

RESEARCH ARTICLE

Perception of other healthcare professionals about the nurses' role and competencies in veno-venous extracorporeal membrane oxygenation care: A qualitative study

Muna Alshammari¹  | Chitra Vellolikalam¹  | Sadiq Alfeeli²

¹College of Nursing, PAAET, Shuwaikh Educational Region, Adailiyah, Kuwait

²Medical and Surgical Services, Taiba Hospital, Sabah Al-Salem, Kuwait

Correspondence

Muna Alshammari and Chitra Vellolikalam, College of Nursing, PAAET, Shuwaikh Educational Region, Adailiyah, Kuwait. Emails: alshammari_pinky@msn.com (M.A.); chitrarajith@gmail.com (C.V.)

Abstract

Aim: This study aimed to explore the perception of other healthcare professionals, including the doctors, physiotherapists and perfusionists, about the nurses' role and competencies in veno-venous extracorporeal membrane oxygenation.

Background: Extracorporeal membrane oxygenation is considered as a challenging clinical activity that requires critical decision and rapid response from nurses, particularly in emergencies. It was observed that nurses are primarily responsible for bedside management of these patients, and teamwork was found helping the nurses to manage this high-acuity care. However, little is known on the perception of other healthcare professionals about the nurses' roles and competencies, which would contribute to further improvements in quality extracorporeal membrane oxygenation care.

Design: This was a qualitative descriptive study.

Methods: One-to-one in-depth interviews were conducted with nine healthcare professionals working in extracorporeal membrane oxygenation care in an adult intensive care unit of a general hospital in Kuwait.

Results: Participants reported that nurses play critical and multiple roles and responsibilities in the insertion, maintenance, weaning, and retrieval of extracorporeal membrane oxygenation, plus providing general nursing care, and performed their roles competently. Heavy workload, less recognition and support, and individual differences in competence were reported as possible barriers to the nurses' performance.

Conclusion: Other healthcare professionals recognize continuous training, having experience, teamwork, and increased staffing as measures that can promote the nurses' role in extracorporeal membrane oxygenation.

KEYWORDS

adult intensive care, advanced practice/nurse specialist roles, competencies, multidisciplinary team

All authors of this review meet the criteria for authorship and approved this paper as they are my workplaces colleagues and entitled to authorship.

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *Nursing Open* published by John Wiley & Sons Ltd.

1 | INTRODUCTION

Extracorporeal membrane oxygenation (ECMO) is a complex and invasive treatment that allows the lungs to rest and recover from respiratory failure while minimizing further iatrogenic ventilator-induced lung injury associated with conventional systems and can improve survival rates and outcomes of patients with severe acute respiratory distress syndrome (ARDS) (Paolone, 2017). ECMO is a hyper-advanced technology that can take over heart and lung function for people who are critically ill and is commonly administered in the ICU setting (Mosier et al., 2015). Previous viral illnesses in recent times such as MERS and H1N1 have shown to present good results from ECMO (Savarimuthu et al., 2020). According to the Extracorporeal Life Support Organization (ELSO), the technique could save up to half of the seriously ill COVID-19 patients for whom ventilation is not working (Beys et al., 2020). WHO recommended that expert centres consider ECMO support in COVID-19-related ARDS with refractory hypoxemia if lung protective mechanical ventilation was insufficient to support the patient (Barbaro et al., 2020). This intervention, therefore, is strongly considered in patients with severe lung injury secondary to COVID-19 (Savarimuthu et al., 2020). In COVID-19 patients with severe ARDS, veno-venous (VV) ECMO was a rescue therapy that allowed ultraprotective ventilation and improved patient oxygenation (Jozwiak et al., 2020).

The role of the intensive care nurse is continually expanding to incorporate these technological advances in the intensive care setting over the past few years (Botsch et al., 2019). ECMO may save a life by providing pulmonary support for the critically ill patient with severe respiratory distress and present an awarding challenge to the intensive care unit nurse (Gay et al., 2005).

Effective care and positive outcomes of the ECMO patient necessitate optimal interdisciplinary management from the healthcare team, including expert care from specially trained registered nurses (RNs) (Botsch et al., 2019). Recently 23 nurses from an adult intensive care unit in Kuwait underwent specialized training in ECMO following the Ministry of Health ECMO committee policy, which was formulated as per ESLO guidelines. Nurses as extracorporeal membrane oxygenation specialists are becoming a trend nowadays as this improves patient outcomes (Hackmann et al., 2017).

