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The influence of post-resuscitation debriefing and clinical learning environment on CPR quality and resuscitation self-efficacy among emergency department healthcare workers

Marintas[a], Prima Dewi K[a], Nurdina[a], Nurwijayanti[a], and Yuli peristiowati[a]*

[a]*Universitas Strada Indonesia*

**Corresponding author: marintas@gmail.com*

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ABSTRACT

Background: CPR quality and resuscitation self-efficacy are critical for successful cardiac arrest management. Structured debriefing and supportive learning environments are hypothesized to enhance these outcomes.

Purpose: This study aimed to evaluate the associations between post-resuscitation debriefing and the clinical learning environment with CPR quality and resuscitation self-efficacy.

Methods: A quasi-experimental study with a one-group pretest-posttest design was conducted at the Emergency Department of Undata Hospital. All eligible healthcare workers (n = 51) were recruited using total sampling. Data on post-resuscitation debriefing, clinical learning environment, CPR quality, and resuscitation self-efficacy were collected using validated questionnaires and observation sheets. Bivariate analysis was performed using Spearman's rank correlation test. Multiple linear regression analysis was conducted to identify predictors of CPR quality and resuscitation self-efficacy, controlling for age, work experience, and profession. Statistical significance was set at $p < 0.05$.

Results: Post-resuscitation debriefing was significantly associated with CPR quality (rho = 0.412, p = 0.003) and resuscitation self-efficacy (rho = 0.523, p < 0.001). The clinical learning environment was also significantly associated with CPR quality (rho = 0.456, p = 0.001) and resuscitation self-efficacy (rho = 0.389, p = 0.005). Multiple linear regression analysis identified post-resuscitation debriefing as the strongest predictor of CPR quality (beta = 0.398, p = 0.002) and resuscitation self-efficacy (beta = 0.467, p < 0.001), after controlling for confounding variables.

Conclusion: Structured post-resuscitation debriefing and a positive clinical learning environment are significantly associated with improved technical skills and professional confidence among healthcare workers. Implementing standardized debriefing may be an effective strategy for enhancing resuscitation performance in emergency settings.

1. Background

Cardiac arrest is a high-mortality medical emergency requiring rapid and coordinated action, especially in the Emergency Department (ED). Cardiopulmonary Resuscitation (CPR) is the primary intervention used to maintain vital organ perfusion during these events. Nevertheless, survival outcomes depend significantly on the quality of CPR rather than just its implementation. International guidelines underscore that high-quality chest compressions with minimal interruptions, combined with adequate ventilation and adherence to protocols, are the top priorities during resuscitation [1]. The parameters for high-quality CPR are defined by a compression rate of 100--120 bpm, a depth of 5--6 cm, complete chest recoil, a chest compression fraction (CCF) >=60%, and effective ventilation.

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Despite these globally established standards, numerous studies indicate that CPR quality in healthcare facilities remains frequently suboptimal. Research by Giri et al. [2] demonstrates that without structured evaluation and feedback systems, healthcare providers tend to experience a decline in compression quality as the resuscitation progresses. Research by Donoghue et al. [3] also reported that unnecessary compression pauses frequently occur in real-world clinical settings, particularly in high-workload emergency units.

Based on preliminary observations conducted by the researcher between January and February 2026 regarding several resuscitation events in the Emergency Department of Undata Hospital, several critical gaps were identified. First, the average duration of compression pauses exceeded 10 seconds in several resuscitation cycles. Second, compressor rotation was not consistently performed every two minutes. Third, the evaluation of compression quality, specifically depth and frequency, was conducted without the use of feedback devices. Furthermore, documentation of CPR parameters remained limited to the timing of interventions and medication administration. Additionally, a review of internal documentation and informal interviews with healthcare providers revealed that post-resuscitation evaluations were not being performed systematically or structurally.

The effectiveness of debriefing as an intervention to enhance resuscitation quality is limited when performed only incidentally; rather, it necessitates repetitive implementation and integration into the hospital's quality management system. Theoretically, this is elucidated by Kolb's Experiential Learning Theory [4], which posits that consistent and well-executed debriefing encompassing both immediate 'hot debriefs' and periodic, data-driven 'cold debriefs' facilitates a continuous learning cycle. Furthermore, Bandura's Social Cognitive Theory [5] suggests that self-efficacy is cultivated through mastery experiences, vicarious observation, verbal persuasion, and the regulation of emotional responses.

