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Nursing Activities And Workload In The Intensive Care Unit

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ABSTRACT

This study investigates the nursing workload in Intensive Care Units (ICUs) and its implications for patient outcomes and care quality. As healthcare environments evolve with technological advancements and changing patient demographics, the complexity of nursing tasks has intensified, necessitating an examination of the factors contributing to nursing workload. Utilizing the Nursing Activities Score (NAS) instrument, this research evaluates the workload of nursing staff in an adult ICU at a university hospital, aiming to identify how demographic and clinical characteristics impact this workload. Findings indicate that increased nursing workload correlates with decreased patient survival rates and heightened incidences of nosocomial

infections, underscoring the critical relationship between nursing staffing levels and patient safety. The study also highlights that inadequate nurse-to-patient ratios can lead to increased healthcare costs and longer hospital stays, emphasizing the need for optimized staffing strategies. Recommendations include maintaining appropriate nurse-to-patient ratios, enhancing access to resources and technology, promoting interdisciplinary collaboration, and implementing standardized protocols to streamline nursing tasks. By addressing these factors, healthcare facilities can improve the quality of care provided in ICUs, ultimately leading to better patient outcomes and enhanced nurse well-being. This research contributes to the growing body of evidence advocating for systemic changes in ICU nursing practices to mitigate the adverse effects of excessive workload on both patients and healthcare providers.

KEYWORDS: icu, nursing, workload, adverse events, complications.

1. Introduction

The nursing workload in hospitals has been discussed globally because of its implications on the quality of patient care. In intensive care units (ICU), concern is increasing because of the effect of new technologies on care, the changing profile of critically ill patients and the need for skilled labor [1].

In an ICU, nurses note daily whether critical patients will require prolonged assistance regarding the performance of routine procedures both upon admission and during their stay because organ instability can occur at any time over the course of the patients' stays in these units. This variability challenges the balance between an adequate delivery of care and the rational use of resources [2].

Nursing workload consists of the time spent by nursing staff to perform the activities for which they are responsible, whether directly or indirectly related to patient care. These activities can change depending on the patient's degree of dependency, the complexity of the disease, the characteristics of the institution, work processes, the physical layout and the nature of the professional team. The nursing workload also includes other factors in which certain activities unrelated to the patient or his/her family become a component of the responsibilities of nurses during their work shifts. These activities include nursing education (monitoring students, training staff) and organizational and administrative work [3]. Thus, the nursing workload is the total of all of the needs that must be fulfilled relative to the nursing staff available to fulfill them, which ultimately translates into time of care. The various studies that have described nursing workloads have shown that the demographic and clinical characteristics of severely ill patients were not associated with differences in measuring the nursing work [4]. When evaluating nursing work in terms of patient severity, some authors reported that the Nursing Activities Score (NAS) at admission was associated with longer stays in the ICU. In addition, there was an association between mortality and NAS, thus showing that patients who did not survive resulted in an increased nursing workload [5].

To optimize financial resources and to properly allocate human resources in an ICU, thus prioritizing quality and safety of care, ICU performance must be evaluated using prognostic indices and by measuring the nursing workload. The latter is important because among the healthcare teams working in ICU, it is the nursing staff that spends the most time at a patient's bedside, performing procedures and therapeutic interventions. Thus, the aim of this study was to evaluate the nursing workload in an adult ICU of a university hospital using the NAS instrument and to analyze the effects that demographic and clinical characteristics have on their workload [6].

Objectives:

The main objectives of this review are:

1. To assess the impact of nursing workload on patient outcomes in Intensive Care Units (ICUs).

2. To identify factors contributing to high nursing workload in ICUs and potential strategies for workload management.

3. To explore the association between nursing workload and quality of care provided in ICUs.

4. To provide evidence-based recommendations for optimizing nursing workload in ICUs to improve patient outcomes and nurse well-being.

