Review

# Eye Care Practice in Intensive Care Units: A Rapid Review

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**Abstract**

**Introduction.** Ocular Surface Diseases (OSDs) are frequent yet often under-recognised complications in sedated and mechanically ventilated Intensive Care Unit (ICU) patients, in whom impaired eyelid closure and reduced tear film protection promote their development during critical illness. Although these conditions can significantly affect visual function and post-discharge quality of life, ocular care receives inconsistent attention in routine clinical practice. This rapid review aimed to identify and synthesise evidence-based nursing practices for the prevention and management of OSDs in the ICU within this patient population.

**Methods.** A rapid review was conducted between February and August 2024 and registered in PROSPERO (CRD42024540825). Searches were carried out in MEDLINE, CINAHL, Embase, and Google Scholar for full-text studies published in English between 2014 and 2024 that involved adult ICU patients receiving nurse-delivered ocular interventions. Methodological quality was appraised using the Joanna Briggs Institute critical appraisal tools. Given the heterogeneity of study designs and outcomes, a narrative synthesis was undertaken.

**Results.** Fourteen studies (n = 1,322 patients) from six countries met the inclusion criteria; most were randomised controlled trials (64%), and 72% were rated as having high methodological quality. Interventions included the application of preservative-free lubricants, vitamin A–based ointments, moisture chambers, polyethylene covers, eyelid taping, and structured nurse-led protocols. Moisture chambers and ointments demonstrated the strongest protective effects against exposure keratopathy, while the implementation of protocols and targeted nurse education significantly reduced ocular morbidity.

**Discussion.** The findings reaffirm the central role of ICU nurses in preventing OSDs through timely, evidence-based interventions. Standardising eye care practices may substantially reduce complications and enhance long-term

visual outcomes. Further high-quality multicentre studies are required to refine recommendations and support broader clinical implementation.

**Keywords**: Eye Care, Intensive Care Unit, Nursing Practice, Ocular Surface Diseases, OSD, Rapid Review

## Introduction

In healthy individuals, the tear film functions as both a mechanical and biological barrier, maintaining ocular surface hydration and providing antimicrobial protection, while the eyelids act as a physical shield that prevents trauma and dryness (Hernandez & Mannis, 1997; Sorce et al., 2011). In hospitalised patients, particularly those admitted to Intensive Care Units (ICUs), these natural defence mechanisms are often impaired, increasing the risk of ocular surface damage and the development of Ocular Surface Diseases (OSDs) (Mobarez et al., 2022).

Several predisposing factors contribute to this vulnerability. Iatrogenic factors include mechanical ventilation (Kuruvilla et al., 2015), sedation (Imanaka et al., 1997; Mercieca et al., 1999) and neuromuscular blockade (Frazee et al., 2015), while patient–related factors comprise reduced consciousness (Mercieca et al., 1999) decreased tear secretion (Masoudi et al., 2014; Ousler et al., 2008; Saritas et al., 2013), reduced blink rate (Masoudi et al., 2014; Werli-Alvarenga et al., 2011), corneal reflex impairment (Rosenberg & Eisen, 2008; Saritas et al., 2013), incomplete eyelid closure (Jammal et al., 2012; Kuruvilla et al., 2015), and increased vascular permeability (Rosenberg & Eisen, 2008). Patients under deep sedation or pharmacological paralysis represent the most vulnerable group, as their ocular protection mechanisms are severely compromised, predisposing them to OSDs.

The most common ocular complications among ICU patients include dry eye, keratitis, conjunctivitis, and corneal abrasions, often secondary to infection, inflammation, or mechanical trauma (Mobarez et al., 2022). Among these, exposure keratopathy (EK) is the most frequent and clinically significant manifestation (Kuruvilla et al., 2015), affecting between 20-42% of ICU patients and up to 60% of those sedated for more than 48 hours (Grixti et al., 2013; Werli-Alvarenga et al., 2011). In patients undergoing prolonged mechanical ventilation, corneal lesions have been reported in up to 59% of cases (Werli-Alvarenga et al., 2011), underscoring the need for effective preventive measures. If unrecognised or inadequately treated, EK may progress to ulceration, microbial keratitis, or permanent vision loss (Kuruvilla et al., 2015), significantly impacting post–ICU visual outcomes and quality of life.

Eye care therefore represents an essential component of nursing practice in ICU. However, the clinical complexity of critically ill patients and the prioritisation of life–sustaining treatments often result in inconsistent or insufficient ocular care, as clinical attention is primarily directed towards vital organ support (McHugh et al., 2008; Werli-Alvarenga et al., 2011). Despite the clinical relevance of this issue, comparative evidence on the effectiveness of preventive and therapeutic interventions remains limited, hindering the establishment of evidence–based best practices for ICU eye care (Alansari et al., 2015; Werli-Alvarenga et al., 2011). Consequently, interventions are frequently applied based on individual experience rather than standardised, evidence–informed protocols.

The aim of this rapid review is to identify, synthesise, and critically appraise the available evidence on nursing–led eye care practices for the prevention and management of OSDs in sedated, mechanically ventilated adult patients admitted to ICUs.

