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Examining the impact of liaison nurse role on patients' clinical outcomes after intensive care unit discharge: a clinical trial

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ABSTRACT

Aims: The liaison nurse role has been defined in many countries for improving the quality of nursing care delivery to patients who are transferred from intensive care units to general medical-surgical wards. The aim of this study was to examine the impact of ICU liaison nurse role on patients' clinical outcomes after being discharged from intensive care unit.

Methods: In this two-group controlled clinical trial, a convenience sample of 80 patients was drawn in 2014 from selected military hospitals located in Tehran. Patients were randomly allocated to either the control (40 patients) or the experimental groups (40 patients). After being transferred from intensive care unit to general wards, patients in the experimental group received care from a liaison nurse. A data sheet was used for collecting the study data. The validity of the sheet was confirmed by a panel of ten nursing faculties. The Gutmann coefficient of the scale was 0.868 which confirmed the acceptable reliability of the sheet. Study data were analyzed by using the SPSS19 and by conducting the Chi-square and independent-samples t tests.

Results: Hemodynamic and laboratory parameters in the experimental group were not significantly different from the control group (p value>0.05).

Conclusions: Conducting further studies for evaluating different aspects of liaison nurse role is recommended.

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1. Introduction

of modern and intensive clinical care has been enhanced in the last decades [1 and 2]. Innovative care delivery techniques and systems —such as 'critical care without wall', 'shifting boundaries', and 'bridging the gap'— have expanded nursing services and facilitated care delivery to high-risk and critically-ill patients who are hospitalized in general medical-surgical wards [3 and 4]. Pittard noted that maintaining the continuity of care and giving careful attention to the fluctuations of vital signs in general wards are associated with decreased readmission to intensive care units (ICU), shortened hospital stay, and reduced mortality rate [5].

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Many strategies have been developed for improving the quality of post-ICU nursing care [1 and 2]. One of these strategies is advancing ward nurses' knowledge of recovery process, critically-ill patients' ever-changing needs, and the significant effects of close hemodynamic and laboratory test monitoring on achieving successful recovery [6]. In order to achieve these aims, extending intensive care services, and enhancing ward nurses' productivity, some hospitals have defined the new role of 'ICU liaison nurse' [7]. This role was first defined in Alfred Hospital, Melbourne, Australia [8].

An ICU liaison nurse is an specialist intensive care nurse who has the necessary knowledge and skills for maintaining the continuity of care through providing intensive care to critically-ill patients who are hospitalized in or discharged from ICU [5]. The greatest potential advantage of the liaison nurse role is the expansion of intensive care knowledge and skills to the general wards of hospitals [9 and 10]. Other roles of ICU liaison nurses are establishing relationship with ward nurses, evaluating medical and nursing resources in other wards, facilitating the relationship between ICU and ward nurses, monitoring patients' conditions in general wards carefully, and detecting and managing their problems [11 and 12].

In Australia, the ICU liaison nurse role has been recognized as facilitating prompt care delivery to patients who are discharged from ICU [13]. According to Chaboyer et al. (2008), monitoring, documenting, and reporting patients' vital signs significantly contribute to successful recovery. They highlighted that the liaison nurse role is among the strategies that can pave the way for achieving these aims [14]. Currently, liaison nurse services are not provided in clinical settings in our country, Iran. This study aimed at examining the impact of ICU liaison nurse role on patients' clinical outcomes after being discharged from ICU.

2. Methods

This controlled clinical trial was conducted in 2014 on patients who were transferred from ICU to general wards of selected military hospitals located in Tehran, Iran. The sample size was calculated by using the findings of a study conducted by Chaboyer et al. (2007). Accordingly, the Altman's nomogram showed that with a power of 0.9, a sample of 75 patients was necessary. However, to compensate probable attrition, 80 patients were recruited to the study. Sampling was performed by employing the convenience sampling technique. After matching patients in terms of variables such as age, gender, and the main reason for being hospitalized in ICU, they were randomly allocated to either the control or the experimental groups. On the other hand, the inclusion criteria were having an age of 18–85 years and having no cardiac dysrhythmia, immune system disorder, leucopenia, or cancer. The exclusion criteria included developing cardiac arrest and needing cardiopulmonary resuscitation during the study, experiencing sudden changes in hemodynamic status, being transferred to other healthcare centers, and being discharged after giving voluntary consent.

