource. This is also supported by Fernandez-Castillo et al. (2021)[8] who found that the need for critical care specialty increased and the work without any prior experience in critical care can lead to more stress, isolation and dehumanization which lead to frustration and burnout for both groups, specialized nurses and the unspecialized nurses. This was also investigated in our study in terms of workload and staff coping ability. This means that prior ICU experience can help staff to manage stress and workload during a pandemic. Therefore, it is recommended to maintain the skills gained by the inexperienced staff who had ICU exposure in the ICU during the pandemic. In addition, it is important to consider training all the staff who have no experience in an ICU setting.

Resulting analysis from our study revealed that staff age, marital status, gender, qualification, area of experience and years of experience did not influence staff coping mechanisms. Clinically, aged staff especially with co-morbidities showed less engagement compering to the young generation. The ability of the staff to bear the ICU workload was also evaluated and 51% of the staff (39 staff) reported it being bearable. This number is similar to the number of staff who reported suitable health status to physical exertion needs of the ICUs. This result support the administrators of DGKH decision to exclude staff with comorbidities from ICU attachment. However, Kim et al. (2020)[9] found that the more the age of the staff the less the stress experienced during the pandemic. This could be explained by how people perceive stress differently, despite their age. According to Carver and Connor-Smith (2010)[10] person's response to stress differently depends on personal preference and environmental factors. Nevertheless, since the study found that age does not affect nurses coping skills in critical area, this is an interesting result when planning regular training for staff in ICU despite their age. In terms of years of experience, although our study showed there is insignificant effect of years of experience of coping skill, however a study by Kim et al. (2020)[9] found that there is negative correlation between years of experience and stress related to working with COVID-19 patients. This could be explained by most of our sample having at least 5 years of experience or more which is also suggestive of good coping skills. This provides two options for management, either to select staff who has five years of experience or, more to support in ICU or in any pandemics or to involve more of less than five years of experience in future study.

With regard to staff experience of their clinical placement in the ICU, the study revealed a satisfactory level about staff placed in the ICU. This was investigated through their perceptions on the orientation program and their learning experience. Most staff reported that they received adequate information about the objectives and the duration of attachment in ICU. At the same time, staff demonstrated a very good percentage (83%) about their learning experience as the ICU environment provides them with good opportunities to learn. This could be emphasized as staff have their competency checklist which acts as a guidance and provides them with lot aspects in regard of critical care practice. Furthermore, the availability of a clinical preceptor facilitates staff learning process during their attachment. In addition, the ICU leaders were also providing clinical support and guidance as a majority of participants stated. Subsequently, staff would be able to work independently. In this regard, the study demonstrated the majority of staff (90.7%) were able to take care of ventilated critically ill patients with a minimal supervision. These factors could play a significant role in supporting and releasing of stress especially during pandemic situations. This resulted in improving general health staff status suitability with the ICU physical exertion demands as being demonstrated by 76 staff, in comparison to the study conducted by Danielis et al. (2021)[12] which found that the immediate recruitment for ICU nurses resulted in feeling frightened of the unknown while others experienced a lack of information and preparedness. This difference can be explained with the variable of the data collection time as the sample who answered the questionnaire were recruited in the second wave whereas those on the first wave need to be investigated. Hence, our study shows the importance of clear information, explanation of expectations, and transparency with recruited nurses which could help in overcoming the stress.

In addition, lack of resources in providing of care was experienced by almost one quarter of the participants with at least one out of ten being uncertain about the adequacy of resources. "In a disease outbreak, requirements for equipment and supplies including PPE increase tremendously".[12] This can be improved through the identification of essential resources to be used during the pandemic and the careful use of these resources, including PPEs.[12] Another challenge stated by the participants is that staff were not prepared psy-

chologically prior to their attachment. The majority of the staff experienced inadequate psychological preparation for ICU attachment Huang et al. (2020),[13] suggested to provide "more psychological support to nurses" and to "adopt better training in coping strategies". Additionally, it is recommended to "address the psychological problems of ICU nurses who care for patients with COVID-19 and take action as soon as possible to relieve the psychological pressure on these nurses. Clinically (by general observation) it was noticed some staff recorded with high number of sick leaves as they were not satisfied with the ICU placement without preparing them physically and psychologically.

4.1 Strength of the study

Our study had several strengths. Data collection was cost effective and its versatility. The study enables to prove the relationship between the variables, prior ICU experience and coping abilities which will enhance further strategic planning for the stakeholders during such pandemic in the future. Further our knowledge, this is the first study in Oman addressing the above objective.

4.2 Limitations of the study

Staff with prior ICU experience was less as samples included in the study. The study sample size was small and used a convenient sampling method, and thus cannot extrapolated.

5. Conclusion

In shortage of ICU staff in case of a pandemic, staff with neurology and neurosurgery background showed a higher confidence and coping level to ICU stressful environment. Furthermore, staff with other clinical backgrounds can work effectively during this circumstance with organized training, preparedness plan, effective clinical follow up and psychological support. All these factors facilitate the coping mechanism.

Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

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