## Methods

### *Study Design*

A rapid reviewmwas conducted between February and August 2024, following the methodology recommended by the World Health Organization (WHO) and further refined by Langlois et al. into seven phases: (1) needs assessment and topic selection; (2) study development; (3) literature search; (4) study screening and selection; (5) data extraction; (6)

risk of bias assessment;

(7) knowledge synthesis (Langlois et al., 2019; Tricco et al., 2017).

In line with the aim of this review, the guiding research question was: "What are the best evidence-based practices for eye care in patients under sedation and invasive mechanical ventilation to prevent and treat Ocular Surface Diseases (OSDs) in Intensive Care Units (ICUs)?"

The review protocol was prospectively registered in the International Prospective Register of Systematic Reviews (PROSPERO) registration no. CRD42024540825 and subsequently published as a preprint on Preprints.org. (Cellura et al., 2025).

*Search Strategy*

The search strategy was developed collaboratively by all members of the research team and subsequently submitted for academic peer review (AMG). In February 2024, an initial exploratory search was conducted in Google Scholar and the MEDLINE database via PubMed, enabling the authors to identify relevant keywords and indexing terms for the final search strategy. From March to May 2024, comprehensive searches were carried out in MEDLINE (via PubMed), CINAHL (EBSCO), and Embase (Elsevier) using the search strings presented in Table 1.

Table 1. Search Strategy.

| Last updated on 30 May 2024 | | |
|---|---|---|
| MEDLINE (PubMed) | • ((("dry eye syndromes"[MeSH Terms] OR "dry eye"[Text Word] OR "Keratoconjunctivitis"[Text Word] OR "keratoconjunctivitis infectious"[Text Word] OR "keratoconjunctivitis sicca"[Text Word] OR "ocular surface disease"[Text Word]) AND "eye care"[Text Word]) OR (("nursing"[MeSH Terms] OR "nursing"[All Fields] OR "nursings"[All Fields] OR "nursing"[MeSH Subheading] OR "nursing s"[All Fields]) AND "eye care"[Text Word])) AND "intensive care units"[Text Word] | n = 40 |
| | • ((("dry eye syndromes"[MeSH Terms] OR "dry eye"[Text Word] OR "Keratoconjunctivitis"[Text Word] OR "keratoconjunctivitis infectious"[Text Word] OR "keratoconjunctivitis sicca"[Text Word] OR "ocular surface disease"[Text Word]) AND "eye cleaning"[Text Word]) OR "artificial tear drops"[Text Word] OR "lubricating gel"[Text Word] OR ("Over"[All Fields] AND "eye application"[Text Word]) OR "vitamin a eye ointment"[Text Word] | n = 108 |
| CINAHL (EBSCO) | • (((Ocular surface disease) OR (exposure keratitis) OR (keratoconjunctivitis, infections) AND (eye Care) OR (artificial tear drops) OR (lubricating gel) OR (vitamin A eye ointment) AND (intensive care units)) | n = 910 |
| EMBASE (Elsevier) | • ('ocular surface disease'/exp OR 'dry eye'/exp OR 'exposure keratitis'/exp OR 'keratoconjunctivitis'/exp) AND ('eye care'/exp OR 'nursing care'/exp) | n = 247 |

Legend: This table presents the complete search strategy used to identify relevant studies included in the review. Each row corresponds to one of the databases searched MEDLINE (via PubMed), CINAHL (via EBSCO), and EMBASE (via Elsevier). For each database, the exact search string is reported, detailing the keywords, Boolean operators (AND, OR), and the controlled vocabulary or subject headings specific to that source. The search was last updated on 30 May 2024, and the total number of records retrieved from each database is shown in the column on the right.

*Study Selection*

In accordance with methodological standards for systematic reviews (Page et al., 2020), a three-phase process of screening, eligibility assessment, and inclusion was conducted by two independent ICU experts (LC and SGS). A third independent ICU reviewer (SL) was consulted to resolve any discrepancies or disagreements arising during the process. The Rayyan software (free version, v.1.4.3) for systematic reviews (Ouzzani et al., 2016) was used to manage the screening and selection workflow. The following inclusion criteria were applied during the search phase: (1) adults (≥18 years) admitted to ICUs who were sedated and mechanically ventilated; (2) primary studies available in full text and published in English; (3) studies published within the past 10 years addressing the nursing contribution to eye care. The exclusion criteria were: (1) studies involving paediatric populations (<18 years); (2) settings other than intensive care (e.g. recovery rooms or operating theatres); (3) articles not primarily focused on nursing–led eye care.

*Quality Methodological Assessment of Included Studies*

The methodological quality of the included studies was critically appraised using the

Joanna Briggs Institute (JBI) Critical Appraisal Checklists (Aromataris et al., 2015), each selected according to the respective study design (experimental or observational). The tools were applied independently by two reviewers (LC and MC) to assess the risk of bias across key methodological domains, including participant selection, management of confounding factors, outcome measurement, and statistical analysis. Each checklist comprised 8 to 13 items, rated as Yes (Y), No (N), Unclear (UC), or Not applicable (NA). The appraisals were expressed qualitatively at the domain level, in accordance with JBI methodological guidance.

Any discrepancies between reviewers were resolved through discussion and consensus. The inter-rater agreement between the two independent reviewers (LC and MC) was estimated using Cohen's kappa coefficient (κ), which indicated a substantial level of concordance.