Impact of nursing workload on ICU patients:

An increase in the workload of nurses leads to a decrease in patient survival rates, which can be linked to suboptimal care provided to certain patients. Consequently, this may impact the overall quality of care required by some individuals. The Agency for Healthcare Research and Quality (AHRQ) examined the relationship between nursing workload, staffing levels, and their influence on patient outcomes and safety [7]. Their findings indicated that much of the research in this area has primarily concentrated on the effects of staffing on patient safety and satisfaction. Prior studies have demonstrated a significant association between reduced staffing levels and various nursing-sensitive outcomes for patients under nursing care. Additionally, investigations utilizing databases with over 124,000 patients revealed that lower nursing staffing was significantly linked to the onset of pneumonia in patients who needed more nursing attention [8]. A multicenter study conducted in the United States found that surgical patients had an elevated risk of developing pneumonia, which was notably decreased by 8.9% when nursing staffing was increased by one hour per day for these individuals. Thus, enhancing nursing care time can be achieved through increased staffing levels [9]. Another study from the United States also indicated that lower rates of pneumonia were significantly associated with higher nursing staffing in the hospitals analyzed [10]. It is important to recognize that staffing is not the sole significant factor influencing the overall impact of reduced nursing care; the workload of nurses warrants further attention. Other factors, such as economic conditions,

pandemics, the size of healthcare facilities, and patient load, may also play a critical role and should be investigated in future research [11].

Evidence_ based results regarding nursing workload in ICU:

Evidence showed that an increased rate of nursing workload was significantly associated with increased rates of nosocomial infections. Among surgical patients, a higher proportion of care provided by registered nurses was associated with lower rates of urinary tract infections (P=0.04), and a greater number of hours of care per day provided by registered nurses was associated with lower rates of "failure to rescue" (P=0.008). Moreover, Harbarth et al. conducted a study in the neonatal ICU to investigate the same correlation and found that reduced nursing staffing was significantly associated with increased incidence rates of E cloacae infections [12]. Similarly, a study by Archibald et al. in Philadelphia in Philadelphia, United States showed that the monthly incidence rates of nosocomial infections were significantly lower with the reduced working hours of the registered nurses. Needleman et al. [13] studied 11 centers across the United States and stated that lower incidence rates of failure to resuscitate as well as high mortality rates were associated with the increased nursing hours provided by the registered healthcare workers. The increased workload per each patient showed that it can contribute to overall in-hospital mortality. Aiken et al. concluded that if the workload of a registered nurse was increased by one patient, this will contribute to a 7% increase in the risk of mortality in the corresponding population [14]. Manheim et al. also reported that increasing the hospital staffing nurses can reduce the mortality rates and increase the efficiency of the introduced care [15]. A previous investigation by Pronovost et al. showed that, in patients undergoing abdominal aortic surgeries, the rate of hospital stay for these patients increased by 20% when the ratio for nurses to patients was less than 1:2 per day [16]. Lichtig et al. also proved that increased nursing workloads, represented by increasing work hours, were significantly associated with reduced complications and hospital stay [17]. In Australia, a study by Beckmann et al. showed that reduced nurses to patients ratio in the ICU was significantly associated with increased rates of drug self-administration, ventilation, self-extubation, lack of supervision and documentation [18]. Moreover, the need to be mechanicallyventilated secondary to acquired pneumonia was significantly associated with reduced care hours provided by the registered nurses. A previous meta-analysis of nine observational studies concluded that reduced mortality rates in the ICU were not significantly associated with increasing the level of nursing workload and staffing. However, the same study showed that their results were not conclusive due to flawed errors in the included studies [19]. Thompson et al. conducted a large observational study in 35 hospitals and 45 ICUs and reported a correlation between increased nursing working hours and quality of provided care [20]. The authors reported that increased working hours by 20 hours per week significantly increases the risk of catching a nosocomial infection and increases the length of hospital stay for the corresponding patients. In another study by Chang et al., the nurse-

to-patient ratio was significantly associated with in-hospital mortality rates, patients' resuscitation, and overall quality of the provided care [21]. Jung et al. also conducted an observational study to find the correlation between in-hospital mortality and nursing workload among the included population [22]. They divided their population into four grades based on the estimated bed-to-nurse ratio of the center. The authors reported that in-hospital mortality rates were significantly associated with an increased bed-to-nurse ratio (<0.63 or more). However, significance was not estimated in other patients that did not require mechanical ventilation. This was justified by the fact that mechanical ventilation requires the integration of more efforts by the accompanying nurses (due to additional medications, procedures, and equipment) which add to the overall workload and reduces the efficacy of these nurses [23]. The association between nursing workload in ICU patients and increased incidence rates of mortality. For instance, Neuraz et al. in an observational study found that when patient-to-physician ratio exceeded 14 on the Therapeutic Intervention Scoring System (TISS), patients' safety becomes compromised [24]. The nurse-to-patient ratio has been previously used to evaluate patient safety correlation with the nursing workload as reported by previous reports. However, previous research shows that the nursing workload is more complex and can not be determined by a simple ratio as the nurse-to-patient one. This nurse-to-patient ratio is taken into account because of its availability and easy-to-use structure [25]. On the other hand, a previous meta-analysis suggested that having an adequate nurse-topatient ratio might be a significant factor in reducing the adverse events faced by the patients in the ICU in addition to reducing the healthcare costs by preserving the potential resources and reducing the hospital stay [26]. Another meta-analysis by Kane et al. [27] analyzed the results of 28 studies and reported that lower mortality rates among patients in the ICU were significantly associated with increased nursing staffing. However, the study estimated that lower cardiac arrest, unexplained extubation, nosocomial pneumonia, and respiratory failure rates were significantly reduced when the registered number of nurses increased by 1 per patient.

