ORIGINAL RESEARCH

Assessment of the Critical Care Work Environment of Intensive Care Unit Nurses in Saudi Arabia

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Background: Nurses play a major role in the delivery of complex and challenging critical care in intensive care units (ICUs). Assessment of work environment is essential indicators of hospital management and can be applied to workforce planning and identifying nursing profession needs. The American Association of Critical-Care Nurses (AACN) recognized six standards for a healthy work environment and developed the Healthy Work Environment Assessment Tool (HWEAT). The aim of this study was to assess the work environment of ICU nurses in Jazan, Saudi Arabia.

Methods: This cross-sectional study was conducted at public and private hospitals. Data were collected using a self-administered questionnaire that included the sociodemographic characteristics and the AACN HWEAT. Data were analyzed to obtain descriptive and inferential statistics. The Mann–Whitney U and Kruskal–Wallis tests were employed to compare demographic data, on the basis of the overall mean HWEAT score.

Results: The study participants were 238 ICU nurses, who were predominantly female (83%). The mean overall HWEAT score was 3.55±1.03, which is within the "good" range, and was higher for male nurses (3.66), nurses aged ≥41 years (3.76), and nurses with postgraduate education (4.04), work experiences of >10 years (3.63), and alternate work shifts (3.6). Nurses in private hospitals had significantly higher overall scores than nurses in public hospitals (3.83 vs 3.19, P<0.001). All HWEAT standards ("effective decision-making", "authentic leadership", "appropriate staffing", "true collaboration", "skilled communication", and "meaningful recognition") were rated as good (mean range, 3.43–3.63).

Conclusion: The study results could assist hospitals in prioritizing the adoption of AACN HWE standards. A target benchmark of "good" was established for both the overall score and each standard, which indicates a good work environment as perceived by ICU nurses. In Addition, interpersonal differences should be considered when developing improvement initiatives.

Keywords: work environment, nursing practice, intensive care

Introduction

Nurses play a major role in the delivery of critical care in intensive care units (ICUs), where the care they provide is more complex and challenging than that provided in other hospital departments.[1] ICU nurses are frequently subjected to high demands to fulfill the duties assigned to them.[2] Working in a field that involves complex multitasking, high workloads, and providing specialized care to critically ill and reliant patients can be overwhelming for nurses,[3] especially during the coronavirus disease (COVID-19) pandemic. The pandemic of COVID-19 has been the most disruptive factor in the ICU work environment. Over the past two years, ICU teams around the world have been inundated with critically ill patients requiring breathing support and other advanced interventions.[4] It has been proven that the health of the work environments of critical care nurses affects patient care outcomes and the job satisfaction and retention of registered nurses.[5] A growing body of evidence demonstrates a connection between nurse work environments and patient outcomes.[6,7]

Work environment is generally defined as "the physical, chemical, biological, organizational, social, and cultural factors that surround a worker".[8] According to the American Association of Critical-Care Nurses (AACN), "a healthy

work environment (HWE) is imperative to ensure patient safety, enhance staff satisfaction and retention, and maintain an organization's financial viability".[9] The ideal work environment provides conditions for physical, mental, and social well-being.[10] The external pressures of diminishing health-care reimbursement, increasing regulatory requirements, rising acuity and patient complexity, and increased health-care operational restrictions have a negative effect on work environments.[11]

Assessment of work environment is essential indicators of hospital management and can be applied to workforce planning and identifying nursing profession needs.[12] Clinical leaders have recognized that to maintain patient care quality, attention should be paid to the performance of health-care teams.[7] The AACN has identified systemic behaviors that promote patient safety, optimal outcomes, and nursing practice excellence and classified them into six evidence-based standards that are critical for establishing and maintaining a HWE: "skilled communication", "true collaboration", "effective decision-making", "appropriate staffing", "meaningful recognition", and "authentic leadership".[9] For this purpose, the AACN developed a reliable and valid tool, the Healthy Work Environment Assessment Tool (HWEAT), which comprehensively captures work environments to achieve and sustain environments of excellence.[13]