2 | BACKGROUND

According to ESLO, the ECMO specialist is 'the technical specialist trained to manage the ECMO system and clinical needs of the patient on ECMO under the direction and supervision of an ECMO-trained physician (extracorporeal life support organization (ELSO), 2013). Internationally, specialists come from a range of professional backgrounds, including perfusion, nursing, physiotherapy, and medicine (Daly et al., 2017). ECMO specialist is responsible to manage the ECMO system and the clinical needs of the patient on ECMO under the direction and supervision of a licensed ECMO-trained

physician (ELSO Guidelines 2010). The use of extracorporeal life support (ECLS) worldwide has increased exponentially, and educating bedside nurses to manage ECLS circuits broadens the availability of trained providers (Hackmann et al., 2017). With the recent COVID-19 outbreak, ECMO has been found very useful for the treatment of severe forms of COVID-19 and has been successfully implemented in various hospitals (Alshammari et al., 2020).

The growing demand of ECMO care necessitates the need for more specialized nurses. As ECMO specialists, nurses have significantly more autonomy and responsibility in managing all aspects of patients' care needs on a 24-hr basis, and to have the technical skills and knowledge to safely manage the ECMO circuit with perfusion backup for the more complicated aspects of circuit management (Daly et al., 2017). Nurses viewed themselves as competent to perform their role, and this competency was attributed to training, experience and teamwork (Alshammari et al., 2020).

Extracorporeal membrane oxygenation management requires multidisciplinary teamwork (Alshammari et al., 2020; Ratnani et al., 2018), and ECMO nurses require the support of other colleagues and management to be able to adequately execute their role (Alshammari et al., 2020).

Despite nurses reporting that teamwork played a key role in enabling them to provide ECMO care and to achieve favourable outcomes (Alshammari et al., 2020), they viewed themselves as being disrespected when communicated to harshly by some colleagues, which they considered a negative influence on their work relationships and output (Alshammari et al., 2020). Many of the nurses also felt overwhelmed due to the absence of team spirit and high expectations placed upon them when encountering new and challenging clinical scenarios even when lacking experience (Wellman, 2017). Furthermore, it is recommended that nurses who provide frontline care be acknowledged and rewarded for their selfless effort to boost their morale (Alshammari et al., 2020; Honey & Wang, 2013).

Literature on perceptions of the role of ECMO nurses by other healthcare professionals is limited in the area; however, existing literature in other fields has shown their role to be appreciated by OHCPs. In a study by Oyetunde et al. (2014) that explored the perception of patients and other healthcare professionals about the attitude and behaviour of nurses working at one university college hospital, the authors reported that the quality of care provided by the nurses in terms of behaviour and attitudes was appreciated by both other healthcare professionals and patients.

Other healthcare professionals and nurses work together as a team, and one cannot work alone without the other as teamwork is very crucial to manage the complex critical ECMO care. In this context, examining the perceived roles and competencies of nurses and the perceived gaps from the perspective of other healthcare professionals who would be in day-to-day contact with the nurses will give more insight into the role of nurses in ECMO. As nurses need adequate preparation and adaptation to deal with this complexity of care, scrutinizing their role and competencies can be used to discern and describe how effective they are in carrying out their duties

as professionals. In addition, this helps in identifying areas that may need improvement and to facilitate safe and quality care provision.

3 | METHODS

3.1 | Design

A descriptive qualitative approach was adopted, using tape-recorded interviews. Semistructured interviews were used to allow for flexible data collection that resulted in a rich detailed description of the perceptions of other healthcare professionals regarding the roles and competencies of nurses in ECMO care.

3.2 | Setting

The study was conducted in a general hospital under the Ministry of Health (MoH) in Kuwait. The hospital was selected because it offers VV ECMO (which is the focus of the current study). This hospital provided education and training to prepare nurses and other healthcare providers to become specialized in ECMO.

3.3 | Participants and data collection

3.3.1 | Sampling and sample size

Purposive sampling was adopted for the selection of participants. The study sample included a total of nine other healthcare professionals who worked in the adult section of the ICU at the respective hospital. We approached nine OHCPs who all accepted to take part in the study. Participants' biodemographic characteristics are provided in Table 1 below.

