

Beyond the Ambulance: Integrating Nursing Science-Infused Post-Acute Recovery Processes into Paramedic Education

Chikage Kubota¹, Miho Tatematsu², Hironori Hayashi³

¹Department of Emergency Medical Science, Faculty of Health Science, Suzuka University of Medical Science, Suzuka, Japan

²Department of Medical Management, National Hospital Organization Nagoya Medical Center, Nagoya, Japan

³Department of Nursing, Japanese Red Cross Kyoto Daini Hospital, Kyoto, Japan

Email: ckubota@suzuka-u.ac.jp

How to cite this paper: Kubota, C., Tatematsu, M. and Hayashi, H. (2026) Beyond the Ambulance: Integrating Nursing Science-Infused Post-Acute Recovery Processes into Paramedic Education. *Open Journal of Emergency Medicine*, **14**, 218-238.

<https://doi.org/10.4236/ojem.2026.143020>

Received: May 22, 2026

Accepted: September 18, 2026

Published: September 21, 2026

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Abstract

Following a legal revision in Japan—specifically, the partial amendment to the Emergency Life-Saving Technicians Act under the 2021 legislation to Secure a System for Providing High-Quality and Appropriate Medical Care, paramedics are now permitted to continue emergency life-saving care for severely ill or injured patients even after hospital arrival, such as within emergency departments, under the direction of a physician. In response to this historic transition, paramedics are expected to expand beyond their traditional prehospital care framework and serve as integral members providing seamless medical care within hospitals. Consequently, it has become essential for them to acquire “daily life support skills” based on a nursing perspective. This ensures patient safety and comfort not only during rapid interventions at emergency scenes but also during standby in emergency departments, transfers for examinations and treatments, and handovers to hospital wards. This study aimed to verify the educational effects of the newly established courses, “Theory of Emergency Health and Daily Life Support Skills” and “Practice of Emergency Health and Daily Life Support Skills”, introduced in the 2023 academic year at the Department of Emergency Medical Sciences, Suzuka University of Medical Science, to obtain foundational data for constructing a standard educational model anticipating future intra-hospital activities. The subjects were 42 second-year students in the department who took the courses in the 2023 academic year. An anonymous, self-administered questionnaire survey was conducted in December 2023, following the completion of all lectures and practical exercises. To eliminate any influence on students’ academic grading, the survey was administered after final grades were determined, ensuring anonymity and voluntary participation through a collection box system. Using a

5-point Likert scale, the survey assessed the degree of knowledge/understanding and skill acquisition across 12 specific technical items, including bed making, handling of sterile materials, gown techniques, repositioning, transfer and mobility assistance, simulated elderly experience, handling of crutches and T-canes, and emergency medical record-keeping. Analysis of 21 valid responses confirmed a high educational effect, with mean scores exceeding 4.0 for all overall awareness items. Notably, “understanding the necessity of communication with patients” scored highest (mean 4.67), indicating that grasping support skills through nursing perspectives helped students recognize the essence of “care” beyond mere life-saving procedures. Statistical analysis revealed an extremely strong positive correlation ($r = 0.940$, $p < 0.001$) between the overall means of theoretical “knowledge/understanding” and practical “skill acquisition”, substantiating that theoretical backing in lectures directly facilitates confident skill acquisition in practice. Furthermore, strong positive correlations were observed among items related to “safety and comfort” and “recovery process”, demonstrating that students had solidified a comprehensive perspective on changes in activities of daily living caused by accidents or illness onset. Among individual items, the “simulated elderly experience” showed the highest knowledge evaluation (4.62), suggesting that experiencing age-related functional decline firsthand is an extremely effective approach to realizing the necessity of care. Conversely, “stretcher transfer” and “emergency medical record-keeping” received relatively lower evaluations, highlighting remaining challenges in mastering complex management involving hospital-specific lines/tubes and progress recording incorporating nursing assessments. The results indicate that an educational program systematically incorporating a nursing perspective, in response to the expanded role of paramedics in Japan, is highly effective in shifting students’ awareness from “transportation” to “continuous patient management”, potentially serving as a pioneering model for training the next generation of paramedics.

Keywords

Post-Acute Recovery Processes, Paramedic, Undergraduate Students

1. Introduction

Japan’s emergency medical system is currently undergoing a historic turning point following the partial amendment of the Emergency Life-Saving Technicians Act [1], enacted in October 2021 in conjunction with the Act to Secure a System for Providing High-Quality and Appropriate Medical Care. The most significant change brought about by this legislative revision is the expansion of the scope of practice for paramedics. Previously restricted strictly to prehospital care—the phase from the scene of the emergency to hospital arrival, paramedics are now authorized to continue emergency life-saving interventions for severely ill or injured patients within medical facilities, such as emergency departments, under the direction of a physician. In response to this historic transition, paramedics are

transcending their traditional boundaries as prehospital care specialists and are now highly expected to serve as vital members in delivering “seamless medical care” within the hospital setting.

However, since the establishment of the system in 1991, paramedic education in Japan has consistently been tailored toward rapid clinical assessment and precise emergency interventions in the prehospital setting, with its curriculum primarily centered on acute care responses. Because emergency scenes demand time-critical interventions where every second counts, patients are often perceived merely as momentary “transport subjects” within the limited timeframe from the scene to the hospital. Consequently, it must be acknowledged that within the conventional educational framework, it has been exceedingly rare for focus to extend to the patient’s ongoing care after hospital arrival, the recovery process amidst altered activities of daily living caused by an accident or sudden illness, or the holistic perspective of the patient as an individual “living their own life”.

