

Original Article

CHANGES IN KNOWLEDGE AND SKILLS FOLLOWING BASIC PRE-HOSPITAL LIFE SUPPORT TRAINING AMONG PREHOSPITAL AMBULANCE PERSONNEL AT EMERGENCY AMBULANCE 118, JAKARTA

Muhammad Syukri¹⁾, Ni Luh Putu Inca Buntari Agustini^{2)*}, Ni Made Dewi Wahyunadi³⁾, Yustina Ni Putu Yusniawati⁴⁾

^{1,2,3,4)} Faculty of Health, Institute of Technology and Health Bali, Denpasar, Indonesia

*Corresponding Author, E-mail : incaagustini@gmail.com

Submitted: 5 October 2026, Revised: 17 October 2026, Accepted: 19 October 2026.

ABSTRACT

Background. Pre-hospital emergency care requires ambulance personnel to demonstrate standardized competencies in assessment, resuscitation, triage, communication, and safe transport. At AGD 118 Jakarta, formal Basic Pre-Hospital Life Support (BPLS) training had not previously been implemented. However, the local training need and the effect of a structured BPLS program had not been formally evaluated.

Research Purpose. This study aimed to assess changes in knowledge and practical skills following BPLS training among ambulance personnel at AGD 118 Jakarta.

Research Methods. A pre-experimental one-group pretest-posttest design was conducted using total sampling of 50 ambulance personnel at AGD 118 Jakarta. Knowledge was assessed using a 40-item multiple-choice questionnaire, and practical skills were assessed using a 93-item observational checklist. Scores were converted to percentages [0–100]. Paired t-tests were used to compare pre- and post-training scores at $\alpha = 0.05$.

Findings. Before training, 66% of participants had poor knowledge and 76% had poor skills. After training, 76% had good knowledge and 72% had good skills. Mean knowledge scores increased from 42.34 to 75.68 (mean change +33.34 percentage points; $t = -21.453$; $df = 49$; $p < 0.001$), while mean skill scores increased from 44.10 to 74.32 (mean change +30.22 percentage points; $t = -19.876$; $df = 49$; $p < 0.001$).

Conclusion. Knowledge and practical skills increased significantly following BPLS training. The findings support institutionalizing structured, competency-based BPLS training and periodic refresher assessment for ambulance personnel. Because the study used a one-group design and measured outcomes immediately after training, the findings should be interpreted as within-participant learning gains rather than a causal treatment effect.

Keywords: Ambulance Personnel, Basic Pre-Hospital Life Support, Knowledge, Pre-hospital Emergency Care, Skills.

BACKGROUND

Pre-hospital emergency care is a critical component of emergency response because timely assessment, resuscitation, triage, communication, and safe transport can influence outcomes for patients with trauma and acute illness. Current WHO guidance emphasizes standardized operational processes, clinical protocols, medical oversight, and appropriate training and certification for prehospital providers. Therefore, the knowledge and practical skills of ambulance personnel are central to safe and effective prehospital care [1].

In Indonesia, strengthening prehospital emergency services remains an important system-level priority. Competency development should address core tasks such as CPR, airway and breathing management, patient assessment, triage, communication, and safe

transport. An internal preliminary assessment conducted in May 2025 at AGD 118 Jakarta involving eight personnel (five medical personnel and three ambulance drivers) found that only 20% correctly sequenced CPR steps, 40% correctly classified triage, 50% had never received formal prehospital emergency training, and 37% reported difficulties with patient handover communication. These findings indicated a local competency-development need and supported the implementation of structured BPLS training.

Indonesia's integrated emergency response system is supported by the technical guidance issued through Decree of the Minister of Health No. HK.01.07/Menkes/1588/2024 on the Technical Guidelines for the Integrated Emergency Response System (SPGDT). The guidance emphasizes coordinated prehospital emergency care and system governance. Within this context, structured competency-based training is relevant for ambulance personnel at AGD 118 Jakarta [2].