TABLE 1 Biographical characteristics of participating OHCPs (N = 9)

Variable	Years	N	Per cent (%)
Gender	Female	4	44.4
	Male	5	55.6
Country of origin	Kuwait	5	55.6
	Egypt	2	22.2
	India	2	22.2
Designation	Surgeon	1	11.2
	Physician	3	33.3
	Physiotherapist	2	22.2
	Perfusionist	3	33.3
Years of ECMO experience	1 year	1	11.2
	2 years	3	33.3
	3 years	2	22.2
	4 years	3	33.3

3.3.2 | Data collection and management

The researcher introduced herself to the participants before the commencement of interviews and explained the purpose of the study to them. To ensure privacy of all information, only authorized individuals were allowed at the interview sessions. A semistructured interview guide was used during the interview procedure, and every participant got interviewed only once. All interviews were in the English language and lasted between 30 and 50 min. An audio recorder was used to record the interviews after which they were transcribed verbatim. The first author, who was a PhD student at the time, an experienced qualitative researcher and a chronic disease expert, transcribed the interviews. To ensure anonymity of participants, all identifiable materials were removed from the interview transcripts before analysis. Co-authors cross-checked all transcribed material to ensure their accuracy. Key insights from the interviews were captured as field notes and were incorporated in the analysis.

3.3.3 | Maintaining rigor

To maintain rigor, all authors were involved in the coding process. The lead researcher's background could have an influence on the research, and this was put into consideration throughout the data analysis and interpretation. Member checking, which could have provided more strength to the research, was not done due to resource constraints.

3.4 | Data analysis

Data analysis was guided by Braun and Clarke's 15-point checklist (Braun & Clarke, 2006), following the outlined strategies, that include the following: (a) data preparation and organization, (b) coding and condensing of codes into resultant themes and (c) data presentation in the form of a discussion. Data analysis was initiated by getting familiar with the data through reading and re-reading of the text. Throughout the data analysis process, memos and other explanatory notes were captured. The initial phase of data analysis followed an inductive thematic analysis approach, which generated codes that guided further analysis. NVivo12 software was used to manage the data analysis process. Regular meetings among the researchers were held to discuss the emerging analysis and to conclude on the generated themes. Data saturation, where further analysis did not generate new codes, guided the number of participants that were included in the study. We also concluded the data collection after the generated data had addressed the objectives of the study.

3.5 | Ethical considerations

Ethical approval was provided by (Ethics approval number: 2018/948). In addition, we sought permission to undertake the

study from the concerned ICU (Ethics approval number: 2018/948) and written informed consent was provided by all study participants. Participant's confidentiality was ensured by using codes to identify them and by restricting access to all study information to only the research team. Hard copies of all materials regarding the study will be kept in a lock-protected cupboard at the primary author's office for 7 years after the study closure.

4 | RESULTS

The findings of the current study suggested that ECMO nurses play a critical role in the management of VV ECMO. The main study findings are presented as three main themes: perception about ECMO nurses' role, perception about ECMO nurses' competencies and concerns about ECMO nurses, and factors affecting the role of ECMO nurses. These are supported by excerpts from participants' verbatim.

4.1 | Perception of other healthcare professionals about ECMO nurses' role

4.1.1 | Importance of nurses in ECMO management

Nurses were perceived to be key players in ECMO care by OHCPs, and their role was regarded as critical since it was considered holistic and patient-centred. The nurses' role was attributed to good outcomes of patients in ECMO.

The nurse is part of the team as he/she is with the patient in a 24-hour base. The nurse checks everything related to ECMO patient and machine, any problem happened in tubing or catheter, the nurse understand the problem that might happen to the patient (OHCP - 1).

Participants acknowledged that ECMO work highly depends on nurses. They acknowledged that nurses perform multiple roles and take care of both machines and patients. Thus, ECMO nurses emerged as a highly dependable cadre of staff in ECMO care, with some admitting that ECMO work cannot progress without the contribution of nurses. 'We cannot start ECMO without the nurse' (OHCP - 5).

Study participants described nurses as key team players and their role attributed to the early detection of any complications. This was a key strength of the nurses' role since quick action is a life-saving strategy for patients who are completely dependent on ECMO. Nurses were viewed as the frontline personnel to identify and report any changes in the ECMO patient's condition and as participants reported 'they are the ones who identify and notify the doctors if there are any issues' (OHCP - 4). To some OHCPs, nurses

are viewed to be the most apt professionals to care for a VV ECMO patient and machine.

4.1.2 | Roles and responsibilities of ECMO nurses

Nurses were reported to perform multiple roles/responsibilities, which are considered challenging and complex. According to OHCPs, the nurses' responsibilities include frequent monitoring of the patient, the machine and the circuit based on the checklist, to reduce risks of complication and/or deterioration, for example, ensuring that cannulas are not dislodged and continuously monitoring the ECMO machine and circuit for any signs of bleeding, infection, displacement, etc. The presence of ECMO nurses is therefore always required to ensure that regular nursing duties such as personal care and mobilization of patients are addressed.

If any changes in machine settings or readings, the nurse knows about the source of the problem if by the machine itself or other issues with the patient (OHCP - 2).