The activities currently required of “intra-hospital paramedics” extend beyond the mere continuation of life-saving interventions. They encompass the provision of “daily life support skills”, grounded in a nursing perspective, to ensure patient safety and comfort during standby periods in the emergency department, transfers for examinations and treatments, and handovers to hospital wards. For instance, in-hospital mobility and transfers, unlike prehospital “transportation”, demand more complex and meticulous risk management, such as the securement of intravenous lines and drains, and strict adherence to the patient’s prescribed resting level. Furthermore, understanding the essence of “care” beyond initial life-saving measures—preventing secondary complications and alleviating psychological distress for patients abruptly deprived of their daily lives by unforeseen emergencies—is increasingly becoming an essential competency for the next generation of paramedics. A study by Kubota *et al.* [2] also revealed that families in hospital critical care centers seek communication with nurses more than with physicians. This implies that families of patients in devastating situations also require support from co-medical professionals.

Systematically learning daily life support skills means more than merely acquiring individual techniques. It is a process of cultivating a “linear perspective”, enabling paramedics to envision the trajectory of a transported patient’s treatment and their recovery phases, including the eventual need for assistive devices. As the scope of paramedic practice expands into the in-hospital setting, the essence of interprofessional collaboration required lies not merely in information transmission, but in the ethical coordination surrounding the “patient’s best interest”. The perspective of “continuity of life”, which is emphasized in this practical course, plays the role of an “Ethical Bridging”. It connects the context of the patient’s previously led life—often captured under the extreme conditions of an emergency scene—to the post-admission treatment plan. The patient’s living background and family intentions gathered at the emergency scene constitute an indispensable narrative for realizing respect for patient autonomy during in-hospital ethical case

conferences. Furthermore, research by Kubota [3] has indicated that incorporating an “Emergency Ethics” course within the paramedic training curriculum was effective in fostering students’ ethical perspectives.

Furthermore, the support provided by medical professionals during a patient’s recovery process ultimately leads to peace of mind for their family. In a study by Kubota [4], a course on the “Emergency Medical Family Support Theory” for paramedic students articulated the necessity of implementing support not only for patients but also for their families. For example, when paramedics proactively support the expansion of a patient’s activities of daily living (ADL) within the hospital during the recovery phase, it improves the patient’s ADL capability. This, in turn, serves as a crucial form of support that brings a sense of security to the family, who are facing the heartbreaking situation of a loved one receiving emergency medical care within their life course. Understanding the fundamental nursing philosophies of “safety and comfort” and the “recovery process” from both theoretical and practical standpoints allows paramedics to expand their communication style. It shifts from communication focused primarily on information gathering at the emergency scene, to communication as an “interpersonal assistance skill” designed to empathize with patient anxieties and support their daily lives. Furthermore, research by Kubota *et al.* [5] emphasizes the importance of communication and support that grasps the patient’s lifestyle and background—moving beyond conventional “emergency life-saving interventions”—especially as the roles of paramedics expand to include in-hospital duties and inter-facility transports. Ultimately, skills rooted in such a profound understanding of humanity serve as an unwavering foundation for paramedics. They are essential for earning trust within the multidisciplinary hospital team and for reconstructing their own professional identity as integral “members of the healthcare team”.

To address these dramatic environmental changes and emerging educational needs, the Department of Emergency Medical Science at the Faculty of Health Sciences, Suzuka University of Medical Science, newly established the courses “Theory of Emergency Health and Daily Life Support Skills” and “Practice of Emergency Health and Daily Life Support Skills” starting in the 2023 academic year. These courses encompass a wide range of technical skills, including bed making, handling of sterile materials, gown techniques, repositioning, simulated elderly experiences, handling of walking aids, and progress recording in the emergency medical field. A major characteristic of this curriculum is its educational approach, which does not end with mere skill imitation; rather, it encourages self-reflection by having students reconstruct the “scientific rationale” behind the skills in their own words through portfolio creation. To date, there have been few instances in Japanese paramedic training programs where nursing-based daily life support skills have been incorporated so systematically and practically. Studies by Kubota [6] [7] report that, historically, university paramedic training programs have not taught patient support skills for paramedics working within hospitals. Therefore, objectively verifying the necessity of teaching nursing-based daily life support

skills is an urgent issue that will influence the overall quality of emergency medical care in the future. Paramedics equipped with daily life support skills as a common knowledge base are expected to be key in building strong collaborations with other professionals within the confined space of a hospital, thereby providing high-quality, seamless medical care with minimal burden on the patient.

Accordingly, this study aims to closely analyze the changes in awareness and the status of skill acquisition among students who completed these courses. It seeks to clarify what effects an educational program incorporating nursing perspectives has on broadening students' mindsets from mere "patient transport" to "continuous patient management". To guide this investigation, this study specifically addresses the following three research questions:

- 1) What specific changes occur in paramedic students' awareness regarding patient care when a nursing-perspective curriculum is introduced?
- 2) How does theoretical knowledge acquired in lectures correlate with the practical mastery of individual daily life support skills?
- 3) To what extent do the lecture and seminar components effectively link together regarding the concepts of patient safety, comfort, and the recovery process?

By examining the process through which theoretical "knowledge and understanding" is successfully translated into practical "skill acquisition", this study will discuss whether this educational model can play a pioneering role in training the next generation of paramedics. The ultimate objective of this study is for the findings presented herein to indicate the ideal direction for paramedic education suitable for the new era following the legislative revision, and to serve as crucial foundational data for constructing a standard educational model to be utilized in training programs nationwide in the future.

