Barriers to the management of ventilator-associated pneumonia: A qualitative study of critical care nurses' experiences

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Abstract

Background & Aims: Ventilator-associated pneumonia (VAP) is associated with serious complications such as morbidity and mortality, prolonged hospital stay, and great financial burden. The purpose of this study was to explore critical care nurses' experiences of the barriers to VAP management.

Materials & Methods: This descriptive qualitative study was done in 2015 using the conventional content analysis approach. A purposive sample of twelve critical care nurses was selected. Data were collected through unstructured interviews and focus group discussions. Graneheim and Lundman's qualitative content analysis was employed for data analysis. The trustworthiness of the data and the findings was ensured by adopting the criteria proposed by Lincoln and Guba.

Results: The major barriers to VAP management were low quality of working life and poor organizational culture.

Conclusion: Nurses can help manage effective VAP through learning new and standard approaches to care delivery and adhering to standards of care.

Key words:
VAP management,
Quality of working life,
Organizational culture

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Introduction

Nosocomial infections are a major global health problem (1, 2) and the commonest complication of hospital care (3). The most prevalent and fatal nosocomial infection in intensive care units (ICUs) is ventilator-associated pneumonia (VAP) (4). The prevalence of VAP is as high as 9%–27% (5).

Intubated patients rapidly develop VAP within the first five days after intubation (5, 6). The risk factors for VAP are numerous and include accumulation of secretions behind the cuff of the endotracheal tube, impaired cough reflex, reduced ciliary activity, immobility, lying in the supine position (7), aging, underlying conditions, altered consciousness, endotracheal intubation, poor nutrition, healthcare workers' poor hand hygiene (8), hypoxia, naso-gastric tube, acidosis, pulmonary edema, immunosuppression (9), burns, disorders of the central nervous system, severity of the underlying conditions, re-intubation, and surgery (10).

VAP extends the duration of mechanical ventilation, prolongs ICU and hospital stay (11 and 12), and expands hospital staff's workload (11). Besides, it is responsible for half of all antibiotic prescriptions for patients receiving mechanical ventilation (8) and imposes a heavy financial burden on patients and healthcare systems (13). According to Lawrence and Fulbrook (2011), VAP adds to the cost of hospital care by 40,000 US dollars per patient per hospital admission (14).

Given the serious complications of VAP and the priority of prevention over treatment, VAP prevention is the most cost-effective and optimal way for fighting VAP (15). Studies have shown that one third of all nosocomial infections such as VAP are preventable (16). Currently, VAP prevention is considered as one of the key components of patient safety guidelines (4), a main safety goal (17), and a quality improvement indicator in most healthcare systems, and a criterion for evaluating ICUs (18).

Despite many efforts for controlling VAP, its incidence rate is still very high and it is the most fatal nosocomial infection. Consequently, prevention and management of VAP necessitate continuous monitoring (19), effective problem assessment, and all-party support. According to Lambert et al. (2013), all hospital staff need to receive continuing education about VAP management. Moreover, preventive measures should be designed to improve the quality of hospital care (17).

Nurses are the most important component of nosocomial infection prevention programs (20). As healthcare providers who have constant presence in clinical settings, nurses have significant roles in preventing and managing health problems and providing care to patients. In addition, implementing VAP prevention strategies is among the key responsibilities of nurses. Thus, exploring their experiences is of great importance. Nonetheless, most of the previous studies into VAP prevention had been done by using quantitative designs, leaving nurses' experiences of VAP prevention poorly explored, if at all. The present study was made to bridge this gap. The purpose of the study was to explore critical care nurses' experiences of the barriers to VAP management.

Methods

Design

This descriptive qualitative study was done by using the conventional content analysis approach (21).

Setting

The study was conducted in 2015 in a teaching hospital located in Lorestan Province, Iran.

Participants

Sampling was done through purposeful sampling and was continued until reaching data saturation (22). Consequently, twelve critical care nurses were selected. Nurses were included if they had at least a bachelor's degree in nursing, minimum work experience in ICUs of three months, desire for sharing their experiences, and stable psychological state for establishing communication. We excluded them if they voluntarily withdrew from the study or avoided sharing their experiences.