The impact of the nursing work environment is an important field of nursing research, especially because it is related to patient safety and quality of care.[14–16] Nurses and health-care administrators must endeavor to improve the nursing work environment.[17] Nursing research has progressively demonstrated the impact of the nursing work environment on the quality of nurses' work experiences and the delivery of quality patient outcomes in acute-care hospitals.[18–20] However, research on the assessment of the work environment of ICU nurses after the COVID-19 pandemic is still scarce, especially in Saudi Arabia, which is needed to emphasize the patient safety and quality of care. Therefore, the aim of this study was to assess the work environment of nurses working in ICUs in Saudi Arabia using the HWEAT. The results of this study can provide baseline data to enable hospital management to benchmark their status based on established quality standards and may be useful for identifying HWE components that require improvement.

Methods
Population and Study Area
A cross-sectional study design was conducted at public and private hospitals affiliated with the Jazan Region Health Administration in Saudi Arabia, between January 2022 and June 2022. The survey population included full-time ICU nurses. Using G*Power software, the minimum sample size required to achieve 80% power for detecting a medium effect, at a significance criterion of $\alpha = 0.05$, was N = 130, for the Independent Sample T-Test.[21] Owing to the lack of accessibility of the ICU nurses' contact information, nursing supervisors in the hospitals were contacted and asked to distribute the survey to ICU nurses in their hospitals. The questionnaire was distributed online using Qualtrics Research Core (Qualtrics, Provo, UT). The survey link was emailed to the nurse supervisors for them to forward to the nurses in their teams. A total of 326 invitations via email were sent to ICU nurses in 13 hospitals in January 2022, with a three follow-up emails every two months. Convenience samples of 238 were collected for this study, which is considered adequate.

Survey
Data were collected using a self-administered questionnaire that included the sociodemographic characteristics (age, sex, educational level, years of experience, time of shift, and type of hospital) and the AACN HWEAT to assess the work environment of the ICU nurses. The HWEAT is an 18-item Likert scale that ranks standard adherence as "needs improvement", "good", or "excellent." The 18-items evaluates each of the six HWE standards with three unique items. On a 5-point Likert scale, participants were requested to choose their level of agreement or disagreement with each statement (1 = "strongly disagree;" 5 = "strongly agree").

The cover page of the survey questionnaire included an introduction sheet that contained the study's objective, duration, privacy and confidentiality statements. The first page of the questionnaire included the participation consent form, which participants should sign to access the survey.

Statistical Analyses

For the statistical analysis, Statistical Package for Social Sciences (SPSS) Version 27 (IBM Corp., Armonk, NY) was utilized to obtain the descriptive statistics for continuous variables (mean, standard deviation [SD]) and categorical variables (n, percentage). Responses from participants were averaged to get the mean score for each item, the mean score for each HWE standard, and the overall mean HWEAT score. The mean score was interpreted as categorical thresholds as follows: 4.00 to 5.00, "excellent"; 3.00 to 3.99, "good"; and 1.00 to 2.99, "needs improvement."[7] The percentage distributions of the ICU nurses at each HWEAT categorical threshold for the HWE standards were obtained. The Kolmogorov–Smirnov goodness-of-fit test is used for testing normality of the distributions of the quantitative variables. The Mann–Whitney U and Kruskal–Wallis tests were employed to compare demographic data. To evaluate statistical significance, a p value of 0.05 was applied.

Ethical Considerations

This study complies with the Declaration of Helsinki and was approved by the Ethics Committee of Jazan University (Approval No.: REC-43/11/279).