4.1.3 | The multidisciplinary role

The participants reported that teamwork played an important role in the management of ECMO. ECMO nurses were viewed as key team players and were regarded as the most active members of the team, who are always available for any help if needed in the management of ECMO. For many procedures such as physiotherapy and respiratory therapy, OHCPs cannot work independent of the nurses. Additionally, the nurses' presence is required at all times to provide bedside care including mobilizing the patient, giving a bath to the patient, turning the patient and assisting with diagnostic procedures and tests such as transferring the patient for CT scanning or X ray.

'our team includes a doctor who fixes the catheter, the ECMO nurse helps the doctor in catheter insertion and all the needed equipment must be prepared by the nurse' (OHCP - 3).

Thus, nurses are considered as an essential part of the ECMO team and their role is regarded as central in-patient management.

4.2 | Other health care professionals' perception of ECMO nurses' competencies

ECMO nurses are required to demonstrate several competencies, based on the knowledge and skills framework. Generally, nurses

were viewed as knowledgeable and competent in performing their roles. OHCPs reported that nurses demonstrated competence in performing various procedures related to operating the ECMO machine and management of the patient on ECMO. Nurses were reported to perform their role with ease and appropriateness, and capable of attending most of the complications that arise during ECMO.

Our nurses can manage all these complex issues and can compensate and manage the overload. They are knowledgeable and meeting expectations. They are skilled and cooperative, and they like learning and training. They ask us questions to clarify their doubts (OHCP – 4).

The competence of nurses was attributed to their long-term experience in ICU, and the trainings were received before and during their ECMO care role. Nurses who previously worked in ICU gained a lot of knowledge regarding ECMO, which improved their competence in providing ECMO care. In addition, a specialized training in ECMO was provided to nurses at the start of their role and later was repeated to address any knowledge gaps that were identified. Considerations for training involved needs assessment to address the specific individual training needs of the staff, as well as their attitudes towards ECMO.

We have a list of nurse competency policy. While training nurses for ECMO, some of them will understand the concepts quickly by one day itself and some of them will take two weeks to understand ECMO. So, if she/he could not reach the competency, she/he is not capable of being an ECMO nurse (OHCP – 2).

Continuing education is given to the nurses to refresh and update them on new innovations. This is undertaken as compulsory drills every 3 months and includes theory and practical workshops. The specialized trainings and experiences enabled nurses to develop critical decision-making skills and to make rapid responses during emergencies, sometimes independent of other healthcare staff as OHCPs report.

There was a situation when the system stopped. Soon the nurse discovered there is air bubble, and she did the right thing like clamping, oxygenation and managed perfectly till the saturation returned to 95% while that time she called the perfusionist to arrive. (OHCP – 3)

OHCPs appreciated the nurses' work and their cooperation and confidence to deal and cope with the daily tasks. The nurses' competences in the management of ECMO was generally attributed to the adoption of adequate protocols, continuous training and ongoing experience received during their practice.

4.3 | Factors affecting the role of ECMO nurses

OHCPs observed that several factors affect the nurses' work while providing ECMO. These mainly include heavy workload, a lack of appreciation from colleagues and supervisors, and variation in competence of the individual nurses.

4.3.1 | Work overload

The majority of participants in the study acknowledged that nurses working in ECMO are overloaded with duties due to a shortage of staffing in the unit. Generally, it is recommended that an ECMO nurse will be assigned to only one patient, and each ECMO patient is cared for by an ECMO nurse and a bedside nurse. However, in current practice, it was reported that one nurse may attend to 2–3 ECMO patients. Due to the shortage of ICU staff, sometimes ECMO nurses attend to both ECMO and ICU patients together, which increases their workload. Managing an ECMO patient is a very complex task, and management of two or three cases in a shift can be exhausting and devastating for the nurses. OHCPs observed that ECMO nurses are often overwhelmed with work:

What I noticed is the shortage of staff which makes them overloaded and exhausted. Normally it should be a 1:1 ratio (OHCP – 3).

Heavy workload was considered disadvantageous to the nurses' role. OHCPs noted that heavy workload may reduce the nurses' efficiency and may result in undesired effects. For example, nurses needed to be on standby to look out for any emerging complications or emergency conditions, which they may not be able to do when overwhelmed with work. They recommended a reasonable number of patients per nurse to facilitate quality care of the patients.

Two patients for one nurse will be good, because at any time anything can happen as an emergency (OHCP – 8).

4.3.2 | Lack of recognition and support

Some participants expressed a concern of lack of support for nurses from colleagues and supervisors. The effort nurses invest in managing ECMO patients usually results in physical and mental strain yet sometimes goes unrecognized. OHCPs feared that this lack of support could result into demotivation and consequently poor performance of nurses, which can lead to poor patient outcomes. The participants observed a need for recognition/appreciation of ECMO nurses to improve their motivation at work.