Debriefing facilitates these four components through structured feedback and team reflection, thereby theoretically enhancing healthcare workers' self-efficacy in performing CPR. The ILCOR recommendations further assert that routine post-event debriefing following cardiac arrest should be considered an integral part of quality improvement strategies, particularly when objective CPR data are available [6]. Furthermore, a study by Edelson et al. [7] demonstrated that repeated, data-driven debriefing conducted over several months improves the chest compression fraction (CCF) and adherence to resuscitation guidelines. Similarly, research by Skare et al. [8] reported that hospitals implementing routine debriefing over a 6--12 month period exhibited significantly more consistent compression quality compared to those without a structured debriefing program.

Beyond its impact on technical aspects, debriefing significantly contributes to the enhancement of healthcare workers' self-efficacy. Structured reflection and feedback sessions following CPR simulations have been shown to significantly increase participants' self-efficacy [9]. Furthermore, debriefing based on high-fidelity simulations improves confidence and clinical readiness during emergencies [10]. Clinical learning experiences that integrate reflection and feedback are positively correlated with improvements in both self-efficacy and clinical competence [11]. This indicates that debriefing not only refines technical compression quality but also reinforces the self-confidence of healthcare workers when performing resuscitation under high-pressure conditions.

The effectiveness of debriefing is highly contingent upon the Clinical Learning Environment (CLE). A supportive learning environment characterized by a robust safety culture, open interprofessional communication, supervisory support, and psychological safety encourages healthcare workers to remain receptive to evaluation and to learn actively from their experiences. Effective team communication and collaboration within emergency units are closely linked to overall team performance and patient safety [12]. A positive clinical learning environment significantly correlates with self-efficacy; in fact, self-efficacy may serve as a mediator between environmental factors and clinical competence [11]. Consequently, debriefing conducted within a conducive environment is more effective in enhancing both CPR quality and self-efficacy compared to debriefing performed in unsupportive or blame-oriented cultures [13]. Therefore, it is imperative to empirically examine how the frequency and quality of debriefing sessions, as well as the prevailing clinical learning environment conditions, are associated with CPR quality and resuscitation self-efficacy among healthcare workers, particularly within the Emergency Department of Undata Hospital.

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2. Methods

2.1 Research design

This study employed a quasi-experimental design with a one-group pretest-posttest approach to examine the associations between post-resuscitation debriefing, the clinical learning environment, CPR quality, and resuscitation self-efficacy among healthcare workers in the Emergency Department of Undata Hospital. This design was chosen because the study involved an intervention (structured post-resuscitation debriefing program) with measurements taken before and after the intervention period. All eligible physicians and nurses working in the emergency department were recruited. Data were collected using validated questionnaires assessing post-resuscitation debriefing practices, the clinical learning environment, and resuscitation self-efficacy, along with observation sheets for CPR quality assessment. Bivariate relationships were analyzed using Spearman's rank correlation test. Multiple linear regression was performed to identify predictors of CPR quality and resuscitation self-efficacy while controlling for potential confounders (age, work experience, and profession). Statistical significance was established at $p < 0.05$.

2.2 Setting and sample

The study was conducted at the Emergency Department of Undata Hospital. The participants included healthcare workers, specifically physicians and nurses, directly involved in cardiopulmonary resuscitation (CPR) procedures. The study utilized a total sampling technique, where the entire accessible population of 51 staff members was recruited as respondents. This approach was chosen to ensure maximum professional representation within the department and because the population size was small enough to allow complete enumeration.

Inclusion criteria required participants to be active-duty medical staff who participated in the full study sequence, from the pre-test through the intervention to the post-test, and provided written informed consent. Exclusion criteria included staff members who were on leave or unavailable during the intervention period. CPR quality was evaluated using a structured observation sheet based on the 2020 American Heart Association (AHA) Guidelines for CPR and ECC [14]. All instruments underwent validity and reliability testing to ensure they accurately measured the relationship between structured reflection, environmental support, and clinical performance.

2.3 Instruments and data collection

A Post-Resuscitation Debriefing Questionnaire, developed based on AHA (2020) guidelines [14], consisting of items measuring debriefing timing, structure, constructive feedback, team reflection, and the facilitator's role. Responses were recorded using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). A Clinical Learning Environment Questionnaire, adapted from the Clinical Learning Environment Inventory (CLEI) [15], assessing supervision and guidance, learning opportunities, teamwork, communication, and patient safety culture. Similar to the debriefing tool, this questionnaire utilized a 5-point Likert scale.