Nursing workload and patient safety:

Reports by the Systems Engineering Initiative for Patient Safety (SEIPS) indicated that nursing workload can directly affect the quality of the care provided for the patients which in return affects their safety [28]. Lack of time and increased tasks for nurses in the ICU, which is attributable to the increased workload, is a significant reason for such an effect. Nurses may face huge difficulties in integrating the required tasks and providing the needed care for patients in need. Griffith et al. expressed that increased consumption of healthcare resources may impact the ability of the healthcare officials to direct nursing capabilities into the right path [29]. Baggs et al. also indicated that increased workload may affect the quality of the provided care as nurses would have less time to spend with the relative physicians which increases the risk for developing mistakes and decreasing the quality of care [30]. Reduced communication intervals

between the nurses and patients might also be a contributing factor. Cavanagh et al. mentioned that increased workload might lead to job dissatisfaction which leads to poor performance affecting the quality of the provided care [31]. This theory has been proved by previous investigations as researchers showed that patient satisfaction will lead to a better quality which may result from high-quality care attributable to the satisfaction of the job [32]. In addition to these factors, the increased workload might also lead to a higher burnout and stress levels of the nurses. This may impact the nurses' abilities to work and reduces the efficiency of the provided care owing to the reduced cognitive and physical capabilities, which can affect the quality of the provided care for the patients [33]. Mistakes and errors might also increase with more workload on the performing nursing crew [34]. To eliminate the shortage of nursing efforts attributable to the increased workload, factors that contribute to such events must be identified and corrected. Carayon et al. [35] reported that such factors include the relativity and availability of nurses staffing per patient, exhaustion and stress, poor equipment, and easy access to the patient. Therefore, it is essential to propose human-engineering based approaches suitable for these issues to decrease the burden resulting from the increased workload of nursing personnel [36].

Recommendations for optimizing nursing workload in ICUs:

In order to optimize nursing workload in intensive care units (ICUs) and improve both patient outcomes and nurse well-being, it is crucial to implement evidencebased recommendations. One key recommendation is to ensure appropriate nurse-topatient ratios in ICUs, as studies have shown that higher nurse staffing levels are associated with better patient outcomes, such as reduced mortality rates and shorter lengths of stay. Additionally, providing nurses with adequate resources and support, such as access to cutting-edge technology and ongoing training opportunities, can help them deliver high-quality care more efficiently [37]. Implementing electronic health records, automated medication dispensing systems, and other technology can help streamline nursing tasks and reduce time spent on administrative duties, allowing nurses to focus more on patient care. It is also important to promote interdisciplinary collaboration within the ICU team, as working together with other healthcare professionals can help nurses better manage their workload and provide holistic care to patients. Furthermore, implementing standardized protocols and guidelines for common ICU procedures can help streamline workflow and reduce the risk of errors [38].

2. Conclusion:

In conclusion, addressing nursing workload in intensive care units (ICUs) is paramount for enhancing patient outcomes and ensuring the well-being of nursing staff. This study highlights the intricate relationship between nursing workload and patient safety, emphasizing that increased workloads can lead to compromised care quality and higher mortality rates. Evidence supports the need for optimal nurse-topatient ratios

and adequate staffing levels, which are crucial for maintaining high standards of care. Additionally, implementing technological solutions and fostering interdisciplinary collaboration can alleviate some burdens faced by nurses, allowing them to focus more on direct patient care. As healthcare systems continue to evolve, it is essential to prioritize strategies that effectively manage nursing workloads. By doing so, we can not only improve patient outcomes but also create a more supportive and sustainable work environment for nurses, ultimately leading to a higher quality of care in ICUs. Future research should continue to explore innovative approaches to workload management in this critical healthcare setting.

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