Nurses need appreciation as they are working under pressure most of the time. We observe some

situations where the nurses feel they are underappreciated (OHCP – 5).

4.3.3 | Individual differences in competence

Even though all nurses allocated in ECMO are trained to handle emergencies, their competence and comfort levels for performing particular procedures vary. According to the OHCPs, variations exist in regard to how nurses perceive and cope with the ECMO roles, and these differences influence the way nurses work. For example, some nurses were reported to have difficulties in coping with complex situations while managing ECMO, while others were reported to lack creativity and critical thinking skills, and ability to cooperate with other staff.

Some nurses have known how to manage things quickly and others take time with them to understand and know and sometimes they forget. So, it varies. If we have such nurses who do not know much so we do not want her with us (OHCP – 2).

To lessen on the barriers affecting the ECMO nurses' role, OHCPs recommended the need for continued supervision and monitoring of the work of nurses. In addition, continuous training was recommended to enhance the nurse with updated knowledge in ECMO management. Finally, OHCPs felt that workload challenges could be addressed through an innovation that involves arranging on-call nurses to attend to ECMO retrieval and discussing with the concerned authority for the overtime benefits for those who are working extra hours.

5 | DISCUSSION

5.1 | OHCPs perception of the role of nurses in ECMO

The present study aimed to establish how other healthcare professionals working in ECMO perceived the roles and competencies of ECMO nurses. In general, OHCPs perceived the nurses' role to be very important and critical in the ECMO team. Nurses manage both patients and the ECMO machines, which are key aspects in ECMO care. As Daly (2017) explains, the ECMO specialist nurse is expected to understand and manage both the patient and circuit, and the potential patient-circuit interaction. The current study demonstrated that ECMO nurses possess the qualities of a competent ECMO specialist nurse, through their diverse roles such as setting and running the ECMO machine, troubleshooting, assisting in insertion, stabilizing the patient, retrieval and bedside management of the patient. In addition, OHCPs described the majority of nurses as competent in maintaining the functionality of the ECMO equipment, which promoted patient recovery. It is observed that

good functionality of the ECMO equipment ensures highly protective ventilation (Courtin et al., 2012) and achieves the desired patient outcomes. OHCPs in the current study reported that nurses ensured optimal functioning of ECMO equipment, which contributed to good patient outcomes.

5.2 | OHCPs perception of the competence of nurses in ECMO

The findings of the current study indicated that OHCPs perceive ECMO nurses as competent professionals capable of working independently. It is observed that the highly trained ECMO specialist possesses advanced knowledge and skills to manage troubleshooting and to ensure that the care provided to ICU patients is timely, safe and reliable (O'Connor & Smith, 2018). It is also recommended that ECMO staff should be highly competent in intensive care, ECMO physiology and physics, cannulation and intensive care transport (Broman et al., 2015). Providing nurses with advanced ECMO management skills and engaging them in refresher trainings will empower them to continue to provide safe care to the patients (Hackmann et al., 2017).

In the current study, the nurses' competence was evaluated on the basis of their knowledge and skills, and OHCPs viewed them as competent and confident while dealing with complications arising during ECMO. In a recent study that evaluated the nurses' perspectives in ECMO care, nurses also viewed themselves as competent and attributed their competency mainly to the training received and to the experience spent providing ECMO care (Alshammari et al., 2020). Similar to Alshammari et al. (2020)'s study, participants in this study attributed the nurses' competence in ECMO management to their specialized training and continued experience in the ICU setting, which empowered them to manage ECMO care through early detection of complications and taking appropriate measures to resolve the identified issues.

5.3 | The multidisciplinary role of ECMO nurses

Previously ECMO was considered as mainly the role of a perfusionist, but currently the nurses' role is important and integrated in ECMO management. The current study reported that nurses work as part of a team, and their contribution was highly rated. Our findings align with other research, which suggests that continued education of nurses in ECMO management improves their competence and performance, providing more qualified staff for ECMO management (Hackmann et al., 2017). Due to their scope of work, additional training and experience, nurses are reported to possess unique knowledge and skills to safely manage the ECMO circuit, with perfusion backup for the more complicated aspects of circuit management (Daly et al., 2017), in addition to attending to other needs of the patient. In current practice, a "two carers" approach is adopted in many centres where the ECMO specialist nurse works

collaboratively with a bedside nurse (Daly, 2017). Although still relatively new, the model adopted by the ECMO team at ICU in Kuwait is dependent on the constant presence of a nurse specialized in ECMO care and a committed bedside ICU nurse, who work in collaboration with a multidisciplinary ECMO team. When the ECMO nurse works alongside the ICU bedside nurse, bedside care becomes more effective (Hijjeh, 2017). Moreover, ECMO patients require regular/constant observation and care, which requires a standby nurse (Boling et al., 2016; Hijjeh, 2017).