*Data Extraction*

Two independent reviewers (LC and SGS) individually reviewed the full text articles and extracted the relevant data. Any disagreements between reviewers were resolved through discussion and consensus. All data extracted from each included study were entered into a Microsoft Excel 2016 spreadsheet (Mac version 15.26) and organised according to the following variables: (1) first author and year of publication; (2) country; (3) study design; (4) participant characteristics; (5) interventions; (6) main outcomes.

*Data Analysis and Synthesis*

Due to the clinical and methodological heterogeneity of the included studies — in terms of intervention strategies, duration, and study design — it was not feasible to perform a meta–analysis of the extracted data. Therefore, the results were summarised narratively. The target variables were first categorised according to the type and extent of ocular damage and subsequently organised chronologically within the data extraction table. Additional findings concerning the general characteristics and methodological quality (risk of bias) of the included studies were presented in customised summary tables.

## Results

*Search Results*

A total of 1305 records were initially identified through database searches. Following the application of automated screening tools and the removal of duplicates, 1095 records were excluded. The remaining 210 records underwent title and abstract screening. Of these, 167 studies were excluded for not meeting the predefined inclusion criteria. Subsequently, 43 full text articles were retrieved for detailed evaluation, of which 12 studies met the inclusion criteria and were included in the review. An additional two eligible studies were identified through manual searches, including Google Scholar and backward citation tracking. In total, 14 studies were included in the final synthesis. The study selection process is illustrated in Figure 1.

*Studies Attributes*

Details of the characteristics of the included studies are reported in Table 2 (page 106). All articles were published within the past ten years, representing research conducted across six countries. Data synthesis revealed that 43% (n = 6) of the studies were published before 2019, while 57% (n = 8) were published between 2020 and 2024. The majority of the studies 79%, (n = 11) were conducted in Asia. Regarding study design, 64% (n = 9) were experimental, with a predominance of Randomised Controlled Trials (RCTs), whereas 36% (n = 5) were observational. Across the included studies, ICU patients were sedated, mechanically ventilated, and at risk of OSDs, with sample sizes ranging from 27 to 371 participants. A range of interventions was investigated, including polyethylene covers, preservative–free artificial tears, vitamin A and antibiotic ophthalmic ointments, moisture chambers, eyelid taping techniques, and structured nurse–led eye care protocols. Comparative effectiveness varied among interventions; however, polyethylene covers and ophthalmic ointments consistently emerged as effective strategies for preventing EK and other ocular complications. A smaller subset of studies also examined the impact of nursing education and protocol adherence on patient outcomes, demonstrating significant reductions in ocular morbidity following structured nurse training. Overall, the included studies provided clinically meaningful yet methodologically heterogeneous

evidence, supporting the development of evidence–based nursing protocols for ocular surface management in the intensive care setting.