Results

This study included a total of 238 nurses working in ICUs, and the response rate was approximately 73%. As shown in Table 1, the sociodemographic statistics showed that 83% of the ICU nurses were female, 50% belonged to the age group of 22–30 years, 80% had a bachelor's degree, 45% had 6–10 years of work experience, 65% worked alternate shifts, and 55% were employed in private hospitals. The mean overall HWEAT score was 3.55 ± 1.03, which is within the "good" range. When the groups in each demographic category were compared, the overall HWEAT score was higher for male

Table 1 Summary of the Participants' Demographic Characteristics and the Mean Overall HWEAT Score

Item		n (%)	Overall Mean (SD)	P value
Sex[1]	Female	198 (83)	3.52 (0.93)	0.448
	Male	40 (17)	3.66 (1.07)	
Age (years)[2]	22–30	118 (50)	3.4 (1.08)	0.39
	31–40	104 (44)	3.68 (0.78)	
	≥41	16 (6.7)	3.76 (0.88)	
Qualification[2]	Diploma	42 (18)	3.56 (0.96)	0.53
	Bachelor	190 (80)	3.53 (0.95)	
	Postgraduate	6 (2.5)	4.04 (0.91)	
Length of work experience (years)[2]	0–5	83 (35)	3.47 (1.02)	0.82
	6–10	107 (45)	3.57 (0.90)	
	>10	48 (20)	3.63 (0.96)	
Typical work shift[2]	Days	50 (21)	3.51 (1.04)	0.75
	Nights	34 (14)	3.35 (0.95)	
	Alternate	154 (65)	3.6 (0.93)	
Type of hospital[1]	Public	106 (45)	3.19 (1.01)	<0.001
	Private	132 (55)	3.83 (0.80)	

Note: [a]mann–Whitney U-test. [b]Kruskal–Wallis test.

nurses (3.66), nurses aged ≥41 years (3.76), nurses with postgraduate education (4.04), nurses with work experience of >10 years (3.63), and nurses with alternate work shifts (3.6). ICU nurses in private hospitals had significantly higher overall scores than ICU nurses in public hospitals (3.83 vs 3.19, P < 0.001).

Table 2 shows the results for the responses to each item of the HWEAT. The item "Able to influence policies, procedures, and bureaucracy" scored highest (3.72). The items that scored lower than the mean overall HWEAT score were "Consistent use of data-driven, logical decision-making process", "Enough staff to maintain patient safety", "Formal recognition system makes staff feel valued", and "Zero tolerance for disrespect and abuse" (3.17) in this order. All six standards scored within the "good" range, ranked from highest to lowest in terms of aggregate scores as

