

# Assessment of Intensive Care Nurse Knowledge and Perception of Eye Care Practice for Unconscious and Mechanically Ventilated Patients in Intensive Care Units in Saudi Arabia

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## Research Article

### ABSTRACT

**Background:** Eye care forms part of the care provided to all patients in acute care environments with impaired or compromised protective mechanisms. However, some hospital populations are at greater risk than others for developing complications during their stay.

**Aim:** To identify intensive care nurses' knowledge about eye care for unconscious and mechanically ventilated patients and to assess nurse's perception of eye care practice for unconscious and mechanically ventilated patients by nurses them self.

**Methods:** A descriptive cross sectional was used in this study using a well-structured questionnaire distributed to the willing nurses' participants with implied consent attached to the tool. A total of 55 nurses from medical and surgical intensive care units were included in the study.

**Results:** The total score of nurses' knowledge of eye care revealed that less than half (46.7%) of intensive care unit (ICU) nurses have adequate knowledge and 40% have inadequate knowledge. Statistical significant difference between medical and surgical ICU nurses in 2 subtotal item in knowledge ( $p=0.045$ ). The total nurses perception of eye care practice was 95.6% high acceptance perception regarding eye care practice with 98.2 median and 5.6 IQR and no significant difference was noticed between medical and surgical ICU nurses in total and subtotal score of perception.

**Conclusion:** ICU nurses' level of knowledge concerning eye care of mechanically ventilated patients ranged between adequate and inadequate and did not reach satisfactory level. Moreover, nurses' perception showed high level of acceptance regarding eye care practice for mechanically ventilated patients but unfortunately this finding cannot be translated that clinical practice of eye care is good.

**Keywords:** Eye care, Nurses knowledge, Nurses perception of practices, Unconscious mechanically ventilated patients

### INTRODUCTION

The ventilated intensive care units patients are prone to many eye complications as a result of loss of normal defense mechanism in response to high dose of sedation after mechanical ventilation therapy. Moreover, the working environment in the intensive care units focuses on life threatening situations making a simple procedure like eye care is easily neglected by nurses [1,2]. Eye complications range from 42% to 60% in ICU patients. Conjunctival chemosis, corneal abrasion and corneal ulcer, etc. are examples of eye complications in intensive care units [2].

The conjunctiva protects eye surface from mechanical injury and microorganism. An intact corneal epithelium acts as a bulwark against microbial invasion. The tear film maintains the integrity of the cornea by providing a moist and oxygenated environment and nutrients for the epithelial cells. Tear film also lubricates the eyelids, flushes out foreign body and debris, and prevents adherence of the organism to ocular surface. The eyelid closure and blink reflex provides a

mechanical barrier to trauma, desiccation and adherence of microorganism and also prevent evaporation of tear [1,3]. Eye care practice in intensive care units varies from unit to unit and from country to country. The most reported methods are cleansing eyes with sterile gauze soaked with normal saline every 2-6 h, covering the eye with polyethylene cover, instillation of artificial eye drop and ointment and passive eyelid closure. The effectiveness of these methods depends on the degree of eye complication, using the appropriate methods and the nurses' skills and knowledge in performing the procedure [4]. Poor documentation of early signs of the eye complications by nurses and the lack of evidence-base practice contributes to high incidence of eye complications among mechanically ventilated patients. Many studies had tested hospital base design protocol for eye care at their hospitals and showed great improvement in nurses' performance regarding eye care and decrease incidence rate of eye complications after the education programs but there is no evidence base practices for eye care nurses to be followed by nurses [4]. Little is known about eye care of mechanically ventilated patients in Saudi Arabia. No previous studies concerning nurses' knowledge and practice of eye care for mechanically ventilated patients took place. This study will assess intensive care nurses' knowledge and perception of eye care practice for unconscious and mechanically ventilated patients in intensive care units in order to identify the need of nurses aiming to decrease the eye complications.

## METHODS

### Study Design and Setting

A descriptive cross sectional research design was used during July to August, 2017. The study was conducted in the Adult Medical and Surgical Intensive Care Units at governmental hospital, Eastern Province, Kingdom of Saudi Arabia. The government hospital was located in Alkhobar city with capacity 550 beds.

### Sample

A convenience sample of 55 nurses out of 70 was selected from medical and surgical intensive care units in the previously mentioned hospital with at least 3 months of experience in the intensive care unit were included in the study.