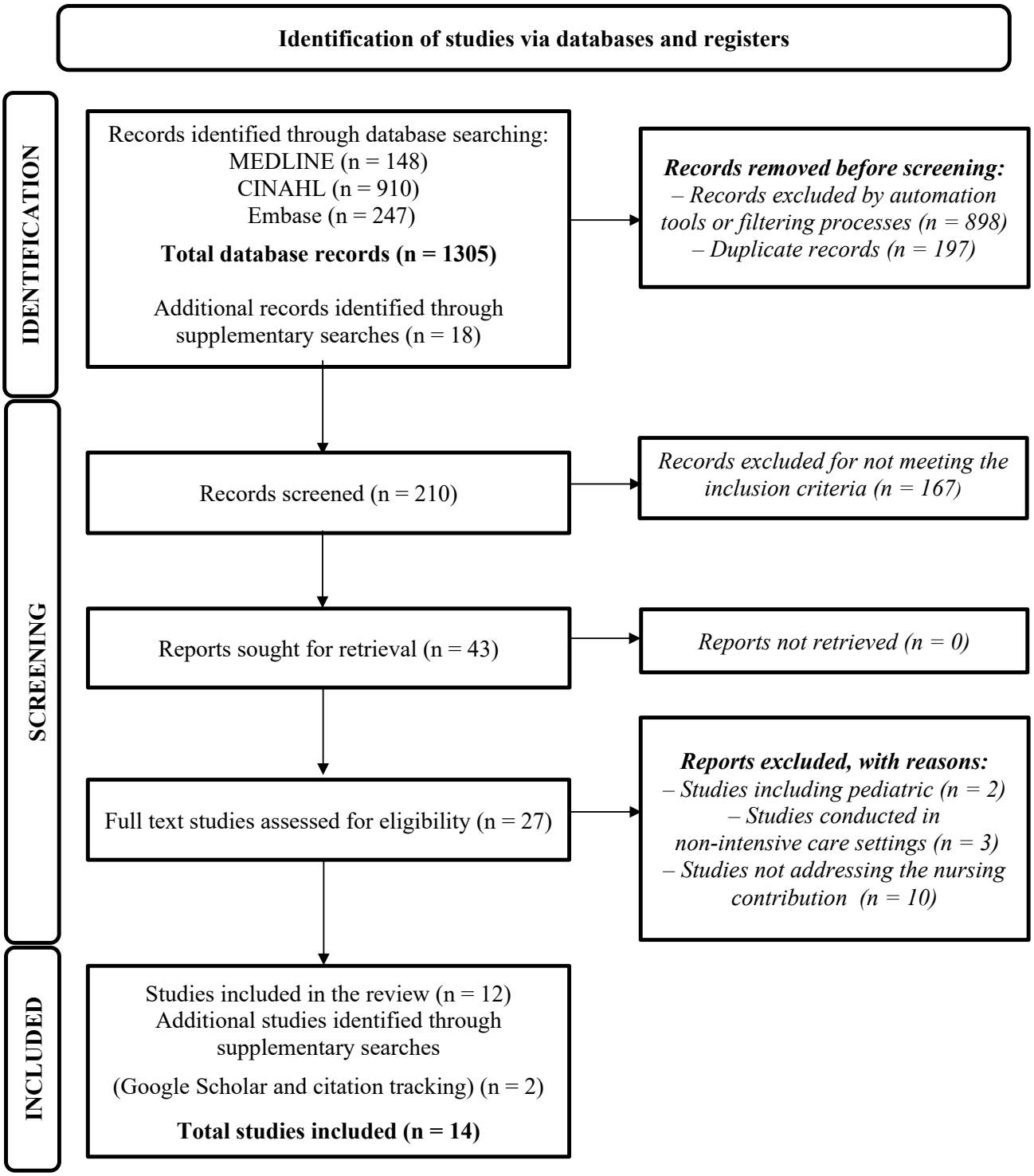


Figure 1. Preferred Reporting Items for Systematic Review and Meta-Analyses PRISMA flow diagram.

Legend: Illustrating the identification, screening, eligibility, and inclusion phases of the rapid review. The process summarises the systematic selection of studies retrieved from electronic databases and supplementary sources according to predefined inclusion and exclusion criteria, resulting in the final sample analysed.

*Methodological Quality*

As shown in Table 4, analysis of the data using the JBI Critical Appraisal Checklists revealed that 72% (n = 10) of the studies were of high methodological quality, 28% (n = 4) were of moderate quality, and none were classified as low quality. Among the observational studies, the data indicated overall good quality in terms of study design and data collection, though some limitations were noted regarding sample representativeness and the control of selection bias. Conversely, the experimental studies generally met the criteria for randomisation and blinding, although several studies reported follow–up limitations that could affect the reliability and internal validity of their findings. Agreement between the two independent reviewers was substantial (κ = 0.66), indicating good inter-rater reliability in the methodological quality assessments.

Table 3. Studies Attributes.

| Attributes | n. | % |
|---|---|---|
| Year of publication | | |
| from 2014 to 2019 | 6 | (43%) |
| from 2020 to 2024 | 8 | (57%) |
| Continent | | |
| United States of America & Canada | 0 | (0%) |
| Asian & Middle East | 11 | (79%) |
| United Kingdom & Europe | 2 | (14%) |
| Australia | 0 | (0%) |
| Latin America | 1 | (7%) |
| Study design | | |
| Observational | 5 | (36%) |
| Experimental and quasi-experimental | 9 | (64%) |

Legend: Descriptive characteristics of the included studies, grouped by year of publication, continent, and study design.

Abbreviations: n, number of studies, and %, percentage of total

Table 4. Quality Assessment of the Included Studies.

| Prospective/Randomised Controlled/Cross-Over Clinical Trials | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Overall |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Kalhori, 2015* | + | - | + | + | - | - | - | + | + | + | + | + | + | **Good methodological quality**, with moderate limitations due to lack of blinding. |
| *Bendavid, 2017* | + | + | + | + | - | + | + | + | + | + | + | + | + | **High methodological quality**, low risk of bias. |
| *Babamohamadi, 2018* | - | - | + | - | - | - | - | + | + | + | + | + | + | **Moderate methodological quality**, with potential reporting bias. |
| *De Araujo, 2019* | + | + | + | + | + | + | + | + | + | + | + | + | + | **High methodological quality**, negligible risk of bias. |
| *Badparva, 2021* | + | + | + | + | + | + | + | + | + | + | + | + | + | **High methodological quality**, negligible risk of bias. |
| *Nikseresht, 2021* | + | ? | + | + | ? | ? | + | + | + | + | + | + | + | **Good methodological quality**, minor uncertainties in some domains. |
| *Pourghaffari, 2021* | + | ? | + | ? | - | ? | + | ? | - | + | + | + | ? | **Moderate methodological quality**, with some risk of bias. |
| *Mobarez, 2022* | + | + | + | + | + | - | + | + | + | ? | + | + | + | **Good methodological quality**, low risk of bias. |
| *Rezaei, 2022* | + | + | + | + | + | ? | - | + | + | + | + | + | ? | **Good methodological quality**, minimal bias. |
| **Case Report Study** | **Q1** | **Q2** | **Q3** | **Q4** | **Q5** | **Q6** | **Q7** | **Q8** | | | | | | |
| *Yu, 2021* | + | + | + | + | + | + | - | + | | | | | | **Good methodological quality**, within the inherent limits of the design. |
| **Cohort Studies** | **Q1** | **Q2** | **Q3** | **Q4** | **Q5** | **Q6** | **Q7** | **Q8** | **Q9** | **Q10** | **Q11** | | | |
| *Kousha, 2018* | + | + | + | + | + | + | + | + | + | / | + | | | **High methodological quality**, low risk of bias. |
| *Pai, 2023* | + | + | + | + | - | - | + | + | + | / | + | | | **Moderate methodological quality**, with potential bias related to confounders. |
| **Cross Sectional Studies** | **Q1** | **Q2** | **Q3** | **Q4** | **Q5** | **Q6** | **Q7** | **Q8** | | | | | | |
| *Dhanapala, 2021* | + | + | + | ? | - | + | + | - | | | | | | **Moderate methodological quality**, with potential analytical bias. |
| *Vyas, 2018* | + | + | + | + | - | + | + | + | | | | | | **Good methodological quality**, with potential analytical bias. |