Multidisciplinary roles and teamwork are essential in ECMO management (Alshammari et al., 2020). In their role as ECMO specialists, nurses have significantly more autonomy and responsibility in caring for patients and the ECMO machinery (Wellman, 2017). It has been observed that nurses manage the emergencies by themselves, and the major problems are rectified with the help of on-call perfusionists or doctors. In the present study, participants reported that ECMO nurses are confident and competent to manage complications and technical emergencies within their scope of practice, a finding reported in a recent study (Alshammari et al., 2020). OHCPs reported that during emergencies nurses had to intervene before other professionals arrived to save the life of the patient. This was attributed to the specialized ECMO training they received and the ongoing continuous training that improved their competency. As O'Connor and Smith (2018) observe, registered nurses trained as advanced ECMO specialists can coordinate care with a bedside nurse, provide comprehensive 24-hr coverage for both the patient (e.g. complex hematological, fluid and sedation management) and the ECMO circuit (e.g. titration of blood flow and sweep gas flow) and may only consult with the perfusionist backup if needed. It is also noted that ECMO nurses should be able to provide early warning if the patient develops signs of a worsening condition (Courtin et al., 2012) and be skilled in recognition of risk factors involved in the patients (Broman et al., 2015). As team players, ECMO nurses should, however, keep the rest of team members updated on the progress of the patients to the rest of the providers (Botsch et al., 2019).

5.4 | Perceived barriers to the ECMO nurses' role

OHCPs expressed their concerns regarding the ECMO nursing shortages and the negative effects that could arise out of these shortages. The scarcity of ICU nurses consequently affected the workload of ECMO nurses. In a previous study, ECMO nurses were working on an average of 1:3 patients as opposed to the recommended average of 1:1 or 1:2 nurse-patient ratio (Alshammari et al., 2020). The nursing shortages have been reported to lead to errors and higher morbidity and mortality rates (Botsch et al., 2019). It has been reported that nurses working in hospitals with lower staffing levels experience exhaustion and lack of job satisfaction compared with those with adequate staffing levels, and this might result into poor care to the patients (Haddad et al., 2021). Patient care under ECMO combines nursing related to heavy intensive treatment (immobility, sedation, enteral and parenteral nutrition), acute monitoring of very restrictive

mechanical ventilation and ECMO. This explains why this nursing workload may require nurse staffing adaptation, allowing one nurse per patient (Courtin et al., 2012). These findings highlight the need to train more ICU nurses on ECMO management to improve staffing levels in ECMO care.

It was also reported in the current study that a lack of recognition/appreciation by colleagues and/or supervisors was a demotivating factor to the work of ECMO nurses. Observation has shown that despite the efforts nurses put into carrying out their duties, the acknowledgment of a job well done by co-professionals still leaves much to be desired (Honey & Wang, 2013; Oyetunde et al., 2014). Nurses should be provided with a favourable and supportive environment to facilitate their role (Alshammari et al., 2020). Giving appropriate recognition and motivation to the nurses can minimize the staff turnover in ECMO units.

Although OHCPs in the current study acknowledged that ECMO nurses were competent in their role, at an individual level, there are differences observed in the levels of competence. This could have resulted from individual motivations for the role, experience in ECMO care and trainings received. As highlighted by Mosadeghrad (2014), there are personal differences or factors such as experience and individual abilities and personalities that influence the services provided by healthcare team members. Efforts to continuously improve the competencies of all nurses in ECMO management is therefore required to ensure delivery of high-quality care.

5.5 | Limitations and recommendations

Our study was conducted in a single institution, which limits the application of the findings to other institutions. It is therefore necessary that similar studies are conducted in other ECMO centres in Kuwait and other countries to inform improvements in the management of ECMO. We also acknowledge that ECMO is a relatively new intervention, and considering its adoption in COVID-19 management, further research in the area is highly recommended. We also acknowledge that being a qualitative study, we included a small sample of participants, which limits generalizability of the study results. However, despite the small sample size, the data material was rich, and the study participants represent different medical specializations.

