

Effect of an Intensive Care Liaison Nurse Intervention on Transfer Anxiety and Vital Signs among ICU Patients during the COVID-19 Pandemic: A Randomized Controlled Trial

Atieh Beyranvand¹, Shirin Hasanvand^{2*}, Fateme Goudarzi², Nasrin Galehdar³, Farzad Ebrahimzadeh⁴

¹ Intensive Care Nursing Graduate, Lorestan University of Medical Sciences, Khorramabad, Iran.

² Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran.

³ Surgical Technology Department, Faculty of Paramedical, Lorestan University of Medical Sciences, Khorramabad, Iran.

⁴ Department of Biostatistics and Epidemiology, Faculty of Health and Nutrition, Lorestan University of Medical Sciences, Khorramabad, Iran.

***Corresponding author:** Shirin Hasanvand, PhD. Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran. Email: Hasanvand.sh1390@gmail.com

Received Date: 03 June 2026; **Revised Date:** 09 August 2026; **Accepted Date:** 13 August 2026; **Published Date:** 17 August 2026.
Nexus of Integrated Clinical Science (NICS). 2026;1(1): 014, <https://doi.org/10.22034/nics.2026.1.014>

Abstract

Background: Transfer of patients from the intensive care unit (ICU) to a general ward can be a stressful process for patients and their families. This study aimed to evaluate the effect of intensive care liaison nurse services on patients' transfer anxiety and vital signs during the COVID-19 pandemic.

Materials and Methods: This randomized controlled trial was conducted from January 2020 to August 2021. Sixty patients were randomly assigned to the control (n=30) and intervention (n=30) groups. The control group received usual care, whereas the intervention group received intensive care liaison nurse services, including patient and family support, staff training, and assessment of the destination ward. Anxiety was assessed using the Spielberger State-Trait Anxiety Inventory immediately after transfer and 6 hours after transfer. Data were analysed using descriptive and inferential statistics, including paired t-test, Wilcoxon signed-rank test, one-way ANOVA, analysis of covariance, and a generalized linear model with a cumulative logit link function.

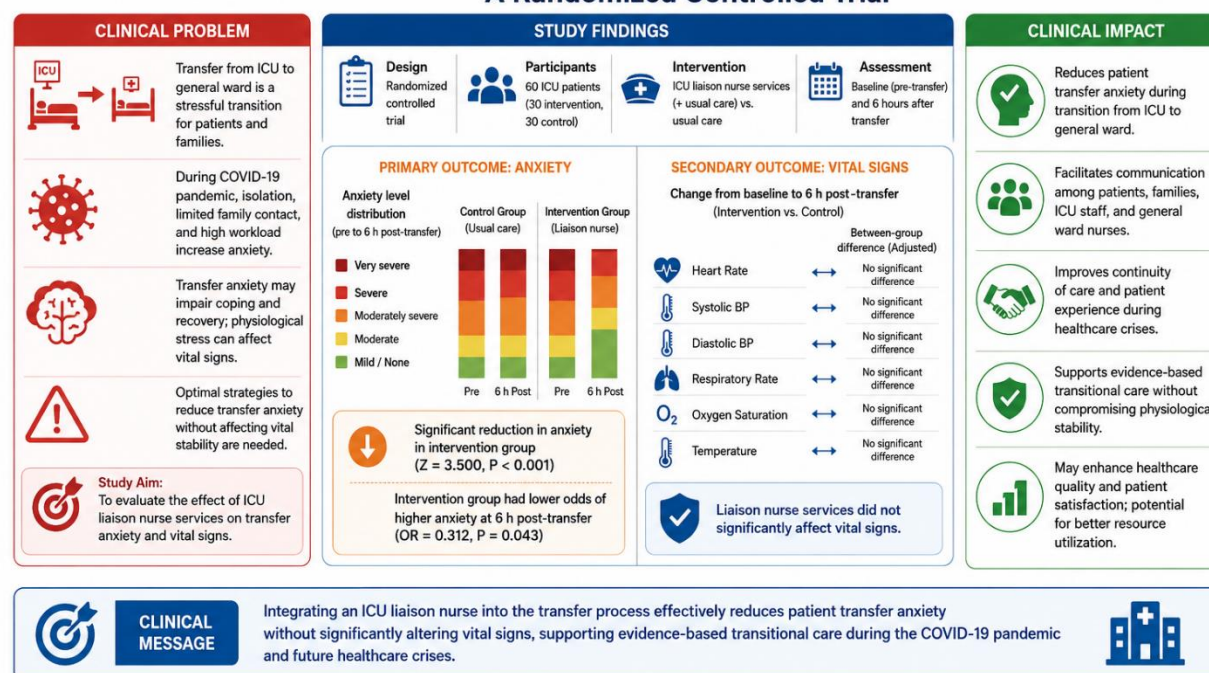
Results: There were no significant between-group differences in demographic characteristics. After adjusting for baseline values, no statistically significant differences were observed between the groups in changes in vital signs. In the control group, the distribution of anxiety levels did not change significantly from baseline to the end of the study, whereas a significant reduction was observed in the intervention group ($Z = 3.500$, $P < 0.001$).

Conclusions: Intensive care liaison nurse services were effective in reducing patients' transfer anxiety but did not significantly affect vital signs. Further studies with larger sample sizes are needed to confirm these findings.