A Resuscitation Self-Efficacy Questionnaire, adapted from Bandura (2006) [16] and Roh et al. (2012) [17], evaluating healthcare workers' confidence in CPR performance, clinical decision-making, stress management, and professional responsibility. Additionally, a CPR Quality Observation Sheet based on the 2020 AHA Guidelines for CPR and ECC [14] was used to evaluate technical skills, including compression depth, rate, chest recoil, and team coordination. Both instruments were validated to ensure they accurately captured the correlation between psychological confidence and technical competence [17].

The questionnaires and observation sheets were reviewed by a panel of experts for content validity (Content Validity Index > 0.83). Reliability testing yielded Cronbach's alpha values of 0.87 for the debriefing questionnaire, 0.84 for the CLEI, 0.91 for the self-efficacy questionnaire, and inter-rater reliability kappa = 0.82 for the CPR observation sheet. To minimize misunderstanding, participants were guided during the data collection process, particularly during the pre-test and post-test phases. Data cleaning was performed to detect input errors or outliers, ensuring high-quality data for multivariate analysis.

2.4 Data analysis

Descriptive and inferential statistics were employed to analyze the data. Frequencies, percentages, means, and standard deviations were used to summarize the demographic characteristics of healthcare workers including age, gender, profession, tenure, and training history as well as the levels of post-resuscitation debriefing, clinical

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learning environment, CPR quality, and self-efficacy.

Bivariate analysis was performed to examine the relationships between the independent and dependent variables. Spearman's rank correlation tests were utilized to evaluate the associations between debriefing methods, the clinical learning environment, CPR quality, and resuscitation self-efficacy. Spearman's correlation was chosen because the debriefing and learning environment variables were measured on ordinal scales.

To determine the simultaneous influence of debriefing and the clinical learning environment on the outcomes, multiple linear regression analysis was conducted using two distinct models: the first for CPR quality (continuous score) and the second for resuscitation self-efficacy (continuous score). Potential confounders including age, work experience, and profession were entered as control variables in the regression models. The assumptions of linear regression (linearity, normality of residuals, homoscedasticity, and absence of multicollinearity) were tested and met. All statistical procedures were performed using SPSS version 26.0.

2.5 Research ethics

Ethical approval was obtained from the Health Research Ethics Committee of Universitas STRADA Indonesia (Reference Number: 2112/Kep.Ka/2026). Participants were provided with detailed information about the study's objectives, procedures, and confidentiality measures. Written informed consent was obtained from all participants prior to data collection. Participation was voluntary, and participants could withdraw at any time without consequence. Data confidentiality and anonymity were strictly maintained throughout the study.

3. Results

The study participants consisted of 51 healthcare workers assigned to the Emergency Department (ED) of Undata Hospital, who were selected based on the predetermined inclusion criteria.

Table 1. Demographic Characteristics of Respondents (n = 51)

Variable		Frequency (n)	Percentage (%)
Gender			
	Female	36	70.6
	Male	15	29.4
Profession			
	Dokter	13	25.5
	Perawat	38	74.5
Age			
	25 - 35 Years	27	52.9
	36 - 46 Years	21	41.2
	47 - 57 Years	2	3.9
	>57 Years	1	2
Work Experience			
	1 – 5 Years	27	52.9
	6 – 11 Years	5	9.8
	12 – 17 Years	11	21.7
	18 – 23 Years	4	7.8
	> 23 Years	4	7.8

Based on the analysis presented in Table 1 involving 51 respondents from the Emergency Department (ED) of Undata Hospital, the gender distribution showed that most respondents were female, accounting for 36 individuals (70.6%), while males represented the minority with 15 individuals (29.4%). Based on profession, most respondents were nurses, totaling 38 individuals (74.5%), whereas physicians accounted for 13 individuals (25.5%). Regarding age, the largest proportion of respondents was in the 25--35 years age group, comprising 27 individuals (52.9%), while the smallest proportion was aged over 57 years, consisting of only 1 individual (2.0%). In terms of work experience, most respondents had 1--5 years of service, with 27 individuals (52.9%), whereas the least represented categories were those with 6--11

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years, 18--23 years, and more than 23 years of service, each consisting of 4--5 individuals.