BPLS training is designed to equip ambulance personnel with fundamental competencies for emergency care before arrival at a health facility. The training in this study included CPR, airway and breathing management, bleeding control, fracture stabilization, patient assessment, triage, evacuation and transport, and emergency communication and handover. Resuscitation-education evidence supports structured instruction, deliberate practice, feedback, and competency-based assessment, while reviews of blended learning and simulation indicate potential benefits for knowledge and practical performance [3,4–6].

Although structured resuscitation education is supported by the broader literature, there is limited service-level evidence describing the implementation and immediate learning outcomes of a structured BPLS program among ambulance personnel in the Indonesian context. The present study addresses this gap at AGD 118 Jakarta, where formal BPLS training had not previously been implemented. Specifically, the study evaluates changes in knowledge and practical skills immediately before and after the BPLS intervention. The findings are intended to inform local competency development and provide a basis for future controlled evaluations.

RESEARCH METHOD

Study Design

This study employed a pre-experimental one-group pretest-posttest design. Measurements were obtained immediately before and after the BPLS intervention. The primary outcomes were knowledge and practical skills. Because there was no control group, the analysis was designed to describe within-participant changes rather than establish a causal treatment effect.

Participants and Sampling

The population comprised all 50 ambulance personnel at AGD 118 Jakarta, and total sampling was used. Inclusion criteria were: [1] active ambulance personnel at AGD 118; [2] willingness to participate and provide written informed consent; and [3] ability to attend all training sessions. Personnel on extended leave or with physical or cognitive limitations that prevented participation in practical training were excluded. All 50 participants completed both the pretest and posttest assessments.

Training Intervention

The BPLS training was delivered over two days and included theoretical and practical components. Theoretical content covered prehospital emergency services, SPGDT, ambulance operational safety, CPR and AED use according to applicable AHA guidance, airway and breathing management (OPA, NPA, suction, and supplemental oxygen), primary and secondary assessment, bleeding control, wound dressing, fracture immobilization, evacuation and safe transport, field triage, and emergency communication and SBAR handover. Practical sessions used mannequin-based simulation scenarios with instructor

supervision and feedback. This combination was intended to provide knowledge acquisition, deliberate practice, and opportunities for performance feedback [3–6,16,17].

Instruments

Instrument validity and internal consistency were assessed before the main study using Pearson product-moment correlation and Cronbach’s alpha. For the pretest instruments, Cronbach’s alpha was 0.870 for the 40-item knowledge questionnaire and 0.993 for the 93-item practical skills checklist, indicating excellent internal consistency.

Data Analysis

Data were summarized using descriptive statistics. The Shapiro–Wilk test was used to assess the distribution of the paired change scores. Pre- and post-training percentage scores were compared using paired t-tests at $\alpha = 0.05$. Mean changes were interpreted as within-participant changes because the study did not include a control group. The study received ethical approval from the institutional ethics committee with approval number 04.244/KEPITEKES-BALI/VII/2025.

FINDINGS

Table 1. Frequency Distribution of Respondent Characteristics (n=50)

Variable	Indicator	Frequency	Percentage (%)
Age (Years)	20 – 30	12	24.0
	31 – 40	20	40.0
	41 – 50	13	26.0
	> 50	5	10.0
Sex	Male	33	66.0
	Female	17	34.0
Education	Senior High School/Equivalent	14	28.0
	D3 Nursing	21	42.0
	S1 Nursing/Nurse Profession	15	30.0
Length of Service	< 1 Years	4	8.0
	1 – 5 Years	23	46.0
	> 5 Years	23	46.0
Previous Training	Yes	25	50.0
	No	25	50.0

Based on Table 1, the majority of respondents were aged 31–40 years (40.0%), male (66.0%), with D3 Nursing educational background (42.0%). In terms of work experience, 46.0% had worked 1–5 years and 46.0% had worked more than 5 years. Notably, half of the respondents (50.0%) had never undergone any formal pre-hospital emergency training before this study.