Implications for Patient Care: ICU liaison nurse services may help reduce patients' transfer anxiety during transition from the ICU to the general ward, particularly during healthcare crises, although they may not significantly affect vital signs.

Keywords: Transfer anxiety, Liaison nurse, Vital signs, Transitional care, COVID-19.

Effect of an Intensive Care Liaison Nurse Intervention on Transfer Anxiety and Vital Signs among ICU Patients during the COVID-19 Pandemic: A Randomized Controlled Trial



ICU: Intensive Care Unit; BP: Blood Pressure; SpO₂: Peripheral Oxygen Saturation

Graphical Abstract. The graphical abstract summarizes the findings of a randomized controlled trial evaluating intensive care liaison nurse services during the transition of patients from the intensive care unit (ICU) to the general ward during the COVID-19 pandemic. The structured intervention provided patient and family support, staff education, communication, and assessment of the destination ward to facilitate continuity of care during this vulnerable transition. The intervention significantly reduced patients' transfer anxiety, whereas no significant between-group effects were observed for vital signs. By strengthening communication and coordination among patients, families, ICU staff, and general ward nurses, ICU liaison nurse services may support a safer and more patient-centered transition process. Overall, this approach may improve the psychological experience of ICU transfer and support evidence-based transitional care, particularly during healthcare crises, without compromising physiological stability.

Introduction

One of the key challenges in the transfer process is adequately preparing patients, their families, and general ward nurses for the transition (1). Inadequate preparation and unplanned transfers may increase the risk of medical errors and adverse outcomes, including mortality (2). Despite partial clinical recovery, many patients experience physical and psychological complications after transfer. Transfer from the ICU may also cause anxiety, adversely affect the treatment process, and impair patients' ability to cope with their illness (3). Transfer anxiety refers to the psychological and physiological responses

experienced by patients and their families during the transition from the intensive care unit (ICU) to a general ward (4). Such anxiety may arise from factors such as inadequate staff skills and limited resources in general wards (5). Exposure to these stressors may lead to physiological changes, including alterations in vital signs (6). Maintaining physiological stability and monitoring vital signs are essential components of intensive care (7). The stressful ICU environment and the process of transferring patients may trigger physiological stress responses, including increased circulating catecholamine and stress hormone levels,

irregularities in heart rate, and changes in body temperature and cardiac output, which may subsequently affect blood pressure and other hemodynamic parameters (8). Changes in vital signs, particularly blood pressure, respiratory rate, and heart rate, are clinically important because they may occur rapidly and provide early indications of changes in a patient's clinical condition or impending deterioration (9).

The COVID-19 pandemic may have further intensified transfer anxiety. During periods of high clinical workload and crisis conditions, healthcare providers may have been required to prioritize immediate clinical needs, potentially limiting attention to the psychological and social needs of patients and their families. Separation from family members and visitation restrictions are important psychological stressors for patients admitted to the ICU (10). During the COVID-19 pandemic, social distancing measures and visitation restrictions further limited contact between patients and their families, potentially increasing feelings of isolation and anxiety during the transfer process. Mottaghi et al. reported that restrictions implemented within the Iranian healthcare system, including limitations on family visitation and reduced family support, were associated with increased stress and anxiety among patients and their families. They also highlighted the lack of clear guidelines for patient–family communication, which may further exacerbate transfer-related anxiety (11).

Effective communication is one of the most important needs of patients and their families and may help reduce anxiety during the transfer process (12). However, in Iran, important challenges to effective transitional care include inadequate coordination between departments and levels of care, insufficient preparation of patients and families for transfer, and difficulties

in maintaining continuity of care. Nurses play an important role in reducing transfer-related anxiety because they are directly involved in coordinating and facilitating the patient transfer process. One approach to reducing communication barriers between patients, families, and healthcare providers and facilitating a safe transition is the use of liaison nurse services. An important role of the liaison nurse is to facilitate effective communication among patients, families, and healthcare professionals (13). By applying communication and clinical skills to the care of patients with complex needs, liaison nurses may help reduce anxiety and improve patient satisfaction (14). Hughes et al. (2022) highlighted the important role of family liaison officers in facilitating communication among patients, healthcare teams, and family members during the COVID-19 pandemic (15). Liaison nurses can also serve as a link between the ICU and general wards to facilitate transitional care (16). Their responsibilities may include transferring knowledge and clinical skills from the ICU to general ward nurses, communicating relevant patient information, assessing available resources, and addressing patients' care needs (17).

Some studies have reported the effectiveness of liaison nurse services in establishing effective communication, improving continuity of care, facilitating patient transfer, reducing the length of hospitalization, and reducing care costs (13). The results of a study show the effect of liaison nurses on reducing patients' anxiety (18). Another study confirmed the positive effects of liaison nurse services on anxiety and some vital-sign parameters (19). However, another study found no significant differences between the intervention and control groups regarding vital signs, level of consciousness, satisfaction with

care, or length of hospitalization (16). In addition, Chaboyer et al. found no significant effect of liaison nurse services on transfer anxiety among patients and their families (5).

Therefore, given that ICU liaison nurse services are not free of charge in Iranian medical centers, limited studies have been conducted in this area, particularly during the COVID-19 pandemic. Given the contradictory findings reported in previous studies, the present study aimed to determine the effect of ICU liaison nurse services on transfer anxiety among ICU patients.