2. Research Methods

2.1. Participants

The subjects of this study were 42 second-year students enrolled in the Department of Emergency Medical Science, Faculty of Health Sciences, Suzuka University of Medical Science, who completed the newly established courses "Theory of Emergency Health and Daily Life Support Skills" and "Practice of Emergency Health and Daily Life Support Skills" in the 2023 academic year. Because this study aimed to verify the effectiveness of a novel educational program within the undergraduate paramedic curriculum, all students enrolled in these courses were included as the target population.

2.2. Data Collection Period and Procedures

The survey was conducted in December 2023, following the completion of all lectures and practical exercises, allowing sufficient time for the students to consolidate the learning content. Upon the conclusion of the final class, the principal investigator provided the participants with detailed explanations—both verbally and in writing—regarding the purpose, significance, and methodology of the

study, as well as the ethical considerations. To completely eliminate any potential influence on students' academic grading, the survey was administered only after final grades had been determined and submitted to the Academic Affairs Office. This procedure was implemented to ensure a system devoid of any psychological coercion to participate.

2.3. Survey Method

The study utilized an anonymous, self-administered questionnaire. The survey forms were distributed simultaneously to all 42 target students. To prevent faculty members from directly accessing or identifying individual responses, students were instructed to submit their completed questionnaires by depositing them into a designated collection box installed on campus. This submission procedure ensured both the anonymity of the respondents and the voluntary nature of their participation throughout the collection process.

2.4. Survey Items

The questionnaire was designed systematically based on the course syllabus and its targeted learning objectives. Importantly, this curriculum and its syllabus were developed based on extensive prior research concerning practicing paramedics and paramedic training curricula in Japan [3] [4] [6] [7]. To ensure content validity, the survey items were derived directly from these evidence-based course requirements and were consensus-validated through rigorous review by the authors, who are experts in emergency medical science and nursing education. While a formal pilot test was not conducted due to the exploratory nature of this newly introduced course sequence, the items were verified to accurately reflect the core competencies expected of the students. Participants were asked to evaluate their level of understanding and proficiency regarding the specific technical items using a 5-point Likert scale (5: Strongly agree; 4: Agree; 3: Neither agree nor disagree; 2: Disagree; 1: Strongly disagree).

The items were categorized into two main components. The first component evaluated the Understanding and Acquisition of Daily Life Support Skills, which included bed making, the handling of sterile materials, gown techniques, patient repositioning (including in emergency medical settings), assistance with wheelchair and stretcher transfers and mobility, the simulated elderly experience, and the handling of crutches and T-canes. The second component assessed Related Knowledge, which encompassed understanding patients through a nursing perspective, approaches to documentation in emergency medical settings, and communication in interprofessional collaboration.

2.4.1. Understanding and Acquisition of Daily Life Support Skills

This component includes bed making, the handling of sterile materials, gown techniques, patient repositioning (including in emergency medical settings), assistance with wheelchair and stretcher transfers and mobility, the simulated elderly experience, and the handling of crutches and T-canes.

2.4.2. Related Knowledge

Understanding patients through a nursing perspective, approaches to documentation in emergency medical settings, and communication in interprofessional collaboration.

2.5. Statistical Analysis

For the multiple-choice items, responses were quantified on a 5-point scale, and quantitative analysis was performed using descriptive statistics (calculation of means and percentages). Throughout the analysis process, repeated discussions were held among the co-researchers to ensure the validity and objectivity of the results.

All statistical analyses in this study were conducted using Microsoft Excel 2024. To examine the relationship between “knowledge and understanding” and “skill acquisition” for each technical item, Pearson’s product-moment correlation coefficient (r) was calculated. Furthermore, to clarify the explanatory power of each indicator, the coefficient of determination (R^2) was simultaneously calculated, enabling a structural analysis of the educational effects. Statistical significance was evaluated using Analysis of Variance (ANOVA) via regression analysis, with significance levels set at 5%, 1%, and 0.1% (two-tailed tests). Although the 5-point Likert scale data are ordinal, parametric tests (Pearson’s correlation and ANOVA) were applied because the intervals between the scale points were assumed to be approximately equal, which is a widely accepted approach in educational research. Additionally, a Spearman rank correlation analysis was performed as a sensitivity check, confirming that both parametric and non-parametric approaches yielded identical statistical interpretations and identical patterns of significance.

3. Ethical Considerations

This study was conducted with the approval of the Clinical Research Ethics Review Committee of Suzuka University of Medical Science (Approval Number: 526). It was clearly explained to the students, both verbally and in writing, that their cooperation in the survey was entirely voluntary and that their decision on whether or not to participate would not result in any disadvantages whatsoever, including any impact on their academic grading. The submission of the questionnaire responses was deemed to constitute consent to participate. All obtained data were anonymized and strictly managed on password-protected devices. Information management was thoroughly enforced in accordance with the university’s regulations, which stipulate that research materials will be retained for 10 years following the completion of the study, after which they will be destroyed in an irretrievable manner.

4. Questionnaire Content

The contents of the questionnaire administered to the paramedic students are presented in **Table 1**.

Table 1. Questionnaire items.