Table 2 Mean Scores of the Healthy Work Environment Assessment Tool Variables

| Variable	Items	Mean (SD)
Skilled Communication	"Maintains frequent communication"	3.68 (1.02)
	"Matches actions to words"	3.55 (1.03)
	"Observes zero tolerance for disrespect and abuse"	3.17 (1.20)
	Overall	3.47 (0.92)
True Collaboration	"Involves staff in decision-making"	3.59 (1.04)
	"Influences policies, procedures, and bureaucracy"	3.72 (1.06)
	"Seeks input for decision-making"	3.58 (1.05)
	Overall	3.63 (1.04)
Effective Decision-making	"Consistent use of a data-driven, logical decision-making process"	3.48 (1.03)
	"Involves the right departments, professions, and groups"	3.67 (1.00)
	"Considers the patient's perspective is in important decisions"	3.67 (0.96)
	Overall	3.61 (0.95)
Appropriate Staffing	"Enough staff to maintain patient safety"	3.30 (1.23)
	"Right mix of nurses and other staff to ensure optimal outcomes"	3.48 (1.13)
	"Support service level allows nurses and staff to focus on care"	3.51 (1.20)
	Overall	3.43 (1.11)
Meaningful Recognition	"Formal recognition system makes staff feel valued"	3.45 (1.09)
	"Staff members let people know when they have done a good job"	3.52 (1.12)
	"Motivating opportunities for personal growth"	3.56 (1.16)
	Overall	3.51 (1.08)
Authentic Leadership	"Staff have a positive relationship with nurse leaders"	3.63 (1.16)
	"Nurse leaders understand the dynamics at point of care"	3.60 (1.12)
	"Nurse leaders play a role in making key decisions"	3.67 (1.16)
	Overall	3.63 (1.11)
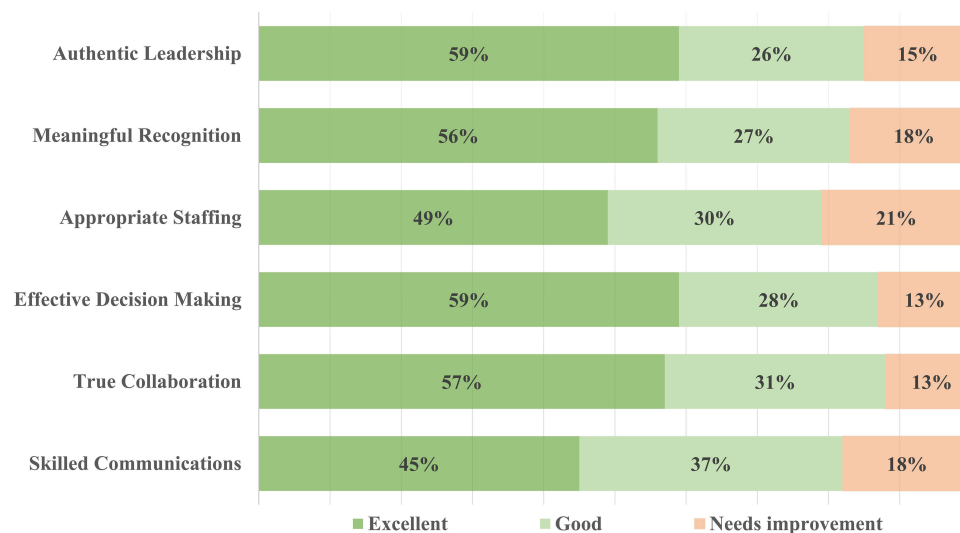
Figure 1 Percentage distributions of the nurses among the HWEAT categorical thresholds for the HWE standards.

follows: "true collaboration" and "authentic leadership" (3.63), "effective decision-making" (3.61), "meaningful recognition" (3.51), "skilled communication" (3.47), and "appropriate staffing" (3.43).

As shown in Figure 1, the percentage distribution of ICU nurses at each HWEAT categorical thresholds indicates that appropriate staffing standard was rated "needs improvement" by the highest percentage of nurses (21%), followed by meaningful recognition and skilled communications (18%). The item "effective decision-making" and "authentic leadership" "standards" was rated "excellent" by the highest percentage of ICU nurses (59%), followed by true "collaboration standards" (57%).

Discussion

Evidence has shown that work environments are strongly associated with patient safety, organizational financial stability, employment and retention.[9,22] Assessment of work environments must be recognized as a main strategic and operational goal of health-care systems.[13] In this study, the ICU nurses reported that the health of their work environment was "good", rating each standard also as "good." This result is consistent with those of earlier research.[13,23,24] However, the mean scores reported in this study (range: 3.43–3.63) were lower than those reported (range: 3.53–3.76) in a previous study conducted in 2012 in Riyadh, Saudi Arabia.[24]

The stratification of the responses according to demographic characteristic showed significantly more positive evaluations by male nurses (3.66), nurses aged ≥41 years (3.76), nurses with postgraduate education (4.04), nurses with a work experience of >10 years (3.63), and nurses with alternate work shifts (3.6). Nurses in private hospitals had significantly higher overall scores than nurses in public hospitals (3.83 vs 3.19, $P < 0.001$). Moreover, this study considered the percentage of nurses at each HWEAT categorical threshold, which showed that appropriate staffing standard was rated "needs improvement" by the highest percentage of nurses (21%). These may point to an opportunity for developing improvement plans that take into consideration interpersonal differences.[25]