Materials and Methods

Study Design and Setting

The present randomized controlled trial (RCT) was conducted from January 2020 to August 2021 in a 450-bed teaching hospital affiliated with a University of Medical Sciences in western Iran. The nurse-to-patient ratio in the relevant wards was 1:3. Sixty patients were recruited from two intensive care units (ICUs): the medical ICU (11 beds) and the surgical ICU (10 beds). During the study period, five COVID-19 pandemic peaks occurred in Iran, resulting in changes in the allocation of some hospital wards. During the initial COVID-19 peaks, several wards were allocated to patients with COVID-19. Although the hospital was not a cardiac center, the coronary care unit (CCU) was repurposed as an ICU for critically ill patients with COVID-19. However, the staffing arrangement and use of the study ICUs remained unchanged throughout the pandemic.

Sample Size and Randomization

The sample size was estimated to be 23 participants per group, considering $\Delta/\sigma = 1$, $\alpha = 0.05$, and $1 - \beta = 0.90$. Considering a potential 30% attrition rate, the final sample size was

determined to be 30 participants per group (20). Permuted block randomization was used to assign participants to the intervention and control groups. A particular column of a random numbers table was selected, and the numbers were read from top to bottom. If a number between 0 and 4 was observed, an A-B random permutation was recorded, whereas a B-A random permutation was recorded if a number between 5 and 9 was observed. A random sequence of the letters A and B, representing the intervention and control groups, was subsequently generated. Participants were recruited sequentially. First, participants in the control group entered the study, followed by recruitment of participants into the intervention group to minimize potential contamination between groups. During the control-group recruitment period, 30 participants were selected according to the predetermined randomization sequence. During the intervention-group recruitment period, participants assigned to the control group according to the same randomization sequence were excluded from consideration. The final sample consisted of 30 participants in each group (Diagram 1).

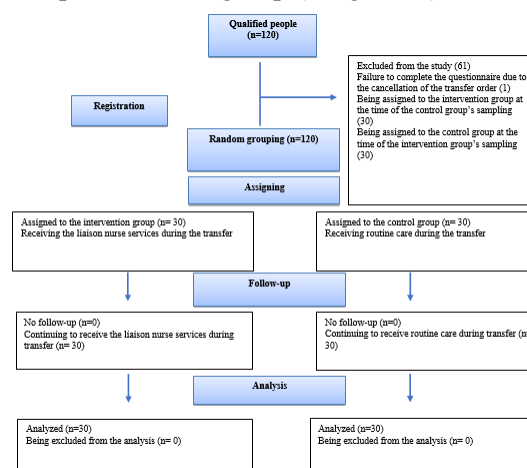


Diagram 1. Flow chart of the study

Eligibility Criteria

The inclusion criteria were willingness to participate in the study; orientation to time, place, and person; ability to complete the questionnaire; age ≥ 18 years; no history of known neurological or mental disorders, anxiety disorders, or malignancy; no previous hospitalization in an ICU; ICU hospitalization for at least 24 hours; and a score >20 on the State-Trait Anxiety Inventory (STAI).

The exclusion criteria were transfer to another hospital; hemodynamic instability during the study; occurrence of a critical condition that could not be managed by the liaison nurse; occurrence of an adverse event, including death, clinical deterioration, or need for surgery; readmission to the ICU during the study; and unwillingness to continue participation in the study.

Outcomes and Data Collection

The primary outcome was anxiety, and the secondary outcome was vital signs. Demographic and clinical data, including age group, employment status, family economic status, marital status, sex, hospitalization ward, educational level, reason for hospitalization, and time between ICU discharge and admission to the general ward, were obtained from the participants or their medical records. Vital signs and anxiety levels were assessed at two time points: immediately before transfer, after the physician ordered transfer from the ICU, and 6 hours after admission to the destination ward.

Assessment of Anxiety

The State-Trait Anxiety Inventory (STAI) was used to assess anxiety. The scale consists of 20 items rated on a 4-point Likert scale (1 = rarely to 4 = almost always), with total scores ranging

from 20 to 80. Scores of 20, 21–31, 32–42, 43–53, 54–64, 65–75, and 76–80 indicated no, mild, moderate-to-low, moderate-to-high, moderately severe, severe, and very severe anxiety, respectively (21). The validity and reliability of the scale have been confirmed in Iran (Cronbach's $\alpha = 0.945$) (21).

Measurement of Vital Signs

A calibrated ALPK2 sphygmomanometer was used to measure blood pressure according to the principles of blood pressure measurement based on American Heart Association guidelines. Respiratory rate (RR) was assessed by observing the patient's respirations and counting them for 1 minute. Heart rate (HR) was measured by palpating the radial pulse for 1 minute. Axillary temperature was measured using a mercury thermometer for 5 minutes. Arterial oxygen saturation (SpO₂) was measured using a Wellex pulse oximeter.

Control Group

Participants in the control group received routine care. Patients were informed about their transfer to the destination ward. During the transfer process, the nurse provided the nurse responsible for the patient's admission with information regarding the patient's general condition, interventions performed in the ICU, and measures required for follow-up in the destination ward. Other care activities in the destination ward were performed according to the information documented in the patient's medical records.

Intervention Group

In addition to routine care, participants in the intervention group received ICU liaison nurse services to ensure structured follow-up during the

transition from the ICU to the general ward. The liaison nurse had seven years of ICU work experience and one year of experience working in a general ward. The liaison nurse services covered four domains: patient support and care, family education and support, staff support and training, and assessment of the destination ward. Services were provided from Saturday to Thursday during the morning and evening shifts, beginning when the decision to transfer the patient was made and continuing until the end of the first shift in the general ward. The dimensions of the liaison nurse services are presented in Diagram 2.