Table 2. Descriptive Statistics of Study Variables (n = 51)

Variable	Mean	SD	Min	Max
Post-Resuscitation Debriefing (score 1-5)	3.72	0.89	1.60	5.00
Clinical Learning Environment (score 1-5)	3.85	0.76	2.20	5.00
CPR Quality (score 0-100)	78.43	12.67	45.00	95.00
Resuscitation Self-Efficacy (score 1-5)	3.91	0.82	2.10	5.00

Table 2 presents the descriptive statistics for the main study variables. The mean score for post-resuscitation debriefing was 3.72 (SD = 0.89) on a 5-point scale, indicating a moderate to high level of debriefing implementation. The clinical learning environment had a mean score of 3.85 (SD = 0.76), suggesting a generally positive learning environment. CPR quality scores ranged from 45 to 95 with a mean of 78.43 (SD = 12.67), indicating considerable variability in technical performance. Resuscitation self-efficacy had a mean of 3.91 (SD = 0.82), reflecting moderate to high confidence levels among participants.

Table 3. Spearman Rank Correlation Matrix (n = 51)

Variable	1	2	3	4
1. Post-Resuscitation Debriefing	1.000			
2. Clinical Learning Environment	0.612**	1.000		
3. CPR Quality	0.412**	0.456**	1.000	
4. Resuscitation Self-Efficacy	0.523**	0.389**	0.478**	1.000

*Note. ** $p < 0.01$ (two-tailed).*

The bivariate analysis using Spearman's rank correlation revealed statistically significant associations between all pairs of variables (Table 3). Post-resuscitation debriefing was significantly associated with CPR quality (rho = 0.412, p = 0.003) and resuscitation self-efficacy (rho = 0.523, $p < 0.001$). The clinical learning environment was also significantly associated with CPR quality (rho = 0.456, p = 0.001) and resuscitation self-efficacy (rho = 0.389, p = 0.005). Notably, the correlation between debriefing and self-efficacy (rho = 0.523) was stronger than the correlation between debriefing and CPR quality (rho = 0.412), suggesting that debriefing may have a greater impact on psychological readiness than on technical performance. The clinical learning environment showed a moderate correlation with debriefing (rho = 0.612, $p < 0.001$), indicating that these two factors are interrelated but distinct constructs.

Table 4. Multiple Linear Regression Predicting CPR Quality (n = 51)

Variable	B	SE	beta	t	p
Constant	32.145	8.234	-	3.902	<0.001
Age	0.312	0.156	0.198	2.000	0.052
Work Experience	0.245	0.189	0.142	1.296	0.202
Profession (Nurse vs. Physician)	2.134	3.456	0.067	0.617	0.540
Clinical Learning Environment	4.567	2.123	0.274	2.151	0.037
Post-Resuscitation Debriefing	5.823	1.789	0.398	3.255	0.002

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Note. $R^2 = 0.412$, Adjusted $R^2 = 0.348$, $F(5, 45) = 6.321$, $p < 0.001$.

Table 5. Multiple Linear Regression Predicting Resuscitation Self-Efficacy (n = 51)

Variable	B	SE	beta	t	p
Constant	1.234	0.567	-	2.176	0.035
Age	0.023	0.012	0.178	1.917	0.062
Work Experience	0.018	0.014	0.112	1.286	0.205
Profession (Nurse vs. Physician)	0.156	0.238	0.058	0.655	0.516
Clinical Learning Environment	0.234	0.146	0.217	1.603	0.116
Post-Resuscitation Debriefing	0.423	0.123	0.467	3.439	0.001

Note. $R^2 = 0.489$, Adjusted $R^2 = 0.432$, $F(5, 45) = 8.597$, $p < 0.001$.

Multivariate analysis was performed using multiple linear regression to determine which independent variable was the strongest predictor of CPR quality and resuscitation self-efficacy among healthcare workers in the Emergency Department of Undata Hospital, after controlling for potential confounders.

For CPR quality (Table 4), the overall model was statistically significant, $F(5, 45) = 6.321$, $p < 0.001$, and explained 41.2% of the variance ($R^2 = 0.412$). After controlling for age, work experience, and profession, post-resuscitation debriefing emerged as the strongest predictor (beta = 0.398, p = 0.002), followed by the clinical learning environment (beta = 0.274, p = 0.037). Age showed a marginally significant association (p = 0.052), while work experience and profession were not significant predictors.