Question No.	Questionnaire Item
1	Through the course “Theory of Emergency Health and Daily Life Support Skills”, I was able to understand daily life support skills for patients from a nursing perspective.
2	Through the course “Theory of Emergency Health and Daily Life Support Skills”, I was able to understand the following daily life support skills for patients in emergency medical settings.
2-1	Bed making
2-2	Handling of sterile materials
2-3	Donning and doffing of PPE (Personal Protective Equipment)
2-4	Patient repositioning
2-5	Patient repositioning in emergency medical settings
2-6	Wheelchair transfer
2-7	Wheelchair mobility
2-8	Stretcher transfer
2-9	Simulated elderly experience
2-10	Crutch handling
2-11	T-cane handling
2-12	Documentation in emergency medical settings
3	Through the course “Practice of Emergency Health and Daily Life Support Skills”, I was able to acquire the following basic skills for patient daily life support, including those in emergency medical settings.
3-1	Bed making
3-2	Handling of sterile materials
3-3	Donning and doffing of PPE (Personal Protective Equipment)
3-4	Patient repositioning
3-5	Patient repositioning in emergency medical settings
3-6	Wheelchair transfer
3-7	Wheelchair mobility
3-8	Stretcher transfer
3-9	Simulated elderly experience
3-10	Crutch handling
3-11	T-cane handling
3-12	Documentation in emergency medical settings
4	Through the course “Theory of Emergency Health and Daily Life Support”, I was able to understand safety and comfort in patient health and daily life, including those in emergency medical settings.

Continued

- | | |
|----|---|
| 5 | Through the course “Practice of Emergency Health and Daily Life Support Skills”, I was able to understand daily life support skills to maintain a safe and comfortable life for patients in emergency medical settings. |
| 6 | Through the course “Theory of Emergency Health and Daily Life Support”, I was able to understand changes in activities of daily living caused by accidents or acute illnesses, based on the recovery process. |
| 7 | Through the course “Practice of Emergency Health and Daily Life Support Skills”, I was able to understand daily life support skills tailored to the recovery process for changes in activities of daily living caused by accidents or acute illnesses. |
| 8 | Through the courses “Theory of Emergency Health and Daily Life Support” and “Practice of Emergency Health and Daily Life Support Skills”, I was able to understand the necessity of communication with patients when practicing daily life support skills, including those in emergency medical settings. |
| 9 | Based on my learning in “Theory of Emergency Health and Daily Life Support” and “Practice of Emergency Health and Daily Life Support Skills”, I was able to create a portfolio on support skills, including their scientific rationales, for daily life changed by accidents or acute illnesses. |
| 10 | I was able to view medicine from a broader perspective by recognizing that the practice of paramedics facing patients with urgent conditions directly connects to supporting the ongoing daily and medical lives of those patients. |

5. Results

The questionnaires were distributed to all 42 students enrolled in this course, and responses were obtained from 22 students (response rate: 52.4%). After excluding one respondent due to missing values, a total of 21 respondents were included in the final analysis (effective response rate: 50.0%).

5.1. Aggregate Results of Course-Wide Understanding and Awareness

Table 2 shows the aggregate results for the four items (Questions 1, 8, 9, and 10) regarding the overall learning objectives and student awareness for this course. The mean scores for all items exceeded 4.0. The highest mean score was observed for “8. Understanding the necessity of communication with patients” at 4.67 (SD = 0.48). This was followed by “1. Understanding daily life support skills through nursing science” at 4.33 (SD = 0.48), “9. Self-reflection through portfolio creation” at 4.24 (SD = 0.70), and “10. Usefulness for future in-hospital activities and other endeavors” at 4.19 (SD = 0.68).

To clarify the relationships between each awareness item (**Table 2**) and the students’ knowledge and skills, Pearson’s product-moment correlation coefficients were calculated.

Table 2. Course-wide understanding and awareness (n = 21).

Question No.	Questionnaire Item	Mean	SD
1	Through the course “Theory of Emergency Health and Daily Life Support”, I was able to understand daily life support skills for patient health and daily life through nursing science.	4.33	0.48
8	Through the courses “Theory of Emergency Health and Daily Life Support” and “Practice of Emergency Health and Daily Life Support Skills”, I was able to understand the necessity of communication with patients when practicing daily life support skills, including those in emergency medical settings.	4.67	0.48
9	Based on my learning in “Theory of Emergency Health and Daily Life Support” and “Practice of Emergency Health and Daily Life Support Skills”, I was able to create a portfolio on support skills, including their scientific rationales, for daily life changed by accidents or acute illnesses.	4.24	0.7
10	I was able to view medicine from a broader perspective by recognizing that the practice of paramedics facing patients with urgent conditions directly connects to supporting the ongoing daily and medical lives of those patients.	4.19	0.68

5.2. Correlations among Awareness Items

Table 3 presents the correlation coefficients among the items in **Table 2**. A significant positive correlation was observed between “Understanding through nursing science (Q1)” and “Usefulness for future in-hospital activities (Q10)” ($r = 0.711$, $p < 0.001$). Additionally, a significant positive correlation was also found between “Understanding through nursing science (Q1)” and “Reflection through portfolio creation (Q9)” ($r = 0.640$, $p < 0.01$).

Table 3. Correlation matrix among awareness items (n = 21).

Question No.	Questionnaire Item	1	8	9	10
1	Understanding Through Nursing Science	-	0.500*	0.640**	0.711***
8	Understanding the Necessity of Communication	0.500*	-	0.246	0.355
9	Reflection Through Portfolio Creation	0.640**	0.246	-	0.425
10	Usefulness for Future In-Hospital Activities	0.711***	0.355	0.425	-

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5.3. Self-Evaluation of Knowledge and Understanding Regarding Individual Daily Life Support Skills

Table 4 shows the self-evaluation results of “knowledge and understanding” for each seminar item. Among all 12 items, the highest mean score was observed for “2-9. Senior experience simulation” at 4.62 (SD = 0.50). This was followed by “2-7. Wheelchair transfer and mobility” at 4.43 (SD = 0.60) and “2-4. Positioning and body mechanics” at 4.38 (SD = 0.59). Conversely, the item with the lowest mean score was “2-8. Stretcher transfer” at 4.05 (SD = 0.74).