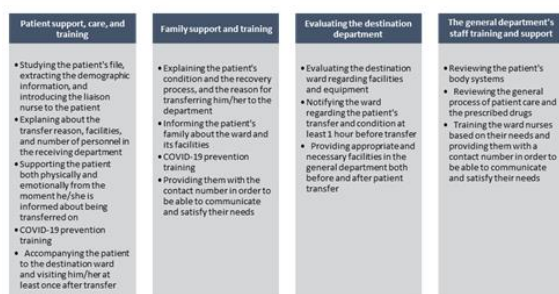


Diagram 2. Description of the services provided by the liaison nurse

Before transfer, after the patient had been informed of the transfer order, vital signs were measured and recorded by an experienced and trained nurse who was not a member of the research team. The patient then completed the anxiety scale either independently or through an interview conducted by a research assistant. The liaison nurse introduced herself/himself to the patient and provided explanations regarding the reason for transfer, its importance, and its potential consequences. Questions raised by the patient were answered, and information regarding the destination ward was provided. The liaison nurse assessed the patient's specific needs before transfer and provided training according to those

needs. The patient's family was also informed about the importance of the transfer and provided with the necessary emotional support. The liaison nurse assessed the facilities of the destination ward. The patient was transferred after the necessary arrangements had been made with the destination ward and appropriate conditions for transfer had been ensured. The general ward staff were informed about the patient's transfer at least 1 hour before the transfer.

To accompany and support the patient and family, the liaison nurse remained available at the hospital until 6 hours after the patient's admission to the destination ward. The liaison nurse's contact number was provided to the patient and the primary family caregiver. The frequency of telephone calls, bedside visits, and training sessions was tailored to the patient's clinical condition. After transfer, an essential component of the liaison nurse service was training and supporting the destination ward staff. The liaison nurse provided the destination ward nurse with information regarding the patient's previous and current condition, disease characteristics, care plan, course of illness in the ICU, current clinical status, and care needs. The nurse responsible for patient care and the liaison nurse jointly evaluated the patient's body systems and reviewed the patient's care needs. They also discussed the patient's medical and nutritional needs. The nature and extent of staff training and support were tailored to the needs of the destination ward staff. To facilitate continuity of care, the destination ward nurse was also provided with the liaison nurse's contact number.

Ethical considerations

Ethics approval was obtained from the Research Deputy of University of Medical Sciences (IR.LUMS.REC.1398.219). It was registered in

the clinical trial registration center under the code IRCT20100609004129N3. The study was conducted based on the Declaration of Helsinki. All the participants were given full explanations regarding the research, its objectives, and data confidentiality, and their written informed consent was obtained.

Statistical Analysis

Data were entered and analyzed using IBM SPSS Statistics version 21. Descriptive statistics were used to summarize the data, including mean and standard deviation (SD) for continuous variables and frequency and percentage for categorical variables. For categorical demographic and clinical variables, the chi-square test or Fisher's exact test was used, as appropriate. Within-group comparisons of continuous variables between pre-intervention (T1) and post-intervention (T2) measurements were performed using the paired-samples t-test or Wilcoxon signed-rank test, as appropriate. For vital signs, changes from T1 to T2 were calculated for each participant, and between-group differences in change scores were evaluated using analysis of covariance (ANCOVA), adjusting for baseline values. For anxiety, the Wilcoxon signed-rank test was used to compare the distribution of anxiety levels between T1 and T2 within each group.

A generalized linear model with a cumulative logit link function was used to compare post-intervention anxiety levels between the groups while adjusting for baseline anxiety levels. One-way analysis of variance (ANOVA) was used where applicable for comparison of continuous variables. All statistical tests were two-sided, and a P-value <0.05 was considered statistically significant.

Results

There were no statistically significant differences between the intervention and control groups in terms of demographic and contextual variables (Table 1). Intragroup comparisons showed no statistically significant differences in the mean values of temperature, systolic blood pressure, diastolic blood pressure, heart rate, or oxygen saturation between the pre-intervention and post-intervention measurements in either group ($P > 0.05$). In the intervention group, respiratory rate showed a statistically significant decrease from 20.233 ± 2.402 to 19.533 ± 1.978 breaths/min ($P = 0.032$); however, the between-group comparison of changes in respiratory rate was not statistically significant ($P = 0.368$). Similarly, none of the other vital signs showed a statistically significant difference in change between the intervention and control groups (all $P > 0.05$) (Table 2). The Wilcoxon signed-rank test showed no statistically significant difference in the distribution of anxiety levels between the beginning and end of the study in the control group ($Z = 0.467$, $P = 0.728$). In contrast, a statistically significant decrease in the distribution of anxiety levels was observed in the intervention group between the beginning and end of the study ($Z = 3.500$, $P < 0.001$).

The generalized linear model with a cumulative logit link function showed a statistically significant difference between the intervention and control groups in the distribution of anxiety levels at the end of the study after adjustment for baseline anxiety levels ($\chi^2 = 4.094$, $df = 1$, $P = 0.043$). The odds of being in a higher anxiety category were lower in the intervention group than in the control group ($OR = 0.312$, $P = 0.043$). The distribution of anxiety levels before and after the intervention in the two groups is presented in Table 3.

