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Elderly patients re-transferred from long-term care hospitals to emergency departments within 48 h

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Abstract

Background & objectives The increasing proportion of elderly populations has led to a rise in chronic diseases and frequent transfers between long-term care hospitals (LTCHs) and emergency departments (EDs). This study investigates the patterns of risk factors of initial-transfers and subsequent re-transfers among patients aged 65 or older. Specifically, we focus on those re-transferred from LTCHs to EDs within 48 h of discharge, often without adequate treatment.

Method This nationwide cross-sectional study used data from South Korea's National Emergency Department Information System (NEDIS) from January 1, 2017, to December 31, 2019. Patients aged 65 or older who were initially transferred from LTCHs to EDs and re-transferred within 48 h, were identified. Logistic regression was employed to analyze risk factors associated with re-transfers.

Results 140,282 elderly patients were identified as having been transferred from LTCHs to EDs. Of these, 38,180 patients received emergency care in the EDs and were discharged back to LTCHs. Among them, 679 patients were returned to LTCHs after receiving acute treatment but revisited the EDs within 48 h. Hospital ward admission rates were higher for re-transferred patients (71.3%) compared to initial transfers (42.1%, $p < 0.0001$). Risk factors for re-transfer included male, nighttime admissions, and longer ED stays (> 6 h). Tertiary hospitals showed higher re-transfer rates to other facilities (13.1%) than general hospitals (2.9%).

Conclusion This study reveals that many health outcomes worsen upon re-transfer compared to the initial-transfer. These findings underscore the need for a coordinated healthcare system that ensures elderly patients from long-term care facilities are initially sent to appropriate hospitals during the initial transfer, which could mitigate repeated ED visits and ensure timely care.

Keywords Elderly patients, Emergency departments, Long-term care hospital, Initial transfer, Re-transfer, Chronic disease management

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Introduction

Global advancements in medical science have significantly extended life expectancy. However, alongside this positive trend, declining birth rates have sharply increased the proportion of elderly individuals. In Korea, the population aged 65 and older, which was below 10% in 2007, exceeded 15% in 2020 and is projected to reach super-aged status by 2025 [1, 2]. This demographic shift has led to an increased incidence and duration of chronic diseases, underscoring the importance of effective disease management for this age group [3, 4].

To address these challenges, the South Korean government expanded the network of Long-Term Care Hospitals (LTCHs) and introduced long-term care insurance for the elderly in 2008. This policy aimed to alleviate the financial burden associated with managing chronic diseases, which are prevalent among older populations [1, 5]. Consequently, the number of LTCHs covered by insurance grew, as did the frequency of elderly patients being transferred from LTCHs to Emergency Departments (EDs) [6, 7].

Although Korean LTCHs are primarily designed to provide long-term care, they often lack the resources needed to manage severe emergencies that require comprehensive medical intervention. As a result, patients with worsening symptoms are frequently transferred to EDs for acute care [8]. However, challenges such as overcrowding, bed shortages, and logistical constraints—especially in larger hospitals—often hinder the provision of definitive treatment. Consequently, many of these patients are re-transferred to other healthcare facilities or back to LTCHs, contributing to a high rate of transfers [7, 9].

Additionally, due to varying caregiver circumstances, patients who return to LTCHs against medical advice after emergency care often face higher Intensive Care Unit (ICU) admission rates upon revisiting EDs [10]. Such inefficient or inappropriate transfers lead to repeated ED visits, exacerbating ED overcrowding [11, 12]. Despite the importance of these issues, no national studies have thoroughly explored the characteristics of patients transferred from EDs to LTCHs who later revisit EDs or how these patterns impact emergency healthcare services in South Korea.

This study aims to investigate the patterns of risk factors of initial and subsequent ED visits among patients aged 65 and older who are re-transferred from LTCHs to EDs without receiving adequate treatment.

Materials and methods

Study Design and Data Collection

This study adopts a cross-sectional design and utilizes the National Emergency Department Information System (NEDIS), an extensive database that captures most ED visits across South Korea. Further details on the NEDIS system have been elaborated on in previous studies [2].

In South Korea, long-term care facilities primarily consist of nursing homes, governed by the Long-Term Care Insurance Act, and LTCHs, which fall under the Medical Service Act. These LTCHs have less stringent designation criteria compared to general medical institutions and mainly focus on providing medical care and functional rehabilitation to elderly patients at risk of disease or disability. For additional information on these institutions, readers are referred to previously published works [2].

Study population

This study was conducted among elderly patients aged 65 years or older who visited nationwide EDs from LTCHs between January 1, 2017, and December 31, 2019, in South Korea. The study focused on patients who were transferred to an LTCH after receiving only emergency care in the ED and were subsequently re-transferred from the LTCH to either the same ED or another ED within 48 h. Re-transfers to the ED were identified using probability matching based on the patient's sex, age (birth date), zip code, initial ED discharge, transfer date, transfer time, and the unique hospital codes of both the LTCH and ED. Patients with incomplete information were excluded. To avoid potential confounding effects of the COVID-19 pandemic on ED utilization, data beyond 2020 were not included.

Study outcomes and variables

The study aimed to identify epidemiological variables influencing patients' initial and subsequent visits to the ED. Variables included demographic characteristics, patient visit confirmation data, and emergency medical result information. Diseases associated with initial transfers and re-transfers were classified using ED discharge codes based on the International Classification of Diseases, 10th revision (ICD-10). The diseases at the time of transferred and re-transferred, the presence of severe diseases and, the number of comorbid diseases were determined based on either discharge disease codes or accompanying disease codes.

Term definition

This study employs the following terms:

- Initial transferred patients: Elderly patients aged 65 years or older who were transferred from an LTCH to a Level 1 or Level 2 ED during the study period.
- Short-term re-transferred patients: Patients whose 48-hour re-transfer period began at the time of discharge from the ED back to the LTCH, after completing emergency care.

- Not re-transferred patients: Patients who were discharged back to the LTCH and did not revisit the ED within 48 h.

According to NEDIS guidelines, the acute phase for registered emergency patients is defined as the 48-hour period from the onset of symptoms to their arrival at the ED [13]. In this study, a re-transfer refers to a patient returning to either the initial ED or another ED within 48 h of discharge, indicating that the emergency was not resolved upon initial discharge.

Statistical analysis

Descriptive analyses were performed on both initially transferred patients and those re-transferred from LTCHs. Chi-square tests were used to verify characteristic differences between initial transfers and short-term re-transfers. For patients discharged back to LTCHs after receiving emergency care, logistic regression was conducted to identify risk factors associated with re-transfer compared to who did not re-transfer. All statistical analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC, USA). A p-value of less than 0.05 was considered statistically significant.

Results

Between January 1, 2017, and December 31, 2019, a total of 140,282 elderly patients were transferred from LTCHs to EDs. Of these, 38,180 patients received emergency care in the EDs and were discharged back to LTCHs. Among them, 679 patients were re-transferred to EDs within 48 h after being discharged to LTCHs following acute care (Table 1). By gender (0.067, $p<0.001$, respectively) and age (0.303, $p<0.001$, respectively) differences

Table 1 Demographic characteristics of elderly patients: initial transferred patients, not re-transferred patients and short-term re-transferred patients

Characteristics	Initial transferred patients		Not re-transferred patients		Short-term re-transferred patients		P1 value	P2 value
	Cases	(%)	Cases	(%)	Cases	(%)		
Total	**140,282**		**37,501**		**679**			
Sex							0.067	< 0.001
Male	58,781	(41.9)	15,517	(41.4)	361	(53.2)		
Female	81,501	(58.1)	21,984	(58.6)	318	(46.8)		
Age groups							0.303	< 0.001
65–74	30,518	(21.8)	8,042	(21.4)	197	(29.0)		
75–84	71,328	(50.8)	19,221	(51.3)	280	(41.2)		
≥ 85	38,436	(27.4)	10,238	(27.3)	202	(29.7)		
Region							< 0.001	< 0.001
Metropolitan	68,984	(49.2)	19,339	(51.6)	387	(57.0)		
Urban	71,298	(50.8)	18,162	(48.4)	292	(43.0)		
Korean triage and acuity scale							< 0.001	< 0.001
Level 1,2	31,033	(22.1)	8,442	(22.5)	119	(17.5)		
Level 3	76,686	(54.7)	22,724	(60.6)	223	(32.8)		
Level 4,5	32,540	(23.2)	6,329	(16.9)	161	(23.7)		
Admission time							0.002	< 0.001
Weekdays (8 to 18)	86,540	(61.7)	23,462	(62.6)	353	(52.0)		
Weekdays (18 to 8)	22,737	(16.2)	6,092	(16.2)	159	(23.4)		
Holydays (8 to 18)	20,725	(14.8)	5,321	(14.2)	110	(16.2)		
Holydays (18 to 8)	10,280	(7.3)	2,626	(7.0)	57	(8.4)		
ED results							-	< 0.001
Discharge	36,285	(25.9)			75	(11.0)		
Transfer hospital	4,218	(3.0)			35	(5.2)		
Transfer LTCH	38,180	(27.2)	37,501	(100.0)	75	(11.0)		
Admission	59,066	(42.1)			484	(71.3)		
Death	2,533	(1.8)			10	(1.5)		
ED LOS (mean, std; (Hr))	9.1 ± 13.0		9.7 ± 13.3		5.6 ± 9.9		< 0.001	< 0.001

Korean triage and acuity scale; Level 1,2: Critical, Level 3: Emergency, Level 4,5: Urgent; LTCH: Long-term care hospital; ED LOS: Length of stay in emergency department

ED Results: Disposition after treatment in the emergency department

P1 value: P value of between initial transferred patients and not re-transferred patients

P2 value: P value of between not re-transferred patients and short-term re-transferred patients

Table 2 The odds ratio of short-term re-transferred patients and not re-transferred patients

Characteristics	Unadjusted	Adjusted
	OR (95% CI)	OR (95% CI)
Sex		
Female	1	1
Male	1.61 (1.38–1.87)	1.50 (1.27–1.76)
Age groups		
65–74	1	1
75–84	0.60 (0.50–0.72)	0.65 (0.54–0.79)
≥ 85	0.81 (0.66–0.98)	0.88 (0.71–1.08)
Region		
Metropolitan	1	1
Urban	0.67 (0.57–0.78)	0.70 (0.59–0.82)
Korean triage and acuity scale		
Level 1,2	1	1
Level 3	0.69 (0.58–0.82)	0.74 (0.61–0.90)
Level 4,5	0.98 (0.77–1.23)	1.09 (0.84–1.41)
Admission time		
Weekdays (8 to18)	1	1
Weekdays (18 to 8)	1.73 (1.43–2.10)	1.29 (1.05–1.58)
Holydays (8 to 18)	1.32 (1.06–1.65)	1.18 (0.94–1.49)
Holydays (18 to 8)	1.85 (1.43–2.40)	1.35 (1.02–1.78)
ED LOS		
4 h ≥ time	1	1
4 h < time ≤ 6 h	0.89 (0.70–1.13)	0.92 (0.71–1.17)
6 h < time ≤ 12 h	1.31 (1.06–1.63)	1.37 (1.09–1.71)
12 h < time	2.23 (1.83–2.71)	2.13 (1.73–2.62)
Season		
Winter	1	1
Spring	0.98 (0.79–1.22)	0.99 (0.79–1.23)
Summer	0.97 (0.79–1.20)	1.00 (0.81–1.25)
Autumn	0.89 (0.72–1.11)	1.10 (0.89–1.38)

The number of unknowns was excluded from each variable, but included in logistic regression calculations

Odds ratio over 1, the odds of short-term re-transferred patients are greater than the odds of not re-transferred patients

Korean triage and acuity scale; Level 1,2: Critical, Level 3: Emergency, Level 4,5: Urgent; ED LOS: Length of stay in emergency department; Winter: December-February; Spring: March-May; Summer: June-August; Autumn: September-November

were observed only between short-term re-transferred patients and not re-transferred patients. Additionally, region ($p<0.0001$), Korean triage and acuity scale (KTAS) level ($p<0.0001$), and admission time ($p=0.002$, $p<0.0001$, respectively) showed differences among all three groups.

In terms of emergency care outcomes, 71.3% of re-transferred patients were admitted to hospital wards, a significantly higher than the 42.1% admission rate among initial transfers ($p<0.0001$). The average length of stay in the ED for short-term re-transferred patients was shorter then initial transferred patients and not re-transferred patients (initial transfer: 9.1 h, not re-transfer: 9.7 h, re-transfer: 5.6 h) ($p<0.001$).

Risk factors for Re-transfer

Logistic regression identified several risk factors for re-transfer within 48 h compared to those not re-transfer (Table 2). These risk factors included male sex (OR 1.50, CI 1.27–1.76), transfer from metropolitan hospitals (OR 1.29, CI 1.05–1.58), high acuity (KTAS level 1 or 2) (OR 0.74, CI 0.61–0.90), nighttime admissions (Weekdays (18 to 8): OR 1.29, CI 1.05–1.58), Holydays (18 to 8): OR 1.35, CI 1.02–1.78), and length of stay in EDs exceeding 6 h (6 h < time ≤ 12 h: OR 1.29, CI 1.05–1.58, 12 h < time: OR 1.29, CI 1.05–1.58).

Hospital transfer patterns

Of the initially transferred patients, 65.1% were sent to tertiary hospital EDs, whereas 72.3% of short-term re-transferred patients went to general hospitals (Table 3). Only 27.6% of those initially transferred to tertiary hospital EDs were re-transferred to the same level of facilities; the remainder were transferred to general or other hospital EDs.

The hospital ward admission rate among short-term re-transferred patients was highest in general hospitals (80.4%) compared to tertiary hospitals (37.9%) ($p<0.001$). Discharge or transfer back to LTCHs was more frequent among short-term re-transferred patients at tertiary hospitals (46.2%) compared to general hospitals (15.9%) (Table 4).

Characteristics of chief complaints and major disease

Short-term re-transferred patients were more likely to present with severe diseases (59.6%) than those initially transferred (43.6%). The Charlson's Comorbidity Index was also significantly higher in short-term re-transferred

Table 3 Comparison of hospital emergency department levels between initial transfer and re-transfer visits from LTCH

Level of initial transferred hospital	Level of re-transferred hospitals								*P*-value
	Total		Level 1		Level 2		Level 3		
	Cases (%)		Cases (%)		Cases (%)		Cases (%)		
Total	679	(100.0)	145	(21.4)	491	(72.3)	43	(6.3)	< 0.0001
Level 1	442	(65.1)	122	(27.6)	289	(65.4)	31	(7.0)	
Level 2	237	(34.9)	23	(9.7)	202	(85.2)	12	(5.1)	

LTCH: long-term care hospital; Level1: Tertiary Hospitals; Level2: General Hospitals; Level3: Hospitals

Table 4 Distribution of emergency medical outcomes for elderly patients re-transferred from LTCH to the emergency department within 48 h

Level of re-transferred hospitals	ED Results										*P*-value
	total		Discharge or Transfer to LTCH		Hospital ward admission		Transfer to other hospital		Death		
	Cases (%)		Cases (%)		Cases (%)		Cases (%)		Cases (%)		
Total	679	(100.0)	150	(22.1)	484	(71.3)	35	(5.2)	10	(1.5)	< 0.0001
Level1	145	(21.4)	67	(46.2)	55	(37.9)	19	(13.1)	4	(2.8)	
Level2	491	(72.3)	78	(15.9)	395	(80.4)	14	(2.9)	4	(0.8)	
Level3	43	(6.3)	5	(11.6)	34	(79.1)	2	(4.7)	2	(4.7)	

LTCH: long-term care hospital; Level1: Tertiary Hospitals; Level2: General Hospitals; Level3: Hospitals

ED Results: Disposition after treatment in the emergency department

Table 5 Distribution of severe disease companion index at the time of initial transfer and re-transfer of elderly patients from LTCH to the emergency department within 48 h

Number of Severe Disease	Initial transferred		Re-transferred		*P*-value
	Cases %		Cases %		
Number of severe diseases					< 0.0001
0	383	56.4	274	40.4	
1	250	36.8	268	39.5	
2	34	5.0	92	13.5	
More 3	12	1.8	45	6.6	
Charlson's comorbidity index (mean, std; (unit))	0.9 ± 1.3		1.4 ± 1.6		< 0.0001

LTCH: long-term care hospital

patients compared to initial transfers (re-transferred: 1.4, initial transferred: 0.9, P-value: <0.0001) (Table 5).

The most common chief complaints in both groups were dyspnea, fever, and abdominal pain. Among the major diseases, gastrointestinal malignancy (10.3%), influenza and pneumonia (7.8%), and cerebrovascular disease (6.6%) were common in short-term re-transfer patients. In contrast, lung diseases due to external agents (15.6%), other diseases of the urinary system (6.6%), general symptoms and signs (6.2%), and other diseases of the digestive system (5.9%) were frequent in the without re-transfer group (Table 6).

Figure 1 highlights the concordance between chief complaints (A) and major diseases (B) at the time of initial transfer and re-transfer in short-term re-transferred patients.

- Dyspnea was concordant in more than 50% of the short-term retransfer patients, and bloody stool in more than 40%, while the concordance rate for mental status changes or hypotension was 0 (Fig. 1 A).
- Among major diseases, cerebrovascular diseases (I60-I69) and malignant neoplasms of digestive (C15-C26) and respiratory organs (C30-C39) remained

Table 6 Comparison of chief complaints and major diseases of elderly patients: not re-transferred patients and short-term re-transferred patients

Rank	Not re-transferred patients		Short-term re-transferred patients	
		Case (%)		Case (%)
Chief Complaints(Top 10)				
1	Dyspnea	7,326 (19.5%)	Dyspnea	127 (18.7%)
2	Fever	6,539 (17.4%)	Fever	64 (9.4%)
3	Abdominal pain	1,678 (4.5%)	General weakness	44 (6.5%)
4	General weakness	1,478 (3.9%)	Abdominal pain	39 (5.7%)
5	Decreased mentality	1,052 (2.8%)	Mental status changes	27 (4.0%)
6	Hematochezia	1,008 (2.7%)	Altered mentality	18 (2.7%)
7	Hypotension	900 (2.4%)	Hematochezia	14 (2.1%)
8	Melena	803 (2.1%)	Hypotension	13 (1.9%)
9	Coxalgia	658 (1.8%)	Hematuria	11 (1.6%)
10	Bloody vomiting	564 (1.5%)	Back pain	11 (1.6%)
Major Diseases(Top 10)				
1	J09-J18	5,838 (15.6%)	C15-C26	70 (10.3%)
2	N30-N39	2,481 (6.6%)	J09-J18	53 (7.8%)
3	R50-R69	2,319 (6.2%)	I60-I69	45 (6.6%)
4	K90-K93	2,214 (5.9%)	R50-R69	39 (5.7%)
5	I60-I69	1,822 (4.9%)	C30-C39	35 (5.2%)
6	N17-N19	1,501 (4.0%)	R00-R09	30 (4.4%)
7	R00-R09	1,378 (3.7%)	N30-N39	23 (3.4%)
8	I30-I52	1,240 (3.3%)	K90-K93	23 (3.4%)
9	J60-J70	1,222 (3.3%)	I30-I52	23 (3.4%)
10	K80-K87	1,166 (3.1%)	N17-N19	21 (3.1%)

Major diseases were ascertained using disease code (International Classification of Diseases, 10th revision). C15-C26: Malignant neoplasms of digestive organs, C30-C39: Malignant neoplasms of respiratory and intrathoracic organs, I30-I52: Other forms of heart disease, I60-I69: Cerebrovascular diseases, J09-J18: Influenza and pneumonia, J60-J70: Lung diseases due to external agents, K80-K87: Disorders of gallbladder, biliary tract and pancreas, K90-K93: Other diseases of the digestive system, N17-N19: Renal failure, N30-N39: Other diseases of the urinary system, R00-R09: Symptoms and signs involving the circulatory and respiratory systems, R50-R69: General symptoms and signs, S70-S79: Injuries to the hip and thigh