### Data Collection Tool

A self-administered questionnaire was used; the tool was developed by Fasafsheh et al. [4] Permission to use the tool was obtained from the author through the e-mail. This tool was tested for validity and reliability. Reliability Statistics showed the value of Cronbach's Alpha coefficient for the whole scale as 0.728, which is an excellent internal consequence of the validity of this questionnaire. This tool consisted of three sections:

**Section I:** This section addressed the descriptive characteristics of the nurses as age, gender, nationality, education, years of experience, type of ICU, eye care training courses taken and patient to nurse ratio.

**Section II:** This section addressed knowledge about anatomy and physiology of the eye, mechanical ventilation and its effect on the eyes and eye complications. The questions were in the form of 18 multiple choice questions that covered the three areas mentioned before. 8 questions related to eye anatomy and physiology, 5 questions covering the effect of mechanical ventilation on the eye and other 5 questions related to eye complications. As regards scoring, zero was assigned to wrong answer and one for correct answer with a total score of 18. The total score of knowledge was calculated as follows:

Inadequate knowledge <60%, Adequate knowledge ranged from 60%-80% and Satisfactory knowledge >80% [4].

**Section III:** This section addressed ICU nurses' perception of eye care practice, the questionnaire items follows likert scale from 0-3 showing nurses degree of acceptance where (0) indicates strongly disagree, (1) disagree, (2) agree, and (3) indicates strongly agree. The total number of statements was 18, 5 statements related to eye assessment, 5 statements covering prevention and management of the eye complications and 8 statements discussing infection control, with a total score of 54. As regards scoring, the minimum score was zero and the maximum score was 54. The total score of perception was calculated as follows: Less acceptance <60%, moderate acceptance ranged from 60%-80% and high acceptance >80% [4].

### Pre-Procedure Process

1. Ethical permission for the study was obtained from the Institutional Review Board.
2. Official permission from the hospital and nursing director and authorized person in the Intensive care unit of the University was obtained to conduct the study.
3. Written implied consent from each nurse was obtained.

4. A pilot study was carried out on 5 nurses in order to assess the clarity and applicability of the tool. Nurses in the pilot study were included in the study subjects.
5. All nurses were assured that their information is totally confidential and their anonymity was ensured.

### Procedure

Data collection has been started after obtaining the IRB on April 2017 and lasted for one month. Fifty five questionnaires were distributed to the nurses in the previously mentioned setting in morning, evening and night shift and collected back at the end of each shift, only 45 nurses responded.

## RESULTS

Total number of nurses participated in the study was 45 nurse. The qualitative demographic data of the participants showed in **Table 1**. Female nurses were 77.8% (n=30) and 60% (n=27) were from surgical intensive unit, 77.8 (n=35) of them had bachelor degree. Out of 45 nurses, 91.1% (n=41) of the nurses didn't take eye care training course. 84.8% (n=38) of the nurses were working with 1:2 nurse to patient ratio. The median (IQR) of the age is 28.0 (8.5) with minimum age 20 years and the maximum 50 years. The median (IQR) of experience of the nurses since graduation and experience in critical care sitting were 5.0 (8.0).

**Table 1.** Respondents demographic characteristics.

Characteristics	Frequency (%)
<b>Gender</b>	
Male	10 (22.2)
Female	35 (77.8)
<b>Educational level</b>	
Diploma degree	9 (20)
Bachelor degree	35 (77.8)
Master degree	1 (2.2)
<b>Type of ICU</b>	
Medical	18 (40)
surgical	27 (60)
<b>Nurse to patients ratio per shift</b>	
01:01	7 (15.6)
01:02	38 (84.4)
<b>History of previous training of eye care course</b>	
Yes	4 (8.9)
No	41 (91.1)
<b>Number of eye care training courses</b>	
One time	3 (75)
Two time	1 (25)

**Table 2.** Distribution of nurses according to the total score of knowledge and type of ICU.

Total score of the knowledge	Medical (n=18)	Surgical (n=27)	Total score	P value
Inadequate <60%	9 (50)	9 (33)	18 (40)	
Adequate 60%-80%	9 (50)	12 (44.4)	21 (46.7)	
Satisfactory >80%	0	6 (22.2)	6 (13)	
Min-Max	5-13	7.0-17	5-17	
Mean (± SD)	10.4 (± 2.3)	11.9 (± 2.6)	11.3 (± 2.6)	0.116
Median (IQR)	10.5 (2.75)	11 (4)	11 (3)	

Shows that less than half (46.7%) of ICU nurses had adequate score of knowledge and (40%) of them had inadequate score of knowledge related to eye care, while (22.2%) of nurses in the surgical ICU had satisfactory score of knowledge compared with (0%) of those in the medical ICU. No statistical significant difference was noticed between medical and surgical ICU nurses regarding the total score of knowledge (P=0.116) (**Table 2**).