Table 1. Comparison of the intervention and control groups in terms of demographic and contextual variables

Variable	Category	Group		P-value
		Control	Intervention	
		Frequency (%)	Frequency (%)	
Age group (years)	<30	9 (30)	11 (36.7)	0.785
	≥30	21 (70)	19 (63.3)	
Employment status	Unemployed	15 (50)	16 (53.3)	>0.999
	Employed	15 (50)	14 (46.7)	
Economic status	Weak	9 (30)	6 (20)	0.492
	Moderate	17 (56.7)	17 (56.7)	
	Good	4 (13.3)	7 (23.3)	
Marital status	Single	13 (43.3)	11 (36.7)	0.792
	Married	17 (56.7)	19 (63.3)	
Gender	Female	14 (46.7)	18 (60)	0.438
	Male	16 (53.3)	12 (40)	
Ward	Medical ICU	18 (60)	16 (53.3)	0.795
	Surgical ICU	12 (40)	14 (46.7)	
Educational level	Below high school diploma	14 (46.7)	16 (53.3)	0.606
	High school diploma or higher	16 (53.3)	14 (46.7)	
Hospitalization reason	Non-poisoning	16 (53.3)	17 (56.7)	>0.999
	Poisoning	14 (46.7)	13 (43.3)	
Time between ICU discharge and admission to the general ward (hours)	<6	15 (50)	15 (50)	>0.999
	≥6	15 (50)	15 (50)	

Variable	Control			Intragrou p P-value	Intervention			Intragrou p P-value	P-value for between- group change
	T1* Mean ± SD	T2 † Mean ± SD	Chang e Mean ± SD		T1 Mean ± SD	T2 Mean ± SD	chang e Mean ± SD		
Temperatur e	37.24 ± 0.389	37.21 ± 0.387	-0.03 ± 0.359	0.651	36.927 ± 0.273	36.92 ± 0.281	-0.006 ± 0.193	0.866	0.241
SBP‡	130.6 7 ± 20.44 7	129.1 ± 21.5	-1.57 ± 13.48	0.668	123.83 3 ± 15.351	121 ± 10.78	-2.833 ± 9.71	0.121	0.225
DBP§	84 ± 14.46 8	81.5 ± 12.32 8	-2.5 ± 12.37	0.277	78.5 ± 15.928	75.83 ± 10.26 2	-2.667 ± 10.80 7	0.187	0.194
Heart rate	92.6 ± 19.15 2	93.1 ± 18.84 7	0.5 ± 9.645	0.778	84.433 ± 9.394	83.1 ± 9.481	-1.333 ± 4.155	0.089	0.137
Respiratory Rate	20.73 3 ± 4.913	20.3 ± 4.07	-0.433 ± 2.542	0.358	20.233 ± 2.402	19.53 ± 1.978 3	-0.7 ± 1.705	0.032	0.368
SpO ₂	93.33 3 ± 5.175	93.93 3 ± 4.283	0.6 ± 3.058	0.291	97.233 ± 0.626	97.1 ± 1.348	-0.133 ± 1.57	0.645	0.317

*Pre-intervention † Post-intervention ‡ Systolic Blood Pressure § Diastolic Blood Pressure

Table 2. Comparison of vital signs between the control and intervention groups

Discussion

According to the findings, ICU liaison nurse services during the COVID-19 pandemic reduced patients' anxiety levels during transfer. This finding is consistent with that of Jodaki et al. (2017), who found that liaison nurse services decreased patients' anxiety levels during the transfer process (18). It should be noted that the study population in the aforementioned study consisted of patients transferred from the cardiac surgery ICU. Moreover, this finding is consistent with that of Noroozi et al. (2019), who also found that the presence of a liaison nurse resulted in decreased anxiety levels among patients after transfer; however, their study was conducted during the admission process in the CCU ((19). However, the findings of the current study are not consistent with those of previous research. In the study by Chaboyer et al. (2007), liaison nurse services did not significantly affect patients' anxiety (5). It should be noted that, in that study, the effectiveness of liaison nurse services was not

assessed before patient transfer, and no comparison was made after transfer, which may have affected the results.

According to the research findings, no significant changes were observed in vital sign parameters following the provision of liaison nurse services during the COVID-19 pandemic. These results are consistent with those of previous studies (16, 22). in which the effect of liaison nurse services on the physiological indicators of patients transferred from the ICU was not confirmed. However, in the study by Zakeri Moghaddam et al. (2016), the results indicated a positive effect of liaison nurse services on reducing vital signs (23). Furthermore, Noroozi et al. (2019) used liaison nurse services during the admission process in the CCU. These services had positive effects on some vital sign parameters, including systolic blood pressure, diastolic blood pressure, pulse rate, and respiratory rate (19). It should be noted that the stressors associated with the ICU and CCU environments are undoubtedly different, which may affect the findings.