Table 2. Distribution of Knowledge Levels Before and After BPLS Training (n=50)

Knowledge Category	Pretest (n=50)	Pretest (%)	Posttest (n=50)	Posttest (%)
Good (76–100%)	3	6.0	38	76.0
Fair (56–75%)	14	28.0	11	22.0
Poor (<56%)	33	66.0	1	2.0
Total	50	100	50	100

Table 2 shows a marked shift in knowledge distribution following BPLS training. Prior to training, the majority of respondents (66.0%) had poor knowledge, while only 6.0% demonstrated good knowledge. After training, 76.0% of respondents achieved good knowledge, with only 2.0% remaining in the poor category.

Table 3. Distribution of Skill Levels Before and After BPLS Training (n=50)

Skills Category	Pretest (n=50)	Pretest (%)	Posttest (n=50)	Posttest (%)
Good (76–100%)	2	4.0	36	72.0
Fair (56–75%)	10	20.0	13	26.0
Poor (<56%)	38	76.0	1	2.0
Total	50	100	50	100

A similar pattern was observed for skills (Table 3). Before training, 76.0% of respondents had poor skill levels and only 4.0% were in the good category. After training, 72.0% reached good skill levels, with only 2.0% remaining at the poor level.

**Table 4. Paired t-test Results for Knowledge and Skills
Pre- and Post-BPLS Training (n=50)**

Variable	Mean percentage score $\pm$ SD	t	Df	p-value
Knowledge Pre	42.34 $\pm$ 9.81			
Knowledge Post	75.68 $\pm$ 10.22	-21.453	49	<0.001
Skills Pre	44.10 $\pm$ 12.03			
Skills Post	74.32 $\pm$ 10.87	-19.876	49	<0.001

Paired t-test analysis showed statistically significant within-participant increases in knowledge (mean pre: 42.34 $\pm$ 9.81; mean post: 75.68 $\pm$ 10.22; mean change: +33.34 percentage points; $t = -21.453$; $df = 49$; $p < 0.001$) and skills (mean pre: 44.10 $\pm$ 12.03; mean post: 74.32 $\pm$ 10.87; mean change: +30.22 percentage points; $t = -19.876$; $df = 49$; $p < 0.001$).

DISCUSSION

Knowledge and practical skills increased substantially following BPLS training. At baseline, 66% of participants had poor knowledge and 76% had poor skills. After training, 76% achieved good knowledge and 72% achieved good skills. The paired analyses also demonstrated statistically significant increases in both outcomes. These findings are consistent with evidence that structured resuscitation and prehospital training can improve educational outcomes when training includes active practice, feedback, and competency-based assessment [3–6].

The increase in knowledge from 42.34 to 75.68 percentage points suggests a substantial immediate learning gain. The BPLS program combined didactic instruction with demonstrations and practical activities, which is consistent with contemporary resuscitation-education principles emphasizing structured instruction, deliberate practice, feedback, and assessment of learning outcomes [3,4–6]. The present findings therefore provide service-level evidence that a structured BPLS curriculum can improve immediate knowledge scores among ambulance personnel.

The increase in practical skills from 44.10 to 74.32 percentage points is also consistent with evidence supporting simulation, deliberate practice, and feedback in resuscitation education [16,18]. Mannequin-based scenarios allowed participants to rehearse CPR, airway

management, patient assessment, and evacuation procedures under supervision. Reviews of high-fidelity simulation and feedback-based training indicate that structured practice can improve practical performance, although effects vary according to learner group, training design, and outcome measurement [5,6,7,8].