**Table 3.** Distribution of nurses according to the subtotal score of knowledge and type of ICU.

Score of the knowledge	Medical (n=18)	Surgical (n=27)	Total score	P value
<b>Anatomy and physiology of eye</b>				
Inadequate <60%	5 (33.8)	11(40.7)	17 (37.8)	0.826
Adequate 60%-80%	11 (61.1)	11 (40.7)	22 (48.9)	
Satisfactory >80%	1 (5.6)	5 (18.5)	6 (13.3)	
Min-Max	2-7	3-8	2-8	
Mean (± SD)	4.7 (± 1.8)	5.0 (± 1.6)	4.9 (± 1.5)	
Median (IQR)	5.0 (2.3)	5.0 (2.0)	5.0 (2.0)	
<b>The mechanical ventilation effect on the eye</b>				
In adequate <60%	2 (11.1)	2 (7.4)	4 (8.9)	0.045
Adequate 60%-80%	6 (33.3)	2 (7.4)	8 (17.8)	
Satisfactory >80%	10 (55.6)	23 (85.2)	33 (73.8)	
Min- Max	1-5	1-5	1-5	
Mean (± SD)	3.5 (± 0.9)	3.9 (± 0.9)	3.7 (± 0.9)	
Median (IQR)	4.0 (1.0)	4.0 (0.5)	4.0 (1.0)	
<b>Eye complications</b>				
Inadequate <60%	11 (61.1)	7 (25.9)	18 (40.0)	0.045
Adequate 60%-80%	5 (27.8)	13 (48.1)	14 (40.0)	
Satisfactory >80%	2 (11.1)	7 (25.9)	9 (20.0)	
Min-Max	0-4	1-4	0-4	
Mean (± SD)	2.2 (± 1.1)	2.9 (± 0.9)	2.6 (± 1.0)	
Median (IQR)	2.0 (1.3)	3.0 (1.0)	3.0 (1.0)	

Regarding the effect of mechanical ventilation on the eye, there was statistical significant difference between nurses in both units (Z=2.002, p=0.045). The majority of nurses in the surgical ICU (85.2% compared with (55.6%) of them in the

medical ICU had satisfactory knowledge. The median (IQR) were 4.0 (1.0) and 4.0 (0.5) for the medical and the surgical ICU nurses respectively. Moreover, a statistical significant difference was noticed regarding eye complications between medical and surgical ICU nurses ( $Z=2.029$ ,  $p=0.045$ ). However, more than one quarter of nurses in the surgical ICU (25.9%) compared with (11.1%) of them had satisfactory knowledge related to eye care complications, While no statistical significant difference was found between medical and surgical ICU nurses' knowledge regarding anatomy and physiology of the eye with median (IQR) 5.0 (2.3) and 5.0 (2.0), respectively (**Table 3**).

**Table 4.** Distribution of nurses according to the total score of perception and type of ICU.

Perception	Medical (n=18)	Surgical (n=27)	Total score	P value
<b>Perception acceptance</b>				
<60% - low acceptable	0	0	0	
60%-80%: Moderate acceptable	1 (5.6)	1 (3.7)	2 (4.4)	0.318
>80%: High acceptable	17 (94.4)	26 (96.3)	43 (95.6)	
Min-Max	77.8-100	79.6-100	77.8-100	
Mean ( $\pm$ SD)	95.2 ( $\pm$ 6.5)	94.4 ( $\pm$ 5.7)	95.9 ( $\pm$ 6)	
Median (IQR)	98.2 (6.5)	100 (3.7)	98.2 (5.6)	

The above table represents the total score of perception of practice for eye care in both medical and surgical intensive care unit. The high acceptable level score was in surgical unit 96.3% (n=27) with the range of 79.6 to 100 and median (IQR) was 100 (3.7) which is not statically significant ( $p=0.318$ ) between medical and surgical nurses regarding perception (**Table 4**).