Levels of the variable anxiety		Control		Intervention	
		Frequency	Percent	Frequency	Percent
Pre-intervention anxiety	No anxiety	0	0.0	0	0.0
	Mild	1	3.3	2	6.7
	Moderate to low	8	26.7	7	23.3
	Moderate to high	11	36.7	9	30
	Moderately severe	10	33.3	10	33.3
	Severe	0	0	0	0
Post-intervention anxiety	Very severe	0	0	2	6.7
	No anxiety	0	0	0	0
	Mild	2	6.7	3	10
	Moderate to low	10	33.3	12	40
	Moderate to high	10	33.3	8	26.7
	Moderately severe	5	16.7	6	20
	Severe	3	10	0	0
	Very severe	0	0	1	3.3

Table 3. Anxiety levels of patients before and after the intervention

To explain these findings, patient transfer can be considered in terms of three categories:

psychological, physical, and care-related responses. Patients may experience transfer anxiety, followed by physiological responses caused by sympathetic activity (24). However, according to Keyvanlu et al. (2021), several factors can affect vital signs, including the type and severity of the disease, differences in the research environment, sample size, the timing and frequency of measurements, the liaison nurse's skills and quality of performance, the quality of care provided, the timing of care during transfer, and patient characteristics (25). These factors may have influenced the results and may explain the lack of a significant effect of liaison nurse services on vital signs in the present study. In this study, liaison nurse services were not limited to the patient; other related domains were also addressed. These services began before patient transfer and continued until the end of the first shift after the patient's placement in the general ward. One of these domains was family support. Family members of patients hospitalized in the ICU usually experience stress, which intensified after the outbreak of the COVID-19 pandemic (26). During the first peak of the COVID-19 pandemic, social distancing made effective communication between patients and their families a challenge for healthcare workers, highlighting the need for more family-oriented care (27). In Iranian culture, the family is the primary support system for patients, plays a critical role in providing care after discharge from the ICU, and bears a substantial burden of care (28). Unfortunately, communication with the families of ICU patients was challenging, particularly during the COVID-19 pandemic. Certain visitation restrictions prevented families from meeting face-to-face with physicians, resulting in increased stress and insecurity among patients and their families (26).

Therefore, one strategy for reducing anxiety in patients and their families is to improve communication between nurses and patients; effective communication can reduce family members' anxiety and even shorten the length of stay in the ICU or hospital (26). The use of liaison nurse services can be helpful in this regard. By using communication and technical skills, the liaison nurse helps care for critically ill patients, supports their families and nurses, and helps reduce patients' anxiety (29). The presence of family members in the ICU is associated with improved patient outcomes.

In contrast, the absence or restricted presence of family members may lead to adverse effects, such as feelings of distress or anger (27). In this regard, the study by Mottaghi et al. (2020) showed that the provision of liaison nurse services during the COVID-19 pandemic reduced transfer anxiety among family members (11). Therefore, the use of liaison nurse services may increase satisfaction and reduce anxiety among patients and their family members during transfer. Supporting nurses and monitoring the destination ward are other domains of liaison nurse services. Patients hospitalized in the ICU require continuous and careful monitoring, and typically, each nurse cares for one patient in these units. In the ICU, nurses are a primary source of support for patients, and depriving patients and their family caregivers of this support may lead to uncertainty and increased stress (30). On the other hand, general ward nurses, who are responsible for caring for several patients, may not be able to remain at the patient's bedside as much as needed. They must also balance patients' needs with available resources, and limited resources may contribute to stress or anxiety (2).

As mentioned, the current study was conducted during the COVID-19 pandemic in an Iranian

healthcare setting. Recent evidence has investigated the impact of liaison nurse services during the pandemic on various patient- and family-related outcomes during transfer from the ICU. The results of some studies have indicated the effectiveness of these services. According to a study by Li and Yang on the implementation of a family-oriented care program by a liaison nurse during the COVID-19 pandemic, an increase in family satisfaction and a decrease in transfer anxiety were reported (31). In the study by Chen et al. (2022), the family liaison nurse improved communication between patients and their families and increased satisfaction among healthcare team members (32). It should also be noted that, during the pandemic, many ICUs adopted telecommunication methods involving liaison services to reduce the risk of COVID-19 transmission. In this regard, another study reported that following the provision of family liaison team services, family satisfaction increased (33).

With the outbreak of the COVID-19 pandemic, healthcare workers faced an unprecedented crisis. In some hospitals, the increased need for ICU beds for patients with COVID-19 led to the establishment of new ICUs. General ward staff and ICU nurses were recruited to staff these units. Due to general nurses' limited knowledge of ICU patient care (31), which posed a major challenge, the use of ICU liaison nurse services may be a suitable approach. One of the strengths of this study was the comprehensive provision of liaison nurse services to patients, families, and general ward nurses, as well as the assessment of the destination ward. However, the lack of sampling during night shifts was a limitation of the present study.

Conclusion

It should be noted that the COVID-19 pandemic was not the first pandemic worldwide, and other pandemics, such as SARS and MERS, had occurred previously. Moreover, the possibility of future crises should be considered. Different approaches should be considered given the common occurrence of transfer anxiety during patient transitions between units. The present study demonstrated that liaison nurse services were effective in reducing patients' transfer anxiety; however, no significant change in vital signs was observed after the intervention. Considering the positive role of liaison nurses in establishing effective communication with patients, families, and general ward nurses, as well as in supporting them and facilitating patient transfer from the ICU, this approach may be considered in countries such as Iran and other developing countries with similar healthcare conditions, particularly during pandemics or other healthcare crises. Moreover, the effectiveness of these services could be investigated in relation to other outcomes, such as patient satisfaction and depression.