None of the HWE standards was rated "excellent." The HWE is multifaceted, and a large body of research has shown that excellence in the work environment arises from a strong commitment to all six standards.[9] Each HWE standard needs continuing attention and should be considered as an on-going improvement opportunity.[9] Skilled communication is crucial in providing excellent patient care and job satisfaction.[9,26]

Poor communication is a leading cause of burnout,[27,28], and practitioners who get training in communication are less likely to have burnout.[16,29,30] Despite that skilled communication was interpreted as good, the item "zero tolerance for disrespect and abuse" showed the lowest score (3.17) among all items in the HWEAT, which presents a need for further attention. According to Matthew Grissinger, "disrespectful behavior chills communication and collaboration, undercuts

individual contributions to care, undermines staff morale, increases staff resignations and absenteeism, creates an unhealthy or hostile work environment, causes some to abandon their profession, and ultimately harms patients".[30,31] Several studies have linked these behaviors to adverse events, medical errors, patient safety compromises, and even patient mortality.[32,33] True collaboration is vital, with 90% of nurses believe that true collaboration is the most crucial aspect for a HWE; it can reduce compassion fatigue and result in improved patient care outcomes.[29,34] In contrast, medical errors and staff turnover is linked to poor collaboration.[35] Effective decision-making enhances patient outcomes and compassion satisfaction while reducing compassion fatigue.[36,37] It is recommended that employees be given chances to engage in decision-making processes, which should be matched with their corresponding accountability, in order to motivate them to strive for excellence.[38] Moreover, staff empowerment, specifically psychological empowerment, has significant impact of employees performance.[39] Appropriate staffing occurs when patient needs align with nurse competencies; mismatches increase the chance of complications and diminish nurses' well-being.[6,7] Nurses with high patient loads experience burnout.[20] A study found that 48% of nurses who quit their jobs cited poor or inadequate staffing as the reason.[6] Moreover, studies have indicated that increasing the number of nurse staff assigned to a unit provides better patient care and decreases the incidence of mortality and adverse patient outcomes.[20,40–42] Lack of meaningful recognition can be a source of compassion fatigue,[9] while recognizing contributions[36] can result in compassion satisfaction.[43] A study indicated that providing personnel with opportunities to demonstrate pride in their work, to be recognized for their achievements, and to be encouraged by superiors strengthened the workforce, which eventually improved the work environment.[44] Authentic leadership is nursing leaders viewed as collaborators, team builders and skilled communicators, which their performance may impact nurse retention, job satisfaction and shaping the work environment.[9,37,45]

The strengths of this study are that a reliable and valid assessment tool, the AACN HWEAT, was used to support continuous improvement through regular assessments and benchmarking, that it allows for performing a meta-analysis, and that it contributes to the evidence-based literature on the nursing work environment. However, its limitations must be acknowledged. Nurse leaders' perceptions of a HWE were not assessed in this study, and the survey did not include qualitative items that could present comprehensive insights into the nursing work environment. In addition, the convenience sampling of the research population and the limited sample size, which may have impacted the representativeness of our sample and the generalizability of the findings. Larger sample sizes in subsequent research would be recommended to confirm the findings from the current study.

Conclusion

The study's findings could assist hospitals in prioritizing the adoption of AACN HWE standards. Based on the findings of this study, a target benchmark of "good" was established for both the overall score and each standard, which indicates a good work environment as perceived by ICU nurses. In addition, interpersonal differences should be considered when developing improvement initiatives. Interventions could contribute to better work environments, health-care services, and patient experience. Regular assessments should be conducted periodically, and results should be used as a benchmark for future comparisons to monitor the implemented improvements and identify shortcomings.

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Disclosure

The authors report no conflicts of interest in this work.

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