**Table 5.** Distribution of nurses according to the subtotal score of perception and type of ICU.

Score of the perception	Medical (n=18)	Surgical (n=27)	Total score	P value
<b>Assessment of the eye</b>				
<b>Perception acceptance</b>				
<60%: Low acceptable	0	0	0	
60%-80%: Moderate acceptable	2 (11.1)	2 (7.4)	4 (8.9)	
>80%: High acceptable	16 (88.9)	25 (92.6)	41 (91.1)	
Min-Max	60-100	66.7-100	60-100	
Mean ( $\pm$ SD)	93 ( $\pm$ 10.8)	95.1 ( $\pm$ 8.8)	94.2 ( $\pm$ 9.6)	
Median (IQR)	96.7 (8.3)	100 (6.7)	100 (6.7)	0.401
<b>Infection control</b>				
<b>Perception acceptance</b>				
<60%: Low acceptable	0	0	0	
60%-80%: Moderate acceptable	0	1 (3.7)	1 (2.2)	
>80%: High acceptable	18 (100)	26 (96.3)	44 (97.8)	
Min- Max	87.5-100	79.2-100	97.9-100	
Mean ( $\pm$ SD)	97.5 ( $\pm$ 4.3)	97.4 ( $\pm$ 5.2)	97.4 ( $\pm$ 4.8)	
Median (IQR)	100 (4.2)	100 (4.2)	100 (4.2)	0.845
<b>Prevention and management of the eye complications</b>				

Perception acceptance				
<60%: Low acceptable	0	0	0	0.117
60%-80%: Moderate acceptable	1 (5.6)	1 (3.7)	2 (4.4)	
>80%: High acceptable	17 (94.4)	26 (96.3)	43 (95.6)	
Min-Max	73.3-100	73.3-100	73.3-100	
Mean (± SD)	93.7 (± 8.1)	96.1 (± 7.5)	95.1 (± 7.7)	
Median (IQR)	93.3 (6.70)	100 (6.7)	100 (6.7)	

The above table showed the result of each item in the perception part separately. "Assessment of the eye" is the first part. Although surgical nurse did very well in this part 92.6% (n=25) was the score but no statistical difference between the medical and surgical units nurses, the overall score was 91.1% (n=41) (P=0.401). The second item is "infection control", 26 surgical nurse (96.3%) had high acceptable level in this part, the median (IQR) was 100 (4.2). The last part is "prevention and management of eye complications", 43 (95.6%) of the nurses had high acceptable level with median (IQR) was 100 (6.7) with no statistical difference between medical and surgical nurses (**Table 5**).

**Table 6.** Correlation of total knowledge and perception score with quantitative character.

Character	Knowledge	Perception
<b>Age</b>		
r	0.18	0.05
p	0.217	0.709
<b>Experience in ICU</b>		
r	0.1	-0.18
p	0.923	0.313

**Table 6** shows that there is no statistical difference between age of the participants and their score in knowledge and perception (P=0.217) for knowledge and P=0.709 for perception. Also for experience in ICU, there is no significant relationship in the total score of knowledge and perception.

**Table 7.** Correlation of total knowledge and perception score with qualitative character.

Character	Knowledge		Perception	
<b>Gender</b>				
Male	55.6	0.412	98.1	0.913
Female	66.7		98.1	
<b>Education level</b>				
Diploma	66.7	0.234	96.3	0.919
Bachelor	61.1		98.1	
Master	38.9		96.3	
<b>History of previous training of eye care course</b>				
Yes	11.5	0.923	51	0.406
No	11		53	
<b>Type of ICU</b>				

Medical	98.2 (6.5)	0.116	98.2 (6.5)	0.164
surgical	100 (3.7)		98.2 (5.6)	
<b>Nurse to patients ratio per shift</b>				
01:01	11	0.866	54	0.273
01:02	11		54	

The above table is representing the correlation between the knowledge and perception to gender and education level. Female participants have higher median than male 66.7 in knowledge but in the perception they were the same with no statistical difference between them. Educational levels of the participant were diploma, bachelor and master degree; statistically there is no significant difference in knowledge and perception (**Table 7**).