Legend: Quality appraisal of included studies using JBI Critical Appraisal Checklists, applied according to study design. "+" = criterion met; "–" = not met; "?" = unclear; "/" = not applicable. Overall quality classified as high, good, or moderate.

Table 2. Data Summary.

| First author, year | Country | Study design | Intervention |
|---|---|---|---|
| Kalhori, 2015 | Iran | Randomised Clinical Trial | Liposic® ointment applied to the eyelid margin every 5 hours, ensuring complete coverage of the cornea before manually closing the eyelid vs transparent polyethylene cover over the eyes extending from the eyebrow to the cheekbone, replaced every 12 hours vs application of preservative free artificial tears, two drops in each eye every 2 hours. |
| Bendavid, 2017 | Israel | Prospective Randomised Pilot Study | Ocular lubricants vs bandage contact lenses vs punctal plugs for the prevention and management of OSDs |
| Babamohamadi, 2018 | Iran | Randomised Clinical Trial | Each patient received vita-min A ointment in one eye every 6 hours for 5 days vs the contralateral eye was treated with a polyethylene film Mois-ture Chamber replaced every 12 hours. |
| Kousha, 2018 | United Kingdom | Two phase Prospective Cohort Study | Introduction of a nurse-led eye care protocol: Ocular cleansing with sterile gauze and isotonic physiological solution, application of Lacri–Lube® every 6 hours and Application of Lacri–Lube® before sleep. |
| Vyas, 2018 | India | Cross Sectional Study | Evaluation of nursing adherence to an evidence–based eye care protocol and its implications for patient–level ocular protection. |
| de Araujo, 2019 | Brazil | Randomised Clinical Trial | Lacribell® artificial tears vs Vidisic® artificial tear gel for the prevention of OSDs in critically ill patients |
| Badparva, 2021 | Iran | Randomised Clinical Trial | Assessment of adherence to standardized eye care practices, including:<br>• Microporous tape eyelid closure;<br>• Lubricant ointment application;<br>• Combined use of ointment and tape. |
| Dhanapala, 2021 | United Kingdom | Cross-Sectional Study | Assessment of adherence to standardized eye care practices, including:<br>• Microporous tape eyelid closure;<br>• Lubricant ointment application;<br>• Combined use of ointment and tape. |
| Nikseresht, 2021 | Iran | Prospective Clinical Trial | Three different ophthalmic treatments were applied for five consecutive days (one per group) vs standard nursing care (contralateral eye as control):<br>• Polyethylene cover applied once a day and replaced as needed;<br>• Polyethylene cover applied once daily, supplemented with artificial tears every 8 hours;<br>• Polyethylene cover applied once daily, supplemented with Lubratex® ointment every 8 hours. |
| Pourghaffari, 2021 | Iran | Cross-Over Clinical Trial | Implementation of a structured eye care protocol following specific nursing training vs no treatment in the control eye. |
| Yu, 2021 | China | Case Report | Both eyes were cleansed daily with sterile water. The right eye received a 2 cm strip of carbomer gel every 6 hours, later replaced with ofloxacin ophthalmic ointment applied every 6 hours. Subsequently, a moisture chamber was applied as an adjunctive measure. |
| Mobarez, 2022 | Iran | Randomised Clinical Trial | An eye care protocol based on eyelid position was implemented as follows:<br>• Group 1: one drop of hypromellose 0.3% instilled into both eyes every 2 hours, continued for 4 hours;<br>• Group 2: three drops of hypromellose 0.3% every 2 hours for 6 hours, with horizontal eyelid taping to maintain closure;<br>• Group 3: three drops of hypromellose 0.3% every 2 hours for 8 hours, with horizontal eyelid taping applied. |
| Rezaei, 2022 | Iran | Randomised Clinical Trial | Nurses applied artificial tears (2 drops) plus a simple ophthalmic ointment every 4 hours, followed by eyelid taping to ensure full closure, for patients with lagophthalmos, passive blinking exercise were added every 30 minutes over one week vs nurses performed hand hygiene and administered artificial tears (2 drops) every 4 hours (control). |
| Pai, 2023 | India | Prospective Cohort Study | Implementation of an eye care protocol following structured nurse training on ocular assessment and prevention of OSDs. |