Implications for Patient Care:

The findings suggest that integrating an ICU liaison nurse into the transition process from the ICU to the general ward may help reduce patients' transfer anxiety, particularly during healthcare crises such as the COVID-19 pandemic. Liaison nurse services can facilitate communication among patients, families, ICU staff, and general ward nurses and may improve continuity of care during patient transitions. However, because no significant effect was observed on patients' vital signs, liaison nurse services should not be considered a strategy for modifying physiological parameters. Further studies with larger samples and different

healthcare settings are warranted to determine the broader clinical benefits of this approach.

Conflict of Interest

The authors declare that they have no conflicts of interest related to this study.

Funding

The authors received no financial support or funding for the research, authorship, or publication of this article.

Ethics Statement

The authors confirm that all ethical principles of research and scientific publication, including plagiarism prevention, data integrity, and avoidance of duplicate publication, were fully observed.

Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Acknowledgments

The authors would like to express their sincere gratitude to Lorestan University of Medical Sciences for its support. The authors also sincerely thank all individuals who contributed to or assisted with the conduct of this study and the preparation of the manuscript.

Publisher's Note

The graphical abstract was prepared by the journal's editorial team using artificial intelligence-assisted design tools and was reviewed and approved by the authors prior to publication.

Reference

1. Cognet S, Coyer F. Discharge practices for the intensive care patient: a qualitative exploration in the general ward setting. *Intensive and Critical Care Nursing*. 2014;30(5): 292-300. <https://doi.org/10.1016/j.iccn.2014.04.004>.
2. Enger R, Andershed B. Nurses' experience of the transfer of ICU patients to general wards: A great responsibility and a huge challenge. *Journal of Clinical Nursing*. 2018;27(1-2): e186-e194. <https://doi.org/10.1111/jocn.13911>.
3. Choi J, Tate JA, Rogers MA, Donahoe MP, Hoffman LA. Depressive symptoms and anxiety in intensive care unit (ICU) survivors after ICU discharge. *Heart & Lung*. 2016;45(2):140-146. <https://doi.org/10.1016/j.hrtlng.2015.12.002>.
4. Brooke J, Hasan N, Slark J, Sharma P. Efficacy of information interventions in reducing transfer anxiety from a critical care setting to a general ward: a systematic review and meta-analysis. *Journal of Critical Care*. 2012;27(4):425.e9-425.e15. <https://doi.org/10.1016/j.jcrc.2011.11.004>.
5. Chaboyer W, Thalib L, Alcorn K, Foster M. The effect of an ICU liaison nurse on patients and family's anxiety prior to transfer to the ward: an intervention study. *Intensive and Critical Care Nursing*. 2007;23(6):362-369. <https://doi.org/10.1016/j.iccn.2007.04.004>.
6. Shaban M, Haj Amiry P, Mehran A, Kahrari S. Evaluation of immediate effect of foot massage on patient's vital signs in a general intensive care unit. *Hayat*. 2004;10(1):71-79. [Link](#).
7. Davidson S, Villarroel M, Harford M, Finnegan E, Jorge J, Young D, et al. Day-to-day progression of vital-sign circadian rhythms in the intensive care unit. *Critical Care*. 2021;25(1):156. <https://doi.org/10.1186/s13054-021-03576-9>.
8. Rajai N, Chooapani Abbakhsh N, Pishgoie S, Sharififar S. The effect of p6 acupressure point on physiological indexes in coronary angiography

- candidates. *Complementary Medicine Journal*. 2016;5(4):1290-1302. [Link](#).
9. Romare C, Anderberg P, Berglund JS, Skär L. Burden of care related to monitoring patient vital signs during intensive care; a descriptive retrospective database study. *Intensive and Critical Care Nursing*. 2022; 71:103213. <https://doi.org/10.1016/j.iccn.2022.103213>.
10. Kamali SH, Kamali SH, Imanipour M, Emamzadeh Ghasemi HS, Razaghi Z. Effect of Programmed Family Presence in Coronary Care Units on Patients' and Families' Anxiety. *Journal of Caring Sciences*. 2020;9(2):104-112. <https://doi.org/10.34172/jcs.2020.016>.
11. Mottaghi K, Hasanvand S, Goudarzi F, Heidarizadeh K, Ebrahimzadeh F. The role of the ICU liaison nurse services on anxiety in family caregivers of patients after ICU discharge during COVID-19 pandemic: a randomized controlled trial. *BMC nursing*. 2022 Sep 10;21(1):253. <https://doi.org/10.1186/s12912-022-01034-6>.
12. Boulton AJ, Jordan H, Adams CE, Polgarova P, TRIC Network, Morris AC, et al. Intensive care unit visiting and family communication during the COVID-19 pandemic: A UK survey. *Journal of the Intensive Care Society*. 2022;23(3):293-296. <https://doi.org/10.1177/17511437211007779>.
13. Zakerimoghadam M, Ghyasvandian S, Asayesh H, Jodaki K. Prevalence of anxiety in the process of transferring patients from cardiac surgery intensive care unit to the general ward. *Journal of Critical Care Nursing*. 2016 Aug 10;9(3). [Link](#).
14. Shakeri D, Ebadi A, Jafari I. The effect of the liaison nurse on satisfying patients transformed from the emergency department. *Journal of Critical Care Nursing*. 2020;13(3):31-39. [Link](#).
15. Hughes L, Anderton L, Taylor R. Evaluation of the family liaison officer role during the COVID-19 pandemic. *Qualitative Research in Medicine and Healthcare*. 2022;6(1):10287. <https://doi.org/10.4081/qrmh.2022.10287>.
16. Tabanejad Z, Pazokian M, Ebadi A. The effect of liaison nurse service on patient outcomes after discharging from ICU: a randomized controlled trial. *Journal of Caring Sciences*. 2016;5(3):215-222. <https://doi.org/10.15171/jcs.2016.023>.
17. Tabanejad Z, Pazokian M, Ebadi A. Examining the impact of liaison nurse role on patients' clinical outcomes after intensive care unit discharge: a clinical trial. *Journal of Critical Care Nursing*. 2015;7(4):253-258. [Link](#).
18. Jodaki K, Ghyasvandian S, Abbasi M, Kazemnejad A, Zakerimoghadam M. Effect of Liaison Nurse Service on Transfer Anxiety of Patients Transferred from the Cardiac Surgery Intensive Care Unit to the General Ward. *Nursing and Midwifery Studies*. 2017;6(1): e33478. <https://doi.org/10.5812/nms.33478>.
19. Noroozi M, Khosravi S, Hekmatpoo D. The effect of liaison nurse on patient anxiety and vital signs during cardiac care unit admission: a randomized clinical trial. *Revista Latinoamericana de Hipertension*. 2019;14(3):271-6. [Link](#).
20. Kutner MH, Nachtsheim CJ, Neter J, Li W. *Applied Linear Regression Models*. 4th ed. New York: McGraw-Hill/Irwin; 2004. [Link](#).
21. Gholami Booreng F, Kareshki H. Construction and validation of a scale of research anxiety for students. *Iranian Journal of Psychiatry and Clinical Psychology*. 2017;23(1):78-93. <https://doi.org/10.18869/nirp.ijpcp.23.1.78>.
22. Elyasi E, Khatiban M, Mohammadi Y, Shamsizadeh M. The Impact of an ICU Liaison nurse Program on Physiological Parameter and Level of Consciousness in Discharging Patients in the Intensive Care Unit: A Randomized