Table 4. Self-evaluation of knowledge and understanding regarding individual support skills (n = 21)

Question No.	Questionnaire Item	Mean	SD
2-1	Bed making	4.14	0.79
2-2	Handling of sterile materials	4.24	0.7
2-3	Donning and doffing of PPE (Personal Protective Equipment)	4.14	0.79
2-4	Patient repositioning	4.38	0.59
2-5	Patient repositioning in emergency medical settings	4.29	0.56
2-6	Wheelchair transfer	4.29	0.72
2-7	Wheelchair mobility	4.43	0.6
2-8	Stretcher transfer	4.05	0.74
2-9	Simulated elderly experience	4.62	0.5
2-10	Crutch handling	4.14	0.73
2-11	T-cane handling	4.14	0.65
2-12	Documentation in emergency medical settings	4.19	0.75

5.4. Self-Evaluation of the Level of Mastery for Individual Daily Life Support Skills

Table 5 shows the self-evaluation results of the “level of mastery” for each seminar item. Among all 12 items, the highest mean score of 4.43 (SD = 0.60) was observed for both “3-2. Handling of sterile items” and “3-7. Wheelchair transfer and mobility.” This was followed by “3-9. Senior experience simulation” at 4.38 (SD = 0.74). Conversely, the items with the lowest mean score were “3-8. Stretcher transfer” (SD = 0.83) and “3-12. Documentation in the paramedic field” (SD = 0.77), both yielding a score of 4.10.

Table 5. Self-evaluation of the level of mastery for individual support skills (n = 21).

Question No.	Questionnaire Item	Mean	SD
3-1	Bed making	4.24	0.62

Continued

3-2	Handling of sterile materials	4.43	0.6
3-3	Donning and doffing of PPE (Personal Protective Equipment)	4.29	0.56
3-4	Patient repositioning	4.33	0.58
3-5	Patient repositioning in emergency medical settings	4.33	0.58
3-6	Wheelchair transfer	4.29	0.64
3-7	Wheelchair mobility	4.43	0.6
3-8	Stretcher transfer	4.1	0.83
3-9	Simulated elderly experience	4.38	0.74
3-10	Crutch handling	4.33	0.58
3-11	T-cane handling	4.24	0.7
3-12	Documentation in emergency medical settings	4.1	0.77

5.5. Correlations between Knowledge/Understanding and Skill Mastery

To examine the relationships between theoretical “knowledge and understanding (Question 2)” and practical “skill mastery (Question 3)” for each daily life support skill, Pearson’s product-moment correlation coefficients were computed on an item-by-item basis (Table 6). The analysis indicated that the vast majority of items exhibited statistically significant positive correlations. Notably, “Positioning and body mechanics ($r = 0.930$)”, “Patient positioning in the paramedic field ($r = 0.927$)”, “Documentation in the paramedic field ($r = 0.922$)”, “Single cane mobility ($r = 0.904$)”, and “Wheelchair transfer ($r = 0.898$)” exhibited exceptionally strong positive correlations ($r \geq 0.80$). In contrast, the correlation for “Senior experience simulation” did not reach statistical significance ($r = 0.414$, $p = 0.062$).

Table 6. Correlation coefficients between “knowledge/understanding” and “skill mastery” ($n = 21$).

Technical Item	Knowledge and Understanding (Question No. & Description)	Skill Mastery (Question No. & Description)	r
Bed making	2-1. Bed making	3-1. Bed making	0.634**
Handling of sterile materials	2-2. Handling of sterile materials	3-2. Handling of sterile materials	0.580**
Donning and doffing of PPE (Personal Protective Equipment)	2-3. Donning and doffing of PPE (Personal Protective Equipment)	3-3. Donning and doffing of PPE (Personal Protective Equipment)	0.579**
Patient repositioning	2-4. Patient repositioning	3-4. Patient repositioning	0.930***
Patient repositioning in emergency medical settings	2-5. Patient repositioning in emergency medical settings	3-5. Patient repositioning in emergency medical settings	0.927***

Continued

Wheelchair transfer	2-6. Wheelchair transfer	3-6. Wheelchair transfer	0.898***
Wheelchair mobility	2-7. Wheelchair mobility	3-7. Wheelchair mobility	0.720***
Stretcher transfer	2-8. Stretcher transfer	3-8. Stretcher transfer	0.643**
Simulated elderly experience	2-9. Simulated elderly experience	3-9. Simulated elderly experience	0.414
Crutch handling	2-10. Crutch handling	3-10. Crutch handling	0.834***
T-cane handling	2-11. T-cane handling	3-11. T-cane handling	0.904***
Documentation in emergency medical settings	2-12. Documentation in emergency medical settings	3-12. Documentation in emergency medical settings	0.922***

Technical Item	Correlation Coefficient (r)	Coefficient of Determination (R ²)	p-value
Bed making	0.634	0.402	0.0020**
Handling of sterile materials	0.58	0.336	0.0058**
Donning and doffing of PPE (Personal Protective Equipment)	0.579	0.335	0.0060**
Patient repositioning	0.93	0.865	<0.001***
Patient repositioning in emergency medical settings	0.927	0.859	<0.001***
Wheelchair transfer	0.898	0.806	<0.001***
Wheelchair mobility	0.72	0.518	0.0002***
Stretcher transfer	0.643	0.413	0.0017**
Simulated elderly experience	0.414	0.171	0.0622 ^{n.s.}
Crutch handling	0.834	0.696	<0.001***
T-cane handling	0.904	0.817	<0.001***
Documentation in emergency medical settings	0.922	0.85	<0.001***
Overall Mean	0.94	0.884	<0.001***

Note. **p < 0.01, ***p < 0.001, n.s. = not significant.