For resuscitation self-efficacy (Table 5), the overall model was also statistically significant, $F(5, 45) = 8.597$, $p < 0.001$, explaining 48.9% of the variance ($R^2 = 0.489$). Post-resuscitation debriefing was again the strongest predictor (beta = 0.467, p = 0.001). The clinical learning environment showed a positive but non-significant trend (beta = 0.217, p = 0.116) after controlling for confounders. None of the demographic control variables were significant predictors of self-efficacy.

These results indicate that post-resuscitation debriefing is consistently associated with both improved technical performance of CPR and enhanced psychological readiness of healthcare workers in emergency care settings, even after accounting for individual characteristics.

4. Discussion

4.1 Association Between Post-Resuscitation Debriefing and CPR Quality

The findings of this study demonstrate that post-resuscitation debriefing is significantly associated with CPR quality among healthcare workers at the Undata Hospital Emergency Department (beta = 0.398, p = 0.002). After controlling for age, work experience, and profession, each one-point increase in debriefing quality score was associated with a 5.82-point increase in CPR quality score. These results suggest that technical skills such as compression depth, rhythm consistency, and the minimization of interruptions are positively associated with the quality of post-action reflective processes.

Theoretically, post-resuscitation debriefing functions as a reflective mechanism that assists healthcare providers in transferring clinical experiences from working memory to long-term memory through evaluation and reinforcement [18]. According to Kolb's Experiential Learning Theory [4], effective learning occurs when concrete experiences are followed by systematic reflection. In the context of resuscitation, debriefing provides a platform for "reflection-on-action," allowing clinical experience to become a meaningful source of learning. This process is critical for developing problem-solving skills and clinical judgment in high-stakes emergencies [19].

Furthermore, the demographic profile of this study shows that most respondents have 1--5 years of work experience. According to Patricia Benner's "From Novice to Expert" theory, this group is categorized as "advanced beginners" -- a phase where individuals recognize clinical patterns but still require guidance in complex situations [20]. Debriefing is essential for this cohort as it helps

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form systematic clinical thinking patterns. This is supported by ILCOR [6], which emphasizes that debriefing should include objective performance feedback (e.g., from defibrillator data) to ensure technical improvements are measurable and evidence-based. In high-stress scenarios like the ED, debriefing may help prevent "cognitive overload" and the "panic-freeze" phenomenon, ensuring that staff can maintain focus and decisive action in future events [21].

It is important to note, however, that the cross-sectional nature of this study precludes causal inferences. While the association is strong and theoretically plausible, we cannot conclude that debriefing directly causes improvements in CPR quality. Reverse causality is possible: healthcare workers with better CPR skills may be more likely to participate in or value structured debriefing. Longitudinal or experimental designs are needed to establish causality.

4.2 Association Between the Clinical Learning Environment and Technical Performance

Bivariate analysis showed a significant positive association between the clinical learning environment and CPR quality (rho = 0.456, p = 0.001). However, in the multivariate model, while the clinical learning environment remained a significant predictor (beta = 0.274, p = 0.037), its standardized coefficient was smaller than that of debriefing. This suggests that while a supportive environment characterized by management support, interprofessional collaboration, and safety culture is necessary, it may serve primarily as a foundation that enables the effectiveness of direct interventions like debriefing, rather than being the direct driver of technical skill improvement.

According to Social Cognitive Theory (Bandura) [5], individuals learn through observation and interaction within their environment. A supportive clinical setting allows healthcare workers to gain experience from seniors and peers. Crucially, the concept of Psychological Safety (Edmondson) [22] explains that an environment where staff feel safe to discuss errors without fear of retribution is an essential precursor for effective debriefing. Without a culture of openness, debriefing sessions would likely fail to produce honest reflections. Thus, the clinical learning environment acts as an "enabling factor" that strengthens the effectiveness of direct interventions like debriefing [23].

The finding that the clinical learning environment was significant in bivariate analysis but had a smaller effect in multivariate analysis may indicate that part of its influence on CPR quality is mediated through debriefing quality. That is, a positive learning environment may facilitate better debriefing, which in turn improves CPR quality. Mediation analysis in future studies could test this hypothesis.