The findings can be interpreted using Kirkpatrick's learning framework because the study measured changes in knowledge and practical skills immediately after training. These outcomes correspond to learning rather than workplace behavior or patient outcomes. The observed gains are compatible with the training design, which combined evidence-based CPR content, contextualized prehospital scenarios, supervised practice, and feedback [9]. However, the study does not establish whether the gains were retained or translated into workplace performance.

The findings are also relevant to the broader literature on BPLS and ambulance-related competencies. A literature review of BPLS training for ambulance personnel has reported improvements in knowledge and skills and emphasized standardized, periodic training. A scoping review of ambulance-related nursing competencies identified assessment, triage, communication, resuscitation, and other emergency-care competencies as important areas requiring ongoing education and training [10,11]. The present study extends this literature by providing an empirical service-level evaluation among ambulance personnel at AGD 118 Jakarta.

Evidence on educational delivery further supports the approach used in this study. Reviews of blended learning for basic life support and accredited life-support courses indicate that combining educational modalities can improve knowledge and skills. Indonesian literature also supports e-learning and simulation as complementary approaches for resuscitation training [4,12,13]. The combination of didactic instruction, demonstration, mannequin-based simulation, and feedback used in the present BPLS program is therefore educationally plausible and aligned with established approaches to simulation-based and emergency health education [16–18].

This study has several limitations. First, the one-group pretest-posttest design without a control group cannot rule out history, maturation, testing, or other alternative explanations for the observed changes. Second, outcomes were measured immediately after training; therefore, long-term retention was not assessed. Evidence indicates that resuscitation skills can decline over time and that training interval, feedback, and refresher practice may influence retention [14,15]. Third, the study measured educational outcomes rather than workplace performance or patient outcomes. Fourth, the study involved all 50 personnel at a single ambulance service, which limits generalizability to other prehospital settings. Future studies should use controlled or randomized designs, include follow-up assessments, and evaluate whether training gains are retained and translated into workplace performance and patient-level outcomes.

CONCLUSION

Knowledge and practical skills increased significantly following BPLS training among ambulance personnel at AGD 118 Jakarta. The proportion of participants with good knowledge increased from 6.0% to 76.0%, and the proportion with good skills increased from 4.0% to 72.0%. These findings support the practical recommendation that AGD 118 institutionalize structured, competency based BPLS training with periodic refresher assessment and skills re-evaluation. Scientifically, future research should use controlled or

randomized designs, longer follow-up, and measures of workplace performance and patient outcomes to determine the durability and broader impact of BPLS training.

Conflict of Interest

The authors declare that there is no conflict of interest.