An ICU liaison nurse with an ICU work experience of nine years was selected. The liaison nurse was also familiar with medical-surgical care delivery. When patients in the experimental group were transferred to general wards, the ICU liaison nurse oriented them to the general atmosphere, the care delivery system, and the facilities of the wards and informed them about the differences between ICUs and general wards. Moreover, the liaison nurse monitored and documented patients' vital signs both at the time of admission to general wards and also two times a day afterward for three subsequent days. The results of vital sign monitoring were compared with the Early Warning Score [8]. Besides, the liaison nurse evaluated patients' laboratory test results—including serum levels of sodium, potassium, creatinine, and urea—and reported any abnormal finding to the attending physician. She also provided patients in the experimental group with educations regarding breathing

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exercises, dietary regimens, permitted level of activity, and other educations based on each patient's personal needs. Patients in the control group received the routine care of the study setting from ward nurses. For preventing the potential confounding variables and measurement biases from affecting the study results, we firstly assessed the patients in the control group. After the intervention, hemodynamic and laboratory parameters were re-evaluated.

We employed a 27-item Likert-type scale for evaluating patients' satisfaction with nursing care services. The content validity of this scale was evaluated by ten nursing faculties who were specialized in the area of critical care and had a clinical work experience of at least fifteen years. Hajinezhad et al. (2007) evaluated the reliability of the scale and reported a Cronbach's alpha of 0.90 for it [16].

Data analysis was performed by using the SPSS v. 19.0. The Chi-square test and descriptive statistics measures were used for summarizing participants' demographic data. Crude Odds Ratio (COR) with a 95% confidence interval was also calculated. The distribution of the study variables was compared with the normal distribution by conducting the Kolmogrov-Smirnov test. Moreover, the independent-samples t test was performed for comparing the study groups.

Formal approval for conducting the study was obtained from the Ethics Committee of Baqiyatallah University of Medical Sciences, Tehran, Iran. The study was registered in the Iranian Registry of Clinical Trials with the registration code of IRCT201306239219N4. Participation in the study was voluntary.

3. Results

In total, 80 patients—40 ones in each group—participated in the study. The Kolmogrov-Smirnov test showed that all the study variables had a normal distribution ($p>0.05$).

Consequently, parametric statistical tests were used for data analysis. The means of patients' ages in both groups were less than 60 years (59.5±1.42). Clinical characteristics of the study participants are shown in Table 1. Most of the patients in both groups (95%) had no previous history of stroke. All patients in the experimental group and 95% of patients in the control group had experienced previous hospitalization in ICU. There were no significant differences between the study groups regarding previous history of stroke and previous hospitalization (Table 1). Moreover, the results of the independent-samples t test showed that the study groups did not significantly differ regarding hemodynamic and laboratory parameters such as mean arterial blood pressure, level of consciousness, oxygen saturation, sputum quantity, as well as serum levels of sodium, potassium, creatinine, blood urea nitrogen, and blood sugar (Table 2; $p>0.05$).

Table 1: Study participants' characteristics (shows that the study groups did not differ significantly regarding previous history of stroke, hospitalization, and ICU hospitalization)

Variable↓	Group→	Experimental N (%)	Control N (%)	Statistical test and P value
History of stroke	Yes	10 (25)	5 (12.5)	χ^2 =2.05 p= 0.1
	No	30 (75)	35 (87.5)	
History of hospitalization	Yes	31 (77.5)	27 (70)	χ^2 =0.58 p=0.4
	No	9 (22.5)	12 (30)	
History of ICU hospitalization	Yes	40 (100)	38 (95)	χ^2 =2.05 p=0.1
	No	0 (0)	2 (5)	

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Table 2: Hemodynamic and laboratory parameters in the study groups (shows that the study groups did not differ significantly regarding hemodynamic and laboratory parameters, confirming the matching of the groups)