Furthermore, a calculation of the correlation between the overall mean of the 12 items for Question 2 (aggregate knowledge comprehension) and that of Question 3 (aggregate skill mastery) revealed a remarkably profound positive correlation ($r = 0.940$, $p < 0.001$).

5.6. Correlation Analysis on the Linkage between Lectures and Seminars: Safety, Comfort, and the Recovery Process

To examine the linkage between “lectures (theory)” and “seminars (practice)” in this course, Pearson’s product-moment correlation coefficients were calculated between the question items sharing common themes: Questions 4 and 5 regarding “safety and comfort”, and Questions 6 and 7 regarding the “recovery process” (**Table 7**). The analysis revealed strong positive correlations across all pairs, with $r > 0.70$ ($p < 0.001$).

Table 7. Correlations between question items regarding “safety and comfort” and the “recovery process” ($n = 21$).

Analyzed Pairs	Question Number and Content	Correlation Coefficient (r)	Coefficient of Determination (R^2)	p-value
Linkage regarding “Safety and Comfort”	Q4 (Lectures): Understood safety and comfort in patients’ healthy lives, including the paramedic field, in “Emergency Health and Daily Living Support.”	0.715	0.511	0.0003
	Q5 (Practice): Understood daily living support skills to maintain patients’ safe and comfortable lives in the paramedic field, in “Emergency Health and Daily Living Support Seminars.”			
Linkage regarding the “Recovery Process”	Q6 (Lectures): Understood changes in activities of daily living (ADL) caused by accidents or onset of illness based on the recovery process, in “Emergency Health and Daily Living Support.”	0.729	0.531	0.0002
	Q7 (Practice): Understood skills corresponding to the recovery process for changes in ADL caused by accidents or onset of illness, in “Emergency Health and Daily Living Support Seminars.”			

6. Discussion

Based on the results of the questionnaire survey, this chapter critically examines and discusses the following key aspects from multifaceted perspectives: the educational effectiveness of introducing daily living support skills into paramedic education, the process of students’ attitudinal transformation, the alignment be-

tween theory and practice, and the challenges for future curricula.

6.1. Transformation of Paramedic Students' Professional Identity and Its Educational Significance

In the present survey, the finding that the mean scores for all awareness items exceeded 4.0 strongly suggests that this educational program had the potential to exert a profound impact on students' perceived professional awareness. In particular, it is highly noteworthy that Question 10—"I recognized that the practice of paramedics confronting acute patient cases serves to support the ongoing convalescent life of patients, thereby enabling me to perceive medicine within a broader scope"—yielded an exceptionally high level of positive agreement, with a mean score of 4.19 (SD = 0.68).

This outcome substantiates that students possess an exceedingly positive sense of expectation and responsibility toward the emerging occupational role of "in-hospital paramedics." This role was established following legislative amendments enacted in October 2021, which authorized paramedics to continue life-saving procedures for severely ill or injured patients within medical institutions under physician direction. Historically, since the inception of the paramedic system in Japan in 1991, conventional paramedic education has exclusively specialized in rapid clinical assessment and accurate emergency intervention within pre-hospital care settings.

Consequently, the educational curricula have been inherently structured with a predominant focus on acute-phase management. As a result of this paradigm, patients have historically tended to be perceived as isolated, "point-in-time" entities—essentially regarded merely as subjects for transport during the constrained timeframe from the incident scene to the receiving medical facility.

However, the integration of a nursing-based perspective through this course is suggested to expand the perceived role of paramedics beyond the mere execution of life-saving interventions, guiding them toward a longitudinal and linear perspective that supports the "patient as a person living their daily life" during the subsequent convalescent process.

Substantiating this conceptual shift, an exceptionally strong and significant positive correlation was observed between Question 1 ("I was able to understand support skills for patients' healthy living through nursing science in 'Emergency Health and Daily Living Support'") and Question 10 ($r = 0.711$, $p < 0.001$). This clearly suggests that acquiring nursing-based daily living support skills does not merely represent the mastery of procedural techniques; rather, it serves as a robust foundation for reconstructing the professional identity of paramedics as integral members of the healthcare team. Furthermore, the highest mean score within the awareness survey ($M = 4.67$, $SD = 0.48$) was observed for Question 8: "I was able to understand that communication with the patient is necessary when practicing daily living support skills, including within the paramedic field." In conventional emergency care settings, communication is predominantly centered on infor-

mation gathering (assessment), such as identifying the chief complaint or taking a medical history.

Nordby and Nøhr *et al.* [8] reported that during the transport of patients with long-term medical conditions, paramedics experience difficulties in communicating under busy and unpredictable circumstances; thus, high-quality communication that incorporates empathy and ethical consideration—rather than mere information transfer—is indispensable. These findings suggest that through their learning experiences in this course, students profoundly internalized the significance of communication as an “interpersonal assistance skill” crucial for ensuring the safety and comfort of convalescent patients and for empathetically addressing their anxiety. This unique pedagogical challenge underscores the critical need for a comprehensive educational framework that addresses both ethical and interpersonal dimensions in undergraduate training. Indeed, as shown in previous curricular evaluations, structured courses focusing on paramedical ethics [3] and family support theory [4] are highly beneficial in fostering students’ holistic, longitudinal, and empathetic perspectives.