## DISCUSSION

The nurses play a vital and distinctive role in a healthcare team, who are dedicated to work with the physicians with a mission to save the life of patients. The nursing staffs in the Intensive Care Unit (ICU) always gives attention on problems, which needs immediate attention, since it is life-threatening in nature and this may lead to lack of attention to other serious issues like the care of eyes. The mechanically ventilated patients are prone to a condition called keratopathy, leading to microbial keratitis, which culminates in corneal perforation and visual loss. Moreover, there are many other conditions which may affect the health of eyes of a mechanically ventilated patient. Since the prime attention of the nurses is to continuously monitor the general condition, infections, ventilation, catheter related infections; surgical site infection, etc.

Here the study focused on the knowledge and perception of nurses on eye care, who are working in the medical and surgical intensive care units, managing the unconscious mechanically ventilated patients. The knowledge gained by the nurses in ophthalmic care depends upon their education, working experience and continuous training which they receive in their tenure. Watts et al. [1] pointed out about ORBIS, an international organization which recognizes that the nurse's role is critical to achieving their mission of preventing blindness through education, hence the emphasis on nurse education. Moreover, the organization emphasises skills, training and self-sufficiency of nurses. The study conducted by Khandekar et al. [2], elucidates the fact that knowledge about eye complications and care are satisfactory among persons with diabetes, but the levels of attitude and practice were less than desired and should be improved. Fashafsheh et al. [3] concluded that educational hand-outs, demonstrations and the designed protocols showed a positive impact in improving nurse's knowledge and practices and in lowering the percentage of eye health complications. Another study also recommends the importance of establishing a written updated protocol for eyes assessment and care with continuous education and appraisal to ensure enough knowledge, and complete safe practices, which certainly leads to minimizing the incidence of eye complications. Hence, lack of appropriate knowledge and attitude of the nursing staff, which is the integral component of the healthcare management, will adversely affect the quality of care and it may also lead to unexpected outcomes.

Priority of eye care in the ICU's in our study clarifies the fact that among the other procedures in the first care plan, majority of the nurses gave eye care as a least priority procedure, but they consider it as the first care plan in the second and third plan. This may increase the risk of acute ocular infections leading to serious implication in the vision for patient. Azfar et al. [4] stated in their study that protocolized eye care can reduce the risk of ophthalmologic complications in ventilated patients. Irrespective of the ICU's where the nurses were working, 40% of the total knowledge score of nurses in both has inadequate knowledge to deal with the ophthalmic issues of the critically ill. Gylar et al. [5] concluded in their study that even though nurses took some precautions to prevent eye complications in critical patients, there were some gaps and insufficiencies in the eye care of ICU patients. This may be due to the lack of experience and knowledge among few of the nurses. Hence there is a need for continuing training in this area to have adequate knowledge among all the nurses in the ICU [6,7]. Cho et al. [8] also points out that it is necessary to intensify eye care education aimed at new nurses who are inexperienced in intensive care unit nursing and provide continuing education on the latest eye care methods and information to experienced nurses.

However, we observed a positive finding in the perception of nurses on the sub total knowledge score [9]. Not even a single nurse fell under the low acceptable category with <60% perception score and the wide majority of them were above 91.1% level of perception score. This was the same in the case of infection control and prevention and management of the ophthalmic complications, but we were not able to find any statistical significance in the finding. We also observed that the majority of nurses have a good perception on the practices and more than 70% of them strongly agree on the practices of assessment of eye, its infection control, prevention and management of the eye complications. But the ultimate aim of a healthcare setting is to have cent percentage agreement level on the perception of ocular care

by the caregivers, especially while dealing with patients under mechanical ventilation. Many studies have confirmed a positive correlation between nurse competency and patient care quality [4]. Furthermore, among the complications we observed a lower level of knowledge, which was statistically significant and there was no significant difference in the demographic variables.

## CONCLUSION

Even though perception of nurses on ocular care of the seriously ill patients is in the moderate and acceptable level, the overall knowledge and awareness of nurses in ocular care has to be improved to the level at which it is expected in an intensive care environment. Hence, emphasis should be given for continuous training and exclusive seminars dedicated to develop knowledge and awareness among nurses is important and would be beneficial to improve the quality of ocular care in an ICU. However, further studies may be useful with a significantly higher sample size to explore the barriers interfering with reduced knowledge level of nurses.

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