Legend: **ICU**: Intensive Care Unit; **vs**: versus; **EK**: Exposure Keratopathy; **OSD**: Ocular Surface Disease; **RR**: Relative Risk; **OR**: Odds Ratio; **$\chi^2$**: Chi

| | Participant profile | Main outcome |
|---|---|---|
| | • n = 96 ICU patients:<br>• n = 32 Liposic® carbomer 980 ointment group;<br>• n = 32 polyethylene film cover group;<br>• n = 32 artificial tear drops group.<br>Homogenous groups. | Analysis revealed that the polyethylene film cover demonstrated the greatest preventive efficacy, with a mean keratopathy score of 0.59 ± 0.66 significantly outperforming the other interventions (p = 0.001). Although no statistically significant difference was observed between the Liposic® carbomer 980 oint-ment and artificial tear drops (p = 0.84), the oint-ment group showed a lower frequency and severity of corneal abrasions (mean = 1.13 ± 0.75, p < 0.001), indicating a superior protective effect on the corneal surface. |
| | • n = 104 ICU patients:<br>• n = 38 ocular lubricants group;<br>• n = 33 bandage contact lenses group;<br>• n = 33 punctal plugs group.<br>Homogenous groups. | The severity of EK increased significantly in the ocular lubricant group (p = 0.01) for both eyes, whereas no worsening was observed in either the bandage contact lens and punctal plug groups. In a post hoc analysis of patients with initially abnormal ophthalmic findings, significant keratopathy heal-ing occurred in the bandage contact lens group (p = 0.02 and p = 0.018 for the left and right eyes, re-spectively*) and in the right eye of the punctal plug group (p = 0.005). No improvement was observed in the eyes of the group treated with eye lubricant. |
| | • n = 38 comatose patients in intensive care (n = 64 eyes):<br>• n = 38 eye vitamin A ointment (VAEO) group.<br>• n = 38 eye Moisture Chamber (MC) group.<br>Homogenous groups. | Schirmer's test value increased by 2.06 mm in the VAEO group (p < 0.001) and slightly decreased by 0.15 mm in the MC group (p = 0.66). Vitamin A ointment has been shown to be more effective than humidification chambers in preventing OSDs in the eyes of patients admitted to ICU and is therefore recommended as the preferred preventive strategy. |
| | • n = 371 ICU patients sedated and mechanically ventilated, and non–sedated mechanically ventilated:<br>• n = 257 phase 1 group (observational phase);<br>• n = 114 phase 2 group (post-protocol implementation). | During phase 1, the overall incidence of EK was 21%, rising to 56% among mechanically ventilated patients [$\chi^2$ (1, n = 257) = 80.8; p < 0.001]. During phase 2, the overall EK incidence significantly decreased to 2.6% (3 cases) [$\chi^2$ (1, n = 371) = 18.6; p < 0.001]; demonstrating the effectiveness of systematic nursing interventions in preventing OSDs. |
| | • n = 120 nurses from six multispecialty hospitals caring for mechanically ventilated ICU patients. | Only 5% received systematic, protocol-based ocular protection. Approximately 43% of patients had their eyelid closure regularly assessed, while 48% received routine ocular cleansing with sterile saline. Patients cared for by nurses aware of EK were significantly more likely to receive adequate ocular protection. |
| | • n = 140 ICU patients:<br>• n = 70 Lacribell® artificial tears group;<br>• n = 70 Vidisic® artificial tear gel group.<br>Homogenous groups. | The use of Vidisic® artificial tear gel was significantly more effective in preventing dry eye than Lacribell® liquid artificial tears, with a RR = 0.40: 95% CI, 0.16-0.96 (p = 0.04). These findings indicate that gel based lubricants provide superior and longer lasting ocular protection for ICU patients at risk of OSDs. |
| | • n = 41 ICU patients (64 eyes):<br>• n = 41 eye Lubratex® ointment group;<br>• n = 41 eye Vitamin A ointment group.<br>Homogenous groups. | A post–intervention conducted after one month (n = 24) demonstrated that 67% of patients received eye lubrication, and 50% had eyelids taped in accordance with ICU eye care guidelines for the supine position. Among patients treated in the prone position, 100% received both ocular lubrication and microporous taping, reflecting full compliance with best-practice recommendations. These findings suggest improved protocol adherence in prone patients but persistent variability in eye care practices among supine ICU patients. |
| | n = 27 mechanically ventilated ICU patients. | A post–intervention conducted after one month (n = 24) demonstrated that 67% of patients received eye lubrication, and 50% had eyelids taped in accordance with ICU eye care guidelines for the supine position. Among patients treated in the prone position, 100% received both ocular lubrication and microporous taping, reflecting full compliance with best-practice recommendations. These findings suggest improved protocol adherence in prone patients but persistent variability in eye care practices among supine ICU patients. |
| | • n =156 ICU patients (n = 312 eyes):<br>• n = 52 eye polyethylene cover group (1);<br>• n = 52 eye polyethylene cover and artificial tear drops group (2);<br>• n = 52 eye polyethylene cover and Lubratex® ointment group (3).<br>No significant differences in demographic characteristics and confounding variables. | No statistically significant difference in the severity of lagophthalmos was found between the three groups (p = 0.93). However, the eyes of patients in the group treated with polyethylene cover and artificial tears showed less severe lagophthalmos than those in the other two groups, suggesting a modest additive effect of the combination of lubrication and occlusive protection in maintaining eyelid closure. |
| | • n = 32 ICU patients (64 eyes):<br>• n = 32 eye intervention group;<br>• n = 32 eye control group. | No significant differences in dacryorrhea or hyperaemia were observed between groups from days 2 to 7 (p < 0.05). However, the incidence of xerophthalmia was significantly lower in the treated eyes from days 4 to 7 (p = 0.0001), accompanied by a parallel reduction in corneal opacity observed from day 4 onward in the intervention group (p = 0.0001). |
| | • n = 1 female patient with right–sided lagophthalmos following brain injury. | Neither lubricating gel, antibiotic ointment, nor bandage lenses proved effective in preventing or resolving EK. Application of a moisture chamber, however, successfully controlled corneal ulceration, avoiding the need for tarsorrhaphy and restoring corneal protection. |
| | • n = 65 ICU patients:<br>• n = 34 intervention group (stratified into three subgroups according to eyelid position);<br>• n = 31 control group.<br>No significant differences were observed in demographic characteristics or confounding variables. | Implementation of the eye care protocol significantly reduced the incidence of OSDs compared to standard care EK: OR = 3.1 (p = 0.02); conjunctivitis: OR = 3.7 (p = 0.01); dry eye: OR = 5.3 (p = 0.001); corneal ulcer: OR = 4.8 (p = 0.003). These findings demonstrate that a structured, position based nurse–led eye care protocol effectively reduces the occurrence of OSDs among ICU patients. |
| | • n = 51 ICU patients (102 eyes):<br>• n = 51 eye intervention group;<br>• n = 51 eye control group.<br>Homogenous groups. | The prevalence and incidence of EK were significantly lower in the intervention group (p = 0.003). A significant difference was also found in the prevalence of EK in the eyes of patients with lagophthalmos (p = 0.03). These results indicate that the combined use of artificial tears, ophthalmic ointment, eyelid bandaging and periodic blinking exercises effectively reduces both the prevalence and severity of EK. |
| | • n = 200 Medical ICU patients:<br>• n = 100 before training group;<br>• n = 100 after training.<br>Homogenous groups. | The incidence of ocular morbidity decreased significantly after training from 63% to 25% (p < 0.001). Patients with lagophthalmos and a length of ICU stay >7 days demonstrated a higher risk of developing. |