Group→ / Variable↓	Experimental Mean (SD)	Control Mean (SD)	Statistical test and P value
Mean arterial pressure	88.3 (10.4)	88.6 (10.5)	t= 0.14; P= 0.8
O_2sa	98.7 (2.2)	98.5 (2.2)	t= 0.34; P= 0.7
GCS at ICU discharge	14 (1.92)	14.3 (1.77)	t= 0.72; P= 0.4
Sputum quantity	2 (1)	1.4 (0.40)	t= 2.54; P < 0.001
Na	136.1 (3.10)	137.3 (5.10)	t= 1.23; P= 0.2
K	4 (0.4)	3.9 (0.60)	t= 0.62; P= 0.5
BUN	21.5 (13.8)	22.9 (19.8)	t= 0.36; P= 0.7
Cr	1 (0.4)	1 (0.3)	t= 0.52; P= 0.5
FBS	128.5 (38.2)	160.7 (64.7)	t= 1.97; P= 0.2
BS	180 (34.1)	159.7 (56.1)	t= 1.17; P= 0.05

4. Discussion

Study findings revealed that the ICU liaison nurse role had no significant effect on patients' hemodynamic and laboratory parameters. The findings of previous studies on the impacts of liaison nurse role are conflicting [9, 17, and 18]. This is probably due to the fact that previous studies mainly dealt with investigating the impact of liaison nurse role on the length of hospital and ICU stays [18] and readmission to ICU before being discharged from hospital [19]. In line with the findings of the current study, Williams (2010) also found that educations and intensive care services provided by liaison nurses had no effect on ICU readmission and the length of ICU stay [18]. However, McIntyre et al. (2012) found that liaison nurse services were effective in improving the quality of care and enhancing ward nurses' care delivery knowledge and skills [20]. Athifa et al. (2011) also reported that ICU liaison nurse service was effective in improving patients' clinical conditions and hemodynamic status [21]. Elliott et al. (2014) noted that patients who are transferred from ICU to general wards are readmitted to ICUs before being discharged from hospital due to receiving ineffective care services and developing hemodynamic instability in wards. They also highlighted that liaison nurses can bridge this care delivery gap by carefully assessing patients' vital signs [10].

O'Sullivan et al. (2014) found that neonatal liaison nurses could save 66 cot days per year and reduce healthcare costs (by $31.416) through providing safe, quality, and cost-effective nursing care [22]. Elliott et al. (2014) assessed post-ICU adverse events and found that liaison nurses can enhance ward nurses' knowledge of post-ICU care and thereby decrease the rate of adverse events and ICU readmissions [23]. Doric et al. (2008) also found that through performing frequent patient visitation, monitoring vital signs and fluid and electrolyte balance, and providing patient educations in general wards, liaison nurses improved patients' capabilities and outcomes [17].

These conflicting findings can be attributed to differences in the organizational structure, care delivery and management systems, liaison nurses' job specification and clinical competence, ward nurses' attitudes towards liaison nurse role, and the length of studies. Conducting further large-scale, multi-center studies can provide stronger evidence regarding the impact of liaison nurses on patient outcomes.

Given the differences between large- and small-scale clinical settings regarding the number of hospitalized patients, the roles and the impacts

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of liaison nurses in these two types of clinical settings might be different [24]. Accordingly, in large-scale settings, liaison nurses' roles are more striking because in such settings, they can provide specialized care to greater numbers of patients [25].

This was the first study in Iran which dealt with ICU liaison nurse role. Accordingly, one of the study limitations was the unfamiliarity of the nurses and the administrators of the study setting with this role. Moreover, in this study, specialized post-ICU care was provided by only one liaison nurse. Finally, our liaison nurse was unable to provide comprehensive care because the study was conducted in a relatively short period of time.

5. Conclusions

Although studies which had been conducted in Australia and England showed the positive impacts of ICU liaison nurse role, our findings revealed that this role had no significant effect on patient outcomes. However, further studies are needed for providing adequate evidence regarding the impacts of liaison nurse role. Moreover, conducting studies on strategies for improving the quality of post-ICU care is recommended. The findings of this study provide a framework for developing and evaluating liaison nurse role in prospective studies.

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