Clinical Trial. *Avicenna Journal of Nursing and Midwifery Care*. 2020;28(3):227-238.

<https://doi.org/10.30699/ajnmc.28.3.227>.

23. Zakerimoghadam M, Ghiasvandian SH, Jodaki K, Kazemnejad A. The effect of liaison nurse on vital signs of patient in the process of transition from cardiac surgery intensive care unite to general ward. *Cardiovascular Nursing Journal*. 2014;3(3):36-43. [Link](#).

24. Häggström M, Asplund K, Kristiansen L. How can nurses facilitate patient's transitions from intensive care: a grounded theory of nursing. *Intensive and Critical Care Nursing*. 2012;28(4):224-233.

<https://doi.org/10.1016/j.iccn.2012.01.002>.

25. Keyvanlou F, Saeid Y, Vafadar Z. The Effect of the Role of Intensive Care Units' Liaison Nurse on Patient Outcomes: A Systematic Review. *Journal of Critical Care Nursing*. 2021;14(2):6-15.

<https://doi.org/10.30491/JCCN.2021.137839>.

26. Keen A, George A, Stuck B, Snyder C, Fleck K, Azar J, et al. Nurse perceptions of a nurse family liaison implemented during the COVID-19 pandemic: a qualitative thematic analysis. *Intensive and Critical Care Nursing*. 2022; 70:103185.

<https://doi.org/10.1016/j.iccn.2021.103185>.

27. Wendlandt B, Kime M, Carson S. The impact of family visitor restrictions on healthcare workers in the ICU during the COVID-19 pandemic. *Intensive and Critical Care Nursing*. 2022; 68:103123.

<https://doi.org/10.1016/j.iccn.2021.103123>.

28. Younesi EH, Sabzi Z, Brojerdi M, Kolagari S. The experiences of family members of COVID-19 patients in Iran: a qualitative study. *Ethiopian Journal of Health Sciences*. 2021;31(6):1111-1120.

<https://doi.org/10.4314/ejhs.v31i6.6>.

29. Tabanejad Z, Pazokian M, Ebadi A. A systematic review of the liaison nurse's role on patient outcomes after intensive care unit discharge. *International Journal of Community Based Nursing and Midwifery*. 2014;2(4):202-210. [Link](#).

30. Doucette E, Sanzone L, Albahouth A, Luca WD, Santella G, Wang K. The role of technology in enhancing a family-centered approach to care: Navigating nurse-family communication in the ICU. *Canadian Journal of Critical Care Nursing*. 2019;30(3). [Link](#).

31. Li B, Yang Q. The effect of an ICU liaison nurse-led family-centered transition intervention programmed in an adult ICU. *Nursing in Critical Care*. 2022;27(6):790-798.

<https://doi.org/10.1111/nicc.12781>.

32. Truong M, Watterson JR, Burrell A, Wong P. The impact of the intensive care unit family liaison nurse role on communication during the COVID-19 pandemic: A qualitative descriptive study of healthcare professionals perspectives. *Australian Critical Care*. 2023;36(5):714-720.

<https://doi.org/10.1016/j.aucc.2022.08.010>.

33. Lopez-Soto C, Bates E, Anderson C, Saha S, Adams L, Aulakh A, et al. The role of a liaison team in ICU family communication during the COVID-19 pandemic. *Journal of Pain and Symptom Management*. 2021;62(3):e112-e119.

<https://doi.org/10.1016/j.jpainsymman.2021.04.024>.