Squared Test; **CI**: Confidence Interval; **p**: p-value.

## Discussion

This rapid review included 14 international full text studies, comprising RCTs, cohort studies, cross-sectional studies, and one case report, encompassing a total of approximately 1,322 sedated and mechanically ventilated adult patients admitted to ICUs. The methodological quality, assessed using the JBI Critical Appraisal Tools, was overall high, with 72% of studies rated as high quality and 28% as moderate, while none were classified as low quality. Most studies demonstrated robust design, transparent reporting, and appropriate analytical approaches. Despite heterogeneity in sample sizes, assessment instruments, and intervention types, the findings consistently reinforce the central role of nurses in preserving ocular surface integrity through timely, evidence–based care.

The narrative synthesis highlighted that the primary objective of ocular care in this patient population is the maintenance of ocular surface integrity through adequate cleansing and hydration, primarily by minimising tear film evaporation. Interventions were commonly tailored to the degree of lagophthalmos (Hearne et al., 2018; Kousha et al., 2018; Mobarez et al., 2022). Across all studies, early diagnosis and prevention of lagophthalmos emerged as the first step in preventing ocular surface damage (Rosenberg & Eisen, 2008; Vyas et al., 2018). Regular nursing assessments of eyelid closure, supported by systematic documentation, were essential for early detection of ocular exposure and for initiating protective interventions promptly.

Ocular cleansing was one of the most frequently reported preventive measures, recommended every 2-4 hours or at least once per nursing shift, using sterile gauze moistened with isotonic saline or sterile water (Aromataris et al., 2015; Hearne et al., 2018; Kousha et al., 2018; Vyas et al., 2018; Werli-Alvarenga et al., 2011). Direct irrigation, however, is not recommended due to the risk of contamination and increased ocular surface irritation (Babamohamadi et al., 2018; Werli-Alvarenga et al., 2011). Lubrication using preservative–free artificial tears or ophthalmic ointments was effective in maintaining corneal hydration by reducing evaporation and friction (Hearne et al., 2018; Kousha et al., 2018; Vyas et al., 2018). Vitamin A–based ointments offered additional epithelial protection and prolonged surface retention (Babamohamadi et al., 2018; Badparva et al., 2021), particularly in patients with persistent lagophthalmos.

Moisture chambers and polyethylene film covers were identified as effective mechanical barriers, reducing tear evaporation and creating a micro–humid environment (Babamohamadi et al., 2018; Kalhori et al., 2015; Nikseresht et al., 2021). Their use was especially beneficial in patients under deep sedation or neuromuscular blockade, where blinking and eyelid closure are impaired (Dhanapala & Sabaretnam, 2021; Rosenberg & Eisen, 2008). In selected cases, antibiotic ointments were used prophylactically or therapeutically to prevent ocular infection (Yu et al., 2021). Eyelid taping with microporous adhesive tape, when correctly applied, ensured complete eyelid closure and protection from environmental irritants (Dhanapala & Sabaretnam, 2021; Mobarez et al., 2022).