Data collection

Semi-structured interviews were carried out with twelve nurses for data collection, each of which lasted 30 minutes, on average. Besides, we held two focus group discussions. The size of each focus group was six nurses and the length of the discussions was 25 minutes, on average. Focus group discussions help collect data from a large sample of participants in a short period of time while semi-structured personal interviews provide a deeper understanding of the intended phenomenon (23). Broad open-ended interview questions were employed to delve into the participants' experiences. Some of the interview questions were: "What care measures do you use to prevent VAP?" "How does the physical structure of your unit affect VAP management?" "How do the facilities and equipment in your unit affect VAP management?" "What are the barriers to VAP management in your unit?" "What are the facilitators to VAP management in your unit?" Besides these main interview questions, follow-up questions were also asked to clarify ambiguities in experiences shared by the participants. The interviews and the focus group discussions were recorded digitally using a MP3 recorder.

Data analysis

Concurrently with data collection, we performed data analysis by pursuing the Graneheim and Lundman's five-step approach to content analysis (21). Immediately after holding each interview, it was transcribed word by word and read for several times. Then, primary codes were extracted, compared and merged with each other, and grouped into categories based on their similarities.

Rigor and data trustworthiness

The credibility of the data was maintained through employing the member checking technique, allocating adequate time to data collection, and arranging the interviews based on the interviewees' preferences. Moreover, confirmability was ensured through sending the interviews, codes, and categories to several external reviewers and asking them to assess the accuracy of data analysis, while dependability was maintained by immediate transcription and analysis of each interview. The maximum variation sampling was also employed to enhance the transferability of the findings (24).

Ethical considerations

Ethical approval for the study was obtained from the Ethics Committee of Lorestan University of Medical Sciences, Khorramabad, Iran. After explaining the aim and the methods of the study to the participants, their informed consent for participation in the study and recording their interviews was secured. They were ensured that their information would be treated as confidential and they would have access to the findings.

Results

Most of the participants were female (10 cases). The means of their age and professional experience were 25.3 and 4.6 years, respectively. Their experiences of the barriers to VAP management came into two main themes of low quality of working life and poor organizational culture which are shown in Table 1 and explained in what follows.

Table 1: Main themes, categories and subcategories of critical care nurses' experiences of the barriers to VAP management

Main themes	Main categories	Subcategories
Low quality of working life	Difficult nature of critical care delivery	Mandatory extra shifts Manpower s Shortage Heavy workload Defective equipment Poor structural condition Inadequate equipment
	Lack of opportunities for learning and skill development	Traditional care delivery Professional incompetence
	Unfair salaries	
	Complex nature of work	Critical conditions of patients in ICUs Low safety for critical care nurses
	Unprofessional practice	Workforce' lack of experience Disbelief in standard care delivery
Poor organizational culture	Strict supervision of nurses	
	Poor professional interactions	Professional distrust Poor interdisciplinary collaboration
	Reluctance to perform care measures	
	Routine-based practice	

A. Low quality of working life

Quality of working life (QWL) is the result of workers' satisfaction with their needs and is achieved through attending workplaces. In healthcare organizations, QWL is among the principal factors behind the quality of workers' performance and care. According to our participants, low QWL was among the main barriers to effective VAP management. The five main categories of this main theme were difficult nature of critical care delivery, lack of opportunities for learning and skill development, unfair salaries, complex nature of work, and unprofessional practice.

A1. Difficult nature of critical care delivery

Critical care delivery is complex and difficult because patients who are hospitalized in ICUs usually are critically ill and suffer from life-threatening conditions. The participating nurses referred to low nurse-patient ratio as a major barrier to effective VAP management.

The number of nurses is low and we have to do extra working shifts. Therefore, we are too fatigued to provide quality care. Or, we are very busy at work. There are only two nurses in each shift and hence, we have not adequate time for implementing care measures properly. For instance, instead of letting gavage soup pass through

the nasogastric tube, we push it forcibly by using a gavage syringe. Another instance is that we do not perform suctioning properly in order to be able to carry out our other care-related responsibilities (P. 2).

Nursing staff shortage negatively affected the participants' care quality through increasing their workload and the number of their mandatory extra shifts. Mandatory extra shift was referred to by the participants as another barrier to effective VAP management. Such working schedule tired them, disturbed their personal life, broke their concentration, and reduced the quality of care.

As I have a little baby, I don't want to do extra shifts. However, the hospital nursing office doesn't agree and thus, I have to do extra shifts. When doing extra shifts, I'm greatly preoccupied with my baby and hence, I cannot perform my tasks properly. For instance, I may avoid performing suctioning accurately (P. 1).

Another workforce-related barrier to effective VAP management was lack of professional physiotherapists in hospitals. Therefore, the participants were required to do the extra task of performing physiotherapy for patients. However, they considered physiotherapy neither as their own responsibilities nor as a routine practice and hence, it was usually overlooked.

It is for about two years that there is no physiotherapist in our hospital and thus, physiotherapy is usually performed by us even though it is not among our responsibilities. We perform physiotherapy only for the sake of patients. Of course, our physiotherapies are not standard enough (P. 3).

Critical conditions of patients who are hospitalized in ICUs and their greater need for specialized care services along with serious staff shortage had dramatically expanded our participants' workload. Such a working condition had forced them to pay little attention to the quality of care. On the other hand, during shift handover, the quantity of care was valued much greater than its quality. In other words, if nurses performed smaller number of their tasks with greater quality, they were accused of shirking. Such a practice had resulted in the delivery of low-quality care.

When I'm too busy, I cannot perform suctioning or other care measures accurately because I need to perform each measure quickly in order to have adequate time for my other tasks. Thus, I usually pay little attention to the quality of work because during shift handover, no one values the quality of my care; rather, they only value the amount of undone tasks. Therefore, I need to do all my tasks at any level of quality in order not to be accused of shirking (P. 4).

Despite the necessity to use high-tech equipment in ICUs, our participants noted that they had little access to such equipment. They referred to defective or inadequate equipment as another barrier to effective VAP management. In other words, they had many difficulties in providing quality patient care due to having limited access to basic critical care equipment. Defective equipment resulted in providing nonstandard care while lack of equipment resulted in failure to perform some care measures such as measuring the pressure of endotracheal tube cuff.

The remote controllers of the beds in our unit are defective. When we are too busy with other care measures, we are unable to change the controllers and thus, patients may be in an inaccurate position during gavage (P. 5). We never measure the pressure of endotracheal tube cuff because we have no access to the necessary equipment (P. 7).

Another barrier to effective VAP management was poor and nonstandard structural conditions of ICUs both for patients and nurses. For instance, the participants' working unit had neither an air conditioning system nor an isolated room for patients with infectious diseases. Besides, the windows to open space were kept open for long hours and inter-bed distances were too small. Therefore, the likelihood of infection transmission was high. In addition, the staff resting room was in poor condition.

The physical space of the unit is too awful. There is a small space between the beds and there is no air conditioning system in the unit. In case of poor air conditioning, both nurses and patients are at risk of bacterial infections (P. 6).

A2. Lack of opportunities for learning and skill development

One of the key characteristics of critical care nurses is to have great knowledge of care. In other words, nurses who are not knowledgeable enough cannot work in these units. Nonetheless, our participants' experiences showed that critical care services were provided based on usual routines. In other words, novice nurses learned the way of care delivery from their experienced colleagues and took professional knowledge-based practice for granted. Such a practice had resulted in nonstandard care delivery.

The most important thing for us is that the endotracheal tube cuff be kept full. Therefore, other things (such as the pressure of the cuff) are not very important. We just inject 5 cc of air into the cuff.

According to the participants, some critical care nurses did not have enough professional competence for working in ICUs due to poor in-service education. For instance, some nurses were not skillful enough for measuring the pressure of endotracheal tube cuff or doing physiotherapy. Moreover, as attending physicians or anesthesiologist refrained from setting ventilators, nurses were obliged to do this task despite having received no in-depth training in this area. Consequently, they set ventilators based on their own personal experience.

I have no adequate knowledge about ventilators. Thus, there may be an opportunity for weaning a patient from the ventilator while I cannot take advantage of such opportunity due to having poor weaning skills. Therefore, the patient

may unnecessarily receive mechanical ventilation for many days (P. 8).

A3. Unfair salaries

Because of their heavier workload and stressful work condition, the participating nurses expected to receive higher salaries compared with nurses in other hospital wards. However, hospital administrators' inattention to fair budget and resource allocation had reduced their motivation for work. Financial issues were so important to the nurses that they referred to them as a significant factor behind care quality.

The salaries of critical care nurses should be different from those of nurses in other hospital wards. However, there is no difference between the salaries of these two groups in our hospital. Sometimes, critical care nurses' salaries are even less than other nurses. Such practice significantly contributes to our poor motivation for work (P. 1).

A4. Complex nature of work

When providing care to critically-ill patients in critical situations, the nurses focused mainly on saving patients' life and paid little attention, if any, to the requirements of each care-related activity. Accordingly, they might insert an intra-tracheal tube or perform suctioning under unsterile conditions, resulting in greater risk for VAP. The likelihood of such an unsterile practice was greater in stressful situations such as in emergencies or once working with an inexperienced colleague.

When a patient is critically-ill and needs intubation, I just focus on intubating him/her irrespective of the quality or the sterility of the procedure. The most important thing in such situations is to prevent patient's death (P. 9; group discussion).

Shortage of personal protective equipment had also caused most of the participants to develop hospital-acquired respiratory infections. They referred to this fact as a negative experience and mentioned that they avoid providing standard care to patients with serious infections in order to protect themselves against infections.

Here, I developed pneumonia several times. In order to prevent another episode of pneumonia, I perform suctioning for patients with pneumonia in a very short period of time. Such practice reduces the quality of my care (P. 6).

A5. Unprofessional practice

Due to the critical conditions of patients who are hospitalized in ICUs, critical care nurses need to have high levels of critical care specialty, knowledge, and experience. They not only need to be highly knowledgeable, but also should properly use their knowledge in their practice. Nonetheless, nursing staff shortage in the study setting had resulted in the recruitment of inexperienced nurses for ICU. Inexperienced nurses avoided providing care services independently in order not to be involved in malpractice lawsuits.

I avoid weaning a patient from ventilator independently and attempt to do it after obtaining my senior or manager's permission. I usually perform what they recommend (P. 8).

Some of the participating nurses had no healthy attitude toward quality care delivery and hence, they used to provide care based on their own beliefs and experience. For instance, some of them did not maintain sterility while doing nursing procedures and believed that such practice is sound.

When I go from one patient to another, I simply change my gloves and believe that it is enough for preventing infections. I have no firm belief in washing hands before doing procedures (P. 9, group discussion).

B. Poor organizational culture

Another major barrier to effective VAP management was poor organizational culture. Organizational culture has a significant effect on organizational and employee performance. Factors such as supervision and control, organizational relations, and managerial support can contribute to the formation of cultural norms.

B1. Strict supervision of nurses

Our nurses were continuously monitored by their administrators. However, they believed that evaluation of employee performance is not performed effectively because administrators who did evaluations usually focused more on nursing documentations than the process of care delivery and attempted to pinpoint employees' weaknesses in order to punish them instead of minimizing shortages and weaknesses. Some of the participants also argued that administrators usually evaluate each nurse based on their own previous attitudes towards her/him. Such a poor evaluation had reduced the participants' motivation for quality care delivery.

Previously, they recruited many novice staff to the unit and thus, several errors happened in the unit and all of us were punished consequently. Thereafter, they never pay attention to the ICU and our matron believes that ICU staff never perform their tasks appropriately (P. 10).

B2. Poor professional interactions

The ability to establish effective communications with colleagues is a basic clinical skill and a key component of efficient care delivery in ICUs. Nonetheless, most participants referred to poor inter- and intra-professional interactions as another barrier to effective VAP management. Inter-professional distrust and poor interdisciplinary collaboration were among the participants' main concerns. In the study setting, physicians had no trust in nurses and accused them of shirking, resulting in the reduction of nurses' motivation for quality care delivery.

Every morning, we wash and rinse patients' mouth with chlorhexidine. However, when attending the unit, physicians get angry and complain that why we do not perform mouth washing for patients. They do not trust us

when we say that we have done mouth washing. Such behaviors of physicians make us unmotivated (P. 5).

On the other hand, there were weak intra-professional interactions among nurses due to their heavy workload. In other words, they were unable to help each other in doing care-related activities. Sometimes, the nurses were even unable to perform their activities due to the lack of help and support.

I cannot ask my colleagues to help me because they are heavily involved with their own duties. If they help me, their duties would remain undone. Therefore, I cannot efficiently perform suctioning when I'm alone (P. 11).

B3. Reluctance to perform care measures

Our participants' detailed another problem in managing VAP as their reluctance and lack of motivation for performing care measures. Factors contributing to such reluctance were, but not limited to, inaccurate judgments, administrators' inattention to nurses, poor accommodation for nurses, and similar salaries for critical care nurses and the nurses of other hospital wards. Such situations disappointed the participants and hence, they had no motivation for better care delivery.

Our resting room is of poor condition. No one values our welfare. When we go to the resting room to take some rest, such problems add psychological fatigue to our physical fatigue because we feel that no one values us (P. 10).

B4. Routine-based practice

The other barrier to effective VAP management was nurses' routine-based practice due to lack of efficient incentive systems and poor workforce development policies. According to the participants, their administrators paid little attention, if any, to their career advancement and professional development, did not encourage them, and used punishment instead of encouragement. Therefore, the nurses were reluctant to learn and provide quality care.

If you do your tasks correctly, our administrators never encourage you. However, if you commit an error, they will punish you. The predominant system in our setting is punishment not incentive (P. 1).

Discussion

The purpose of the study was to explore critical care nurses' experiences of the barriers to VAP management. The study findings indicated that there were many barriers to effective VAP management in ICUs.

One of the major barriers to VAP management was nurses' low QWL. Mullen (2015) also noted that in the United States, nurses face many barriers in their working life (25). Long working hours due to mandatory extra shifts was among the factors which contributed to the difficulty of critical care delivery, nurses' fatigue, and reduced quality of nursing care. Olds et al (2010) also reported that increased work hours raise the likelihood of adverse events and errors in healthcare (26). Renata et al. (2012) also found nurses' heavy workload as a risk factor for nosocomial infections (27).

Duffin (2014) noted that higher nurse-bed ratio prolongs patients' survival in ICUs (28). The results of studies made by Laschinger et al. (2000) also illustrated that putting nurses under pressure leaves them with feelings such as dissatisfaction, frustration, and powerlessness (29) and affects their QWL. Our findings also showed that lack of professional physiotherapists in hospitals results in added responsibilities for nurses. It is noteworthy that as a key component of critical care, physiotherapy is of paramount importance to effective airway clearance and VAP management (30).

We also found that nonstandard physical structure of ICU and defects or shortages of high-tech equipment in this unit reduced care quality and interfered with effective care delivery. This finding is in line with the findings reported by Matakala et al. (2014) who reported that the design of ICU can affect care delivery, outcomes of care, and the incidence of infections (31).

Another finding of the study was that care services were provided based on old routines. Lack of opportunities for learning and skill development requires nurses to deliver care services more based on old routines and personal experiences than clinical standards and guidelines. Studies showed that the nursing care delivery system in Iran is congruent with the attributes of Johnson's Delegated Medical Care model. In this model, the cornerstone of care is routine-based practice and execution of medical orders (32). Evidence shows that one of the key prerequisites to effective VAP prevention, particularly in countries with limited resources, is continuing education of healthcare workers (33, 34). In fact, poor in-service training would result in nonstandard care delivery.

Study findings also revealed unfair salaries as another factor affecting nursing care delivery and VAP management in ICUs. Administrators' indifference toward same salaries for critical care nurses and nurses working in other hospital wards had reduced our participants' motivation for work and the quality of their care. Unfair payment for different groups of hospital staff has been reported as a significant factor behind nurses' poor motivation for work (35 and 36).

Unfulfilled work-related needs of nurses (such as need for personal protective equipment) had faced the study participants with serious complications such as pneumonia and thereby, reduced the quality of their care. According to Stone et al. (2004), nurses' working condition is among the major risk factors for healthcare-related infections and occupational exposure to infections (37). Evidence indicates that healthcare workers are at risk for developing hospital-acquired infections. Moreover, nurses' safety and occupational health have been reported to be correlated with their job satisfaction (38). Alex (2011) also found job

satisfaction as a determining factor behind hospital staff's performance and the quality of their care services (39). According to the findings of the present study, nurses' disbelief in standard care delivery was another main factor contributing to VAP management. Such disbelief can result in arbitrary care delivery. Studies have shown a significant correlation between individuals' attitudes and their behavioral pattern. For instance, Noruzi et al. (2015) found that nurses' personal attitudes and beliefs are correlated with their adherence to infection prevention standards (40).

On the other hand, study findings revealed that nurses' professional experience had a significant role in VAP management and standard care provision. In other words, nurses with limited professional experience provided lower quality care. The results of a study by Jafari et al. (2012) illustrated that novice nurses' professional competence is not proportionate to the requirements of clinical settings and hence, they provide low-quality care (41). Vogus et al. (2014) also reported that in their first year of professional practice, novice nurses' performance is significantly affected by environment, workplace conditions, and work-related factors (42). Generally, workplace culture and atmosphere can dramatically affect ward outcomes such as staff performance (43).

We also found that factors such as strict supervision of nurses and inappropriate evaluation of employee performance reduced the nurses' motivation for work, gave them a negative attitude towards their administrators, and prevented them from correcting their errors. The administrators of the study settings paid little attention to the quality of care and focused mainly on spotting employees' errors and punishing them. According to the Social Contracts Theory, nurses who feel injustice in performance evaluation, experience some kind of negative tension and attempt to reduce their involvement in the organization's affairs in order to relieve their tension. On the other hand, nurses who feel that performance evaluation is performed fairly become motivated to play a more significant role in their organizations (44).

The study findings also indicated that poor professional interactions (such as inter-professional distrust) reduced the quality of VAP-related care services. Moreover, nurses' heavy workload had undermined their ability to closely collaborate with each other. Havens (2010) reported that improving nurses' relationships with other healthcare professionals can lower the rate of nosocomial infections and improve the quality of care (45).

Two other significant factors behind ineffective VAP management in the study setting were routine-based practice and lack of innovation at work due to administrators' inattention to personnel and the dominance of punishment system. These findings are contrary to the findings reported by Sajadi et al. (2011) who found no significant correlation between nurses' creativity and organizational culture (46). This contradiction may be due to differences in the design and the setting of these two studies.

This study was done in a single ICU setting and thus, the findings may have limited generalizability. Therefore, conducting further studies in different settings is recommended in order to identify other barriers to effective VAP management.

Conclusion

Poor structural and process standards as well as poor organizational culture are the major barriers to effective VAP management. The findings of the present study enhanced our understanding of the fact that administrators need to adopt strategies to improve nurses' welfare and motivation, alleviate their problems, boost their salaries, enhance the quality of performance supervision and evaluation, and recruit more nurses into ICUs. On the other hand, nurses need to learn new and standard approaches to care delivery in order to play a more significant role in VAP management. Future studies are recommended to develop and implement strategies to improve organizational cultures and nurses' QWL as well as to change nurses' personal beliefs and attitudes.

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