6 | CONCLUSION

The introduction of extracorporeal membrane oxygenation in ICUs expanded the role of the ICU nurses to ECMO specialists. Nurse-managed ECMOs will allow for an increased availability of appropriately trained providers to accommodate the exponential increase in ECMO patients without negatively affecting outcomes. ECMO nurses are regarded as a valuable part of the team and are highly demanded. Understanding their roles and competencies through self-assessment and evaluation by other

healthcare professionals of the multidisciplinary team is essential to make necessary improvements in the practice. The current study, through qualitative inquiry, explored how other healthcare professionals perceived the role and competence of nurses in ECMO care. The results of the study suggested that ECMO nurses are regarded as competent in their work and are a key backbone to the ECMO workforce. Nevertheless, it was noted that the role of ECMO nurses still faces some challenges such as staff shortages, inadequate appreciation and knowledge deficits among some staff, which can affect quality patient care. To maintain high-quality care, therefore, it is recommended that adequate staffing, continuous training and adequate support and motivation be provided to the nurses.

ACKNOWLEDGEMENT

The authors wish to thank all the participants who took part in this study.

CONFLICT OF INTEREST

There is no conflict of interest associated with this publication.

DATA AVAILABILITY STATEMENT

Data related to this study can be availed on request from the first author of this manuscript.