Only one study included patients in the prone position, limiting generalizability (Dhanapala & Sabaretnam, 2021). However, Sanghi et al. and Lightman & Montgomery recommended similar eye care strategies for prone and supine patients, including lubrication, eyelid taping, and postural adjustments such as anti–Trendelenburg positioning and head rotation every four hours (Lightman & Montgomery, 2020; Sanghi et al., 2021). Some studies also examined environmental factors influencing ocular health, such as humidity (50-60%), temperature (22.5-25.5 °C), and light exposure (Werli-Alvarenga et al., 2011). Optimising ambient humidity and avoiding continuous direct lighting were found to support ocular surface hydration and reduce irritation (Demirel et al., 2014; NSW, 2024). Although secondary to direct ocular interventions, these contextual measures complement nursing practices and should be integrated into routine care. Nevertheless, it should be clarified that these environmental recommendations derive mainly from expert consensus rather than direct evidence from the included studies; they therefore represent adjunctive best practices designed to support primary ocular care strategies.

The predominance of eye–focused interventions reflect the local pathophysiology of OSDs, typically resulting from lagophthalmos, reduced tear production, and tear film instability associated with sedation and mechanical ventilation (Hernandez & Mannis, 1997; Kuruvilla

et al., 2015; Mobarez et al., 2022). Such topical approaches are the most direct, measurable, and feasible within nursing practice. Nevertheless, ocular health is also influenced by systemic and organisational factors, including sedation management, ventilator settings, fluid balance, and environmental control, confirming the multidimensional and interdisciplinary nature of eye care in the ICU (Ahmadinejad et al., 2020). Effective prevention thus requires collaboration among nurses, physicians, and ophthalmologists, with nurses playing a pivotal role in early recognition, prevention, and documentation of ocular surface conditions.

Importantly, ICU nurses have demonstrated the ability to detect OSDs, such as EK and keratoconjunctivitis, with acceptable sensitivity and specificity (McHugh et al., 2008). Regular nursing assessments and documentation of ocular condition facilitate early detection and timely management, improving clinical outcomes and supporting continuity of visual health after discharge.

This rapid review therefore underscores an often–overlooked dimension of patient safety in ICU: the prevention and management of OSDs in deeply sedated, mechanically ventilated patients. Despite their impact on visual function and post–ICU quality of life, these complications remain frequently neglected in daily practice.

*Implication for Practice*

To address the persistent gaps in ocular surface care for critically ill patients, the findings of this review support the development of a nurse–led, evidence–based protocol, "Eye Care, You Care", designed for integration into standard intensive care routines (Figure S1 from Supplementary Material).

Drawing on high–quality empirical evidence and expert consensus, the protocol translates best available research into a structured yet flexible framework applicable across diverse ICU settings. It provides clear, actionable guidance on essential nursing interventions, including eye cleansing frequency, lubrication regimens, and the use of moisture chambers to preserve corneal hydration, in accordance with current international recommendations (Lightman & Montgomery, 2020; NSW, 2024). Importantly, the protocol underscores the pivotal role of ICU nurses in the early identification and prevention of OSDs by embedding systematic ocular assessment within routine patient monitoring (McHugh et al., 2008). By fostering timely intervention and interdisciplinary collaboration, this approach promotes a standardised and shared model of eye care, thereby enhancing patient safety, improving clinical outcomes, and supporting long–term visual recovery after critical illness.

*Limits of the Study*

Despite the methodological rigour of this rapid review, several limitations warrant consideration. First, the marked heterogeneity in study designs, intervention protocols, and outcome measures precluded any form of meta–analytic synthesis, preventing the derivation of quantitative effect estimates or comparative efficacy analyses. Moreover, several studies reported outcomes per eye rather than per patient, introducing the potential for intra–patient correlation, and limiting statistical independence. Second, the external validity of some studies was constrained by non-probabilistic sampling and single–centre designs, both of which may have introduced selection bias and restricted the generalisability of findings to broader ICU populations or resource–limited settings. Finally, only one study addressed patients managed in the prone position, thereby limiting the strength of evidence for this subgroup. Although expert consensus supports applying similar ocular care strategies as those used in supine patients, these recommendations remain extrapolations rather than empirically validate

## Conclusion

This rapid review presents the first comprehensive synthesis of evidence concerning ocular care in critically ill, sedated, and mechanically ventilated patients admitted to ICUs. The findings reveal a consistent body of evidence supporting targeted, evidence–based nursing interventions — such as regular ocular cleansing, preservative–free lubrication, and the application of moisture chambers — tailored to the degree of lagophthalmos and environmental conditions.

These results underscore the urgent need to standardise and harmonise nursing eye care practices through structured, evidence–based protocols that can be seamlessly integrated into routine critical care. Implementing such

protocols has the potential to significantly enhance patient safety, preserve ocular surface integrity, and improve post–ICU visual outcomes. Despite heterogeneity in study designs and outcome measures, the overall methodological quality provides a robust foundation for clinical translation. The proposed nurse–led "Eye Care, You Care" protocol operationalises this evidence into a practical, adaptable framework for daily ICU nursing practice, promoting consistency, accountability, and high standards of care. Further multicentre research is warranted to validate these interventions — particularly in patients managed in the prone position and to support their broader adoption across diverse intensive care settings.

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