6.2. Advanced Integration of Theory and Practice: A Structural Analysis of Learning Effects

One of the most prominent findings of this study is the emergence of an exceptionally powerful positive correlation ($r = 0.940$, $p < 0.001$) between the mean scores of the 12 items in Question 2 (assessing theoretical knowledge) and those of the 12 items in Question 3 (assessing practical skill mastery). This clearly demonstrates that our institution’s lecture course, “Emergency Health and Daily Living Support”, and its corresponding seminar course, “Practice of Emergency Health and Daily Life Support Skills”, are delivered with a high degree of alignment, successfully integrating theory and practice without any fragmentation.

A closer inspection of the item-specific correlation analysis (Table 6) highlights remarkably robust associations within the following domains:

“Patient Positioning”: $r = 0.930$ ($p < 0.001$) between knowledge understanding in Q2-4 and skill mastery in Q3-4. “Patient Positioning in the Paramedic Field”: $r = 0.927$ ($p < 0.001$) between Q2-5 and Q3-5. “Documentation in the Paramedic Field”: ($r = 0.922$, $p < 0.001$) between Q2-12 and Q3-12. “T-shaped Cane”: $r = 0.904$ ($p < 0.001$) between Q2-11 and Q3-11.

In these items, it can be seen that a deep understanding of theoretical knowledge (such as body mechanics, the legal and ethical significance of documentation, and the correct use of assistive devices) directly led to high mastery and confidence in practical seminars. David De Jong *et al.* [9] suggest that for students aiming to become professionals, virtual simulated experiences of practicing leadership through simulation function as a foundational experience. It is inferred that teaching how to use a T-shaped cane was a meaningful class content for students who will become healthcare professionals in the future.

On the other hand, regarding the “simulated elderly experience”, the correla-

tion between knowledge/understanding (Q2-9) and skill mastery (Q3-9) was not statistically significant ($r = 0.414$, $p = 0.062$). This lack of correlation suggests that the elderly experience is not a mere “fixed procedure to be mastered”, but rather an emotional and experiential learning component that involves simulating age-related physical decline and empathizing with the resulting psychological anxiety. Therefore, students’ theoretical knowledge and technical self-evaluations did not necessarily move in parallel. Crucially, while skill mastery did not show a linear correlation with knowledge, the knowledge evaluation for Q2-9 recorded the highest mean score of 4.62 (SD = 0.50) among all 12 items. This disparity highlights that while students did not perceive it as a technique to be mechanically mastered, they recognized the profound importance of understanding the physical characteristics of older adults extremely highly.

6.3. Deepening Awareness of “Safety and Comfort” and the “Recovery Process”

To verify how the lecture and seminar components contributed to students’ conceptual formation, this study analyzed the correlations between items addressing identical themes.

First, regarding the understanding of “safety and comfort”—a foundational philosophy of nursing science—a strong positive correlation was demonstrated between Question 4 (“I was able to understand safety and comfort in patients’ healthy lives, including the paramedic field, in ‘Emergency Health and Daily Living Support’”) and Question 5 (“I was able to understand daily living support skills to maintain patients’ safe and comfortable lives in the paramedic field, in ‘Emergency Health and Daily Living Support Seminars’”) ($r = 0.715$, $p < 0.001$). In the extraordinary and critical environments of pre-hospital emergency scenes, “safety” is a concept directly linked to immediate life preservation. However, in in-hospital operations and subsequent continuum care, the dimension of “comfort” must inherently be integrated. Comprehending these two concepts as an interconnected dyad directly contributes to the prevention of secondary complications and the mitigation of psychological distress in patients.

Next, concerning the comprehension of the “recovery process”, a robust positive correlation was obtained between Question 6 (“I was able to understand changes in activities of daily living [ADLs] caused by accidents or onset of illness based on the recovery process, in ‘Emergency Health and Daily Living Support’”) and Question 7 (“I was able to understand skills corresponding to the recovery process for changes in ADLs caused by accidents or onset of illness, in ‘Emergency Health and Daily Living Support Seminars’”) ($r = 0.729$, $p < 0.001$). For paramedic students, longitudinally learning both theoretically and practically how a patient progresses through clinical pathways following initial emergency stabilization, and tracing their rehabilitation to the stage of utilizing assistive devices (such as crutches or canes), proved highly effective in cultivating a comprehensive clinical vision required for modern emergency medical services.

6.4. Identification of Educational Bottlenecks and Implications for Future Improvement

On the other hand, the finding that certain items remained relatively lower in self-evaluation serves as a critical pedagogical indicator for subsequent curriculum development. The lowest self-assessment scores were observed in theoretical knowledge for Question 2-8, “stretcher transfer” ($M = 4.05$, $SD = 0.74$), and in practical skills for Question 3-8, “stretcher transfer” ($M = 4.10$, $SD = 0.83$), alongside Question 3-12, “Documentation in emergency medical settings” ($M = 4.10$, $SD = 0.77$).

6.4.1. Clinical Intricacies of Stretcher Transfer

Shifting from a pre-hospital mindset, where transfers are predominantly performed for immediate “transportation”, to an in-hospital context designed for “convalescence and diagnostic testing” demands a fundamental paradigm shift in risk management. In-hospital transfers inherently require sophisticated clinical reasoning, such as the meticulous management of intravenous lines and drainage catheters, as well as strict adherence to patient mobility and rest restrictions. These environment-specific complexities likely functioned as a cognitive barrier for paramedic students encountering in-hospital protocols for the first time.