4.3 Association Between Post-Resuscitation Debriefing and Self-Efficacy

The strongest correlation identified in this study was the association between post-resuscitation debriefing and self-efficacy, with a standardized beta coefficient of 0.467 (p = 0.001). This suggests that debriefing quality is the most important predictor of healthcare workers' confidence in managing resuscitation. Based on Bandura's Self-Efficacy Theory [16], confidence is built through four sources: mastery experience, vicarious experience, verbal persuasion, and physiological responses.

Debriefing facilitates all four sources: it validates successful actions (mastery), allows peers to learn from each other (vicarious), provides team encouragement (persuasion), and helps regulate the emotional stress following a code blue (physiological). These results align with Psychological Empowerment theory, which states that individuals feel more confident when they perceive themselves as competent and in control of their tasks. For nurses, who are often the primary drivers of chest compressions, this boost in self-efficacy is vital for maintaining adherence to AHA/ERC algorithms and ultimately increasing the chances of achieving Return of Spontaneous Circulation (ROSC) [24].

The clinical learning environment was positively associated with self-efficacy in bivariate analysis (rho = 0.389, p = 0.005) but did not reach significance in the multivariate model (beta = 0.217, p = 0.116). This attenuation suggests that the effect of the learning environment on self-efficacy may be largely mediated by debriefing quality. In other words, a supportive environment enhances self-efficacy primarily by enabling more effective debriefing sessions, rather than through a direct independent pathway.

4.4 The Clinical Learning Environment and Psychological Readiness

The analysis confirmed that the clinical learning environment is positively associated with resuscitation self-efficacy in bivariate analysis. Healthcare workers in supportive environments reported higher confidence levels. This relationship

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is explained by Humanistic Learning Theory (Rogers) [25], which posits that individuals develop optimally in environments that provide emotional support and value the learning process.

In the ED of Undata Hospital, a positive clinical environment provides the social support and clinical supervision necessary for "advanced beginners" to build their professional identity. When a workplace fosters a culture of mentorship rather than blame, healthcare workers are more likely to take initiative and remain calm under pressure. Consequently, self-efficacy is not merely an internal trait but a result of continuous interaction with a supportive workplace. By maintaining a psychologically safe and educational environment, the hospital ensures that its staff remains mentally prepared and technically proficient in providing life-saving emergency care.

4.5 Limitations

This study has several limitations that should be considered when interpreting the findings. First, the quasi-experimental design with a single group limits the ability to establish causal relationships between post-resuscitation debriefing, the clinical learning environment, CPR quality, and resuscitation self-efficacy. Without a control group, we cannot rule out confounding by temporal trends or maturation effects. The findings demonstrate statistical associations but do not prove causation.

Second, the study was conducted in a single emergency department with a relatively small sample of 51 healthcare workers, which may limit the generalizability of the findings to other healthcare settings. The small sample size also constrained the complexity of multivariate models we could test. While our models met the minimum requirement of approximately 10 observations per predictor variable, larger samples would provide more stable estimates. Third, some variables were measured using self-administered questionnaires, which may be subject to response bias and social desirability bias. Healthcare workers may have rated debriefing quality and their own self-efficacy more favorably than objective measures would indicate. Fourth, CPR quality was assessed using observation sheets rather than objective feedback devices (e.g., accelerometer-based compression monitors), which may introduce measurement error. Future studies should incorporate objective CPR quality metrics.

Finally, the study measured variables at a single post-intervention time point for the multivariate analysis. A more robust design would include multiple measurement points before, during, and after the intervention to track changes over time. Future studies involving multiple centers, larger sample sizes, randomized controlled designs, and objective CPR measurement are recommended to confirm these findings and better evaluate causal relationships.

5. Conclusion

This study identified significant associations between post-resuscitation debriefing, the clinical learning environment, CPR quality, and resuscitation self-efficacy among healthcare workers at Undata Hospital. Multiple linear regression analysis revealed that after adjusting for age, work experience, and profession, post-resuscitation debriefing emerged as the strongest predictor of both CPR quality and self-efficacy. These results suggest that healthcare professionals who engage in structured debriefing within supportive environments demonstrate better technical performance and higher psychological confidence. Conversely, a lack of reflective practice may be associated with technical deviations and reduced clinical readiness. Therefore, hospital management and nursing leaders should consider incorporating routine 'hot' and 'cold' debriefing as a standard of care while promoting psychological safety and interprofessional collaboration. Such initiatives may not only improve technical competency but also ensure a more resilient emergency response team. Finally, future longitudinal and experimental research is needed to establish definitive causal relationships across larger healthcare settings.

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