REFERENCES

- [1] World Health Organization. Prehospital emergency care - operational guidance for ambulance systems. Geneva: World Health Organization; 2025. ISBN: 978-92-4-011406-7.
- [2] Kementerian Kesehatan Republik Indonesia. Keputusan Menteri Kesehatan Nomor HK.01.07/Menkes/1588/2024 tentang Pedoman Teknis Sistem Penanggulangan Gawat Darurat Terpadu. Jakarta: Kementerian Kesehatan RI; 2024.
- [3] Donoghue AJ, Auerbach M, Banerjee A, Blewer AL, Cheng A, Kadlec KD, et al. Part 12: Resuscitation Education Science: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2025;152(16_suppl_2):S719-S750. doi:10.1161/CIR.0000000000001374.
- [4] Abuejheisheh AJ, Alasad Alshraideh J, Amro N, Bani Hani S, Darawad MW. Effectiveness of blended learning basic life support module on knowledge and skills: a systematic review of randomized controlled trials. *Heliyon*. 2023;9[11]:e21680. doi:10.1016/j.heliyon.2023.e21680.
- [5] Elgohary M, Palazzo FS, Breckwoldt J, et al. Blended learning for accredited life support courses: a systematic review. *Resusc Plus*. 2022;10:100240. doi:10.1016/j.resplu.2022.100240.
- [6] Nicolau A, Jorge I, Vieira-Marques P, Sa-Couto C. Influence of training with corrective feedback devices on cardiopulmonary resuscitation skills acquisition and retention: systematic review and meta-analysis. *JMIR Med Educ*. 2024;10:e59720. doi:10.2196/59720.
- [7] Vangone I, Arrigoni C, Magon A, Conte G, Russo S, Belloni S, et al. The efficacy of high-fidelity simulation on knowledge and performance in undergraduate nursing students: an umbrella review of systematic reviews and meta-analysis. *Nurse Educ Today*. 2024;139:106231. doi:10.1016/j.nedt.2024.106231.
- [8] Agustini NLPIB, Budiarsana IP, Artawan IK, Hufana OD, Dewi NPAR. Influence of High-Fidelity Manikin-Based Simulation on Nursing Students' Basic Cardiac Life Support Ability and Motivation. *Babali Nursing Research*. 2024;5[2]:334-345. doi:10.37363/bnr.2024.52364.
- [9] Miranda FM, Dos Santos BV, Kristman VL, Mininel VA. Employing Kirkpatrick's framework to evaluate nurse training: an integrative review. *Rev Lat Am Enfermagem*. 2025;33:e4431. doi:10.1590/1518-8345.7250.4431.
- [10] Syukri M, Agustini NLPIB, Wahyunadi NMD, Yusniawati YNP. Effectiveness of Basic Pre-Hospital Life Support Training for Ambulance Personnel: A Literature Review. *Nursing Sciences Journal*. 2025;9[2]:329-340. doi:10.30737/nsj.v9i2.6989.

- [11] Sanjana IWE, Widyandari NMAS, Agustini NLPIB. Nursing Competencies in Ambulance Needs at Prehospital: A Scoping Review. *Jurnal Info Kesehatan*. 2023;21[2]:212-225. doi:10.31965/infokes.Vol21.Iss2.960.
- [12] Wijayantha IPA, Agustini NLPIB, Diyu IANP, Krisnandari D AAIW. Development of Learning Methods Basic Life Support Based on E-Learning Program for Nurses: Literature Review. *Jurnal Info Kesehatan*. 2024;22[1]:41-58. doi:10.31965/infokes.Vol22.Iss1.1304.
- [13] Wang X, Yang L, Hu S. Teaching nursing students: an umbrella review of the effectiveness of using high-fidelity simulation. *Nurse Educ Pract*. 2024;77:103969. doi:10.1016/j.nepr.2024.103969.
- [14] Au K, Lam D, Garg N, Chau A, Dzwonek A, Walker B, et al. Improving skills retention after advanced structured resuscitation training: a systematic review of randomized controlled trials. *Resuscitation*. 2019;138:284-296. doi:10.1016/j.resuscitation.2019.03.031.
- [15] Lee HJ. Training interval, feedback, and retention in cardiopulmonary resuscitation education: a systematic review. *BMC Med Educ*. 2026. doi:10.1186/s12909-026-09538-4.
- [16] Agustini, N. L. P. I. B., Suyasa, I. G. P. D., Israfil, I., Indrayani, N. L. D., & Artsanthia, J. (2025). Simulation in nursing education: A narrative review of strategies, outcomes, and challenges. *Adi Husada Nursing Journal*, 11(1), 17–25.
- [17] Agustini, N. L. P. I. B., Yusniawati, Y. N. P., & Parwati, P. A. (2020). Effect of health education intervention about emergencies on the knowledge and ability of parents in handling children with emergency condition. *Journal of Global Pharma Technology*, 12(1), 420–425.
- [18] Adnyani, P. D., Agustini, N. L. P. I. B., Wahyunadi, N. M. D., Sanjana, I. W. E., & Artawan, I. K. (2023). Advanced Life Support Video Training Modalities: A Literature Review. *Babali Nursing Research*, 4(3), 382–392.



Copyright and Grant the Journal Right under [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

Copyright © 2022 SYNTIFIC PUBLISHER