6.4.2. Paradigm Shift in Documentation Competency

While conventional emergency medical service (EMS) documentation primarily focuses on the chronological listing of objective clinical facts and executed procedures, in-hospital documentation demands an advanced assessment capability to verbalize nuanced “patient responses” and “signs of recovery” for effective inter-professional information sharing. For paramedic students, synthesizing this nursing-based clinical reasoning into written records represented a profound departure from their traditional pre-hospital training. This discrepancy highlights the critical necessity for introducing longitudinal repetitive practice and targeted feedback mechanisms into the training program.

Furthermore, items such as Question 2-1 (“bed making/linen exchange”), Question 2-3 (“gowning technique”), Question 2-10 (“crutches”), and Question 2-11 (“T-shaped canes”) each yielded a theoretical knowledge mean score of 4.14, demonstrating a slight plateau compared to other domains. In teaching these fundamental skills, educators must transcend the repetitive mastery of mere procedural algorithms. Instead, there is a clear imperative to reinforce the pedagogical “meaning-making” or theoretical rationale, explicitly illuminating how these fundamental maneuvers directly intersect with and safeguard the patient’s daily “living environment” and comprehensive comfort.

6.5. Promotion of Interprofessional Collaboration (IPC) and Self-Reflection

Another prominent educational outcome of this study is the reinforcement of students’ self-reflection through the strategic utilization of portfolios. Question 9—

“I was able to create a portfolio reflecting on daily living support skills, including their scientific rationales, for altered activities of daily living caused by accidents or onset of illness, while referencing my learning in ‘Emergency Health and Daily Living Support’ and its seminars”—yielded a high self-assessment score, with a mean of 4.24 (SD = 0.70).

H. Pandya *et al.* [10] noted that the implementation of portfolios empowers students to autonomously self-evaluate the fulfillment of their personal learning needs, professional trajectory, and competency acquisition. In the present survey, the depth of reflection achieved through portfolio creation demonstrated a significant positive correlation with the conceptual comprehension of patient care through nursing science (Question 1) ($r = 0.640$). This empirical linkage confirms that the portfolio effectively functioned as a cognitive vehicle through which students “reconstructed” the scientific rationales behind “why this support skill is necessary” in their own words, thereby facilitating the deep internalization and consolidation of knowledge.

Ultimately, cultivating this “ability to verbalize the clinical meaning of one’s learning” furnishes future practitioners with an unwavering professional foundation. It ensures seamless communication, mutual respect, and effective interprofessional collaboration (IPC) with physicians, nurses, and physical therapists within complex, modern in-hospital care ecosystems.

7. Conclusions

In conclusion, the inaugural educational initiative of introducing “Emergency Health and Daily Living Support” and its corresponding seminars within the Department of Emergency Medical Science at Suzuka University of Medical Science has been quantitatively demonstrated to exert substantial pedagogical efficacy in both accelerating students’ conceptual transformation and facilitating practical skill mastery.

Paramedics equipped with a comprehensive understanding of nursing-based daily living support skills as a shared knowledge base are poised to serve as a vital linchpin in complex in-hospital environments. Their unique competency will enable them to cultivate robust, trusting professional relationships with multi-disciplinary team members, thereby delivering seamless, high-quality, and patient-centered care that minimizes psychophysical distress.

By meticulously refining and reinforcing the educational frameworks to address the specific challenges identified in this study—particularly regarding the clinical intricacies of in-hospital stretcher transfers and advanced clinical documentation, this curriculum model is highly anticipated to contribute to the establishment of a standardized, progressive pedagogical framework tailored for next-generation “in-hospital paramedics”.

8. Limitations

While the present study provides valuable insights into the pioneering integration

of nursing-based perspectives into the paramedic training curriculum, several critical limitations must be acknowledged.

First, the potential for researcher bias warrants consideration, as the investigators also served as the primary course instructors. The principal and co-investigators directly delivered the lectures and practical components of “Emergency Health and Daily Living Support” and its corresponding seminars. To mitigate psychological coercion and social pressure on the participants, the questionnaire was strictly administered only after academic grades were fully finalized and officially submitted to the registrar. Furthermore, anonymity and voluntary participation were rigorously safeguarded through an anonymous, self-administered format utilizing a secured drop-box system. Nevertheless, given the inherent power dynamics between instructors and students within an everyday educational ecosystem, it remains difficult to entirely eliminate the possibility of social desirability bias, wherein students might have felt an implicit psychological obligation to align their responses with perceived faculty expectations, potentially inflating their self-assessment scores.

Second, the small sample size and potential sampling bias limit the statistical generalizability of the findings. Although the target population comprised 42 second-year undergraduate students in the Department of Emergency Medical Science at Suzuka University of Medical Science, the final analysis was restricted to 21 valid responses (a response rate of 50.0%). This constrained sample size ($N = 21$) inherently restricted the statistical power, precluding more complex multivariate analyses to explore confounding variables. Additionally, systematic differences regarding learning motivation or procedural mastery may have existed between the non-respondents and those who chose to participate. Therefore, caution must be exercised when extrapolating these results as a definitive representation of the entire student cohort at the institution.

Third, the single-center design poses a constraint on external validity. This study evaluated an inaugural curriculum implemented within a single department at a single university; thus, generalizing these insights directly to all paramedic training programs across Japan requires prudence. Discrepancies in institutional facilities, preexisting curricular frameworks, faculty expertise, and student demographics across different universities may yield divergent educational outcomes upon implementing a similar program.

Future research should aim to expand the sample size through multi-center collaborative studies. Furthermore, to comprehensively validate the objective efficacy of this educational program, subsequent investigations should transcend subjective student self-evaluations by incorporating objective clinical skill assessments (e.g., OSCE) during clinical placements, as well as longitudinal tracking of graduates’ practical competencies and interprofessional collaboration (IPC) performance in actual post-employment clinical settings.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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