ORCID

Muna Alshammari  <https://orcid.org/0000-0002-7286-3556>

Chitra Velloolikalam  <https://orcid.org/0000-0003-0376-6397>

REFERENCES

- Alshammari, M. A., Velloolikalam, C., & Alfeeli, S. (2020). Nurses' perception of their role in extracorporeal membrane oxygenation care: A qualitative assessment. *Nursing in Critical Care*, 2020, 1–7. <https://doi.org/10.1111/nicc.12538>
- Barbaro, R. P., MacLaren, G., Boonstra, P. S., Iwashyna, T. J., Slutsky, A. S., Fan, E., Bartlett, R. H., Tonna, J. E., Hyslop, R., Fanning, J. J., Rycus, P. T., Hyer, S. J., Anders, M. M., Agerstrand, C. L., Hryniewicz, K., Diaz, R., Lorusso, R., Combes, A., Brodie, D., ... Winkels, H. (2020). Extracorporeal membrane oxygenation support in COVID-19: An international cohort study of the Extracorporeal Life Support Organization registry. *Lancet*, 396(10257), 1071–1078. [https://doi.org/10.1016/s0140-6736\(20\)32008-0](https://doi.org/10.1016/s0140-6736(20)32008-0)
- Beys, C., Huette, P., Abou-Arab, O., Berna, P., & Mahjoub, Y. (2020). Extracorporeal membrane oxygenation for COVID-19-associated severe acute respiratory distress syndrome and risk of thrombosis. *British Journal of Anaesthesia*, 125(2), e260–e262. <https://doi.org/10.1016/j.bja.2020.04.079>
- Boling, B., Dennis, D. R., Tribble, T. A., Rajagopalan, N., & Hoopes, C. W. (2016). Safety of nurse-led ambulation for patients on venovenous extracorporeal membrane oxygenation. *Progress in Transplantation*, 26(2), 112–116. <https://doi.org/10.1177/1526924816640646>
- Botsch, A., Protain, E., Smith, A., & Szilagyi, R. (2019). Nursing implications in the ECMO patient: Advances in extracorporeal membrane oxygenation. In M. S. Firstenberg (Ed.), (Vol. 3). IntechOpen. <https://www.intechopen.com/chapters/67217>
- Broman, L. M., Holzgraefe, B., Palmer, K., & Frenckner, B. (2015). The Stockholm experience: Interhospital transports on extracorporeal membrane oxygenation. *Critical Care*, 19, 278. <https://doi.org/10.1186/s13054-015-0994-6>
- Courtin, A., Sanchez, L., Sinquet, J.-C., Gaudard, P., Eliet, J., Barge, F., & Colson, P. (2012). ARDS and ECMO, an update on critical care nursing. *Open Journal of Nursing*, 02(03), 301–306. <https://doi.org/10.4236/ojn.2012.223044>
- Daly, K. J. R. (2017). The role of the ECMO specialist nurse. *Qatar Medical Journal*, 2017(1), 54–<https://doi.org/10.5339/qmj.2017.swace Iso.54>
- Daly, K. J., Camporota, L., & Barrett, N. A. (2017). An international survey: The role of specialist nurses in adult respiratory extracorporeal membrane oxygenation. *Nursing in Critical Care*, 22(5), 305–311. <https://doi.org/10.1111/nicc.12265>
- Extracorporeal Life Support Organization (ELSO) (2013). *Guidelines for training and continuing education of ECMO specialists*. Extracorporeal Life Support Organization (ELSO). <https://www.elseo.org/Portals/0/IGD/Archive/FileManager/97000963d6cusersshyerdocuselsoguidelinesfortrainingandcontinuingeducationofecmosp ecialists.pdf>
- Gay, S. E., Ankney, N., Cochran, J. B., & Highland, K. B. (2005). Critical care challenges in the adult ECMO patient. *Dimensions of Critical Care Nursing*, 24(4), 157–162; quiz 163–154. <https://doi.org/10.1097/00003465-200507000-00001>
- Hackmann, A. E., Wiggins, L. M., Grimes, G. P., Fogel, R. M., Schenkel, F. A., Barr, M. L., Bowdish, M. E., Cunningham, M. J., & Starnes, V. A. (2017). The utility of nurse-managed extracorporeal life support in an adult cardiac intensive care unit. *Annals of Thoracic Surgery*, 104(2), 510–514. <https://doi.org/10.1016/j.athoracsur.2016.11.005>
- Haddad, L. M., Annamaraju, P., & Toney-Butler, T. J. (2021). Nursing shortage. In StatPearls. StatPearls Publishing Copyright © 2021, StatPearls Publishing LLC. <https://pubmed.ncbi.nlm.nih.gov/29630227/>
- Hijeh, M. (2017). ECMO nurse specialist: Qatar experience. *Qatar Medical Journal*, 2017(1), 55. <https://doi.org/10.5339/qmj.2017.swacelso.55>
- Honey, M., & Wang, W. Y. (2013). New Zealand nurses perceptions of caring for patients with influenza A (H1N1). *Nursing in Critical Care*, 18(2), 63–69. <https://doi.org/10.1111/j.1478-5153.2012.00520.x>
- Jozwiak, M., Chiche, J.-D., Charpentier, J., Ait Hamou, Z., Jaubert, P., Benganem, S., Dupland, P., Gavaud, A., Péne, F., Cariou, A., Mira, J.-P., & Nguyen, L. S. (2020). Use of venovenous extracorporeal membrane oxygenation in critically-ill patients with COVID-19. *Frontiers in Medicine*, 7(958), 1–8. <https://doi.org/10.3389/fmed.2020.614569>
- Mosadeghrad, A. M. (2014). Factors affecting medical service quality. *Iran J Public Health*, 43(2), 210–220.
- Mosier, J. M., Kelsey, M., Raz, Y., Gunnerson, K. J., Meyer, R., Hypes, C. D., Malo, J., Whitmore, S. P., & Spaite, D. W. (2015). Extracorporeal membrane oxygenation (ECMO) for critically ill adults in the emergency department: History, current applications, and future directions. *Critical Care*, 19, 431. <https://doi.org/10.1186/s13054-015-1155-7>
- O'Connor, N., & Smith, J. R. (2018). An innovative ECMO staffing model to reduce harm. *Journal of Perinatal & Neonatal Nursing*, 32(3), 204–205. <https://doi.org/10.1097/jpn.0000000000000355>
- Oyetunde, M. O., Kelechi, O. M., & Oyediran, M. O. (2014). Perception of patients and other health care professionals about nurses at the University College Hospital, Ibadan, Oyo State, Nigeria. *Open Journal of Nursing*, 04(13), 947–955. <https://doi.org/10.4236/ojn.2014.413101>
- Paolone, S. (2017). Extracorporeal membrane oxygenation (ECMO) for lung injury in severe acute respiratory distress syndrome (ARDS):

- Review of the literature. *Clinical Nursing Research*, 26(6), 747–762. <https://doi.org/10.1177/1054773816677808>
- Ratnani, I., Tuazon, D., Zainab, A., & Uddin, F. (2018). The role and impact of extracorporeal membrane oxygenation in critical care. *Methodist DeBakey Cardiovascular Journal*, 14(2), 110–119. <https://doi.org/10.14797/mdcj-14-2-110>
- Savarimuthu, S., BinSaeid, J., & Harky, A. (2020). The role of ECMO in COVID-19: Can it provide rescue therapy in those who are critically ill? *Journal of Cardiac Surgery*, 35(6), 1298–1301. <https://doi.org/10.1111/jocs.14635>
- Wellman, J. (2017). *An exploration of staff experiences of extracorporeal membrane oxygenation (ECMO)*. Ph.D. University of East London School of Psychology.

How to cite this article: Alshammari, M., Vellolikalam, C., & Alfeeli, S. (2022). Perception of other healthcare professionals about the nurses' role and competencies in veno-venous extracorporeal membrane oxygenation care: A qualitative study. *Nursing Open*, 9, 996–1004. <https://doi.org/10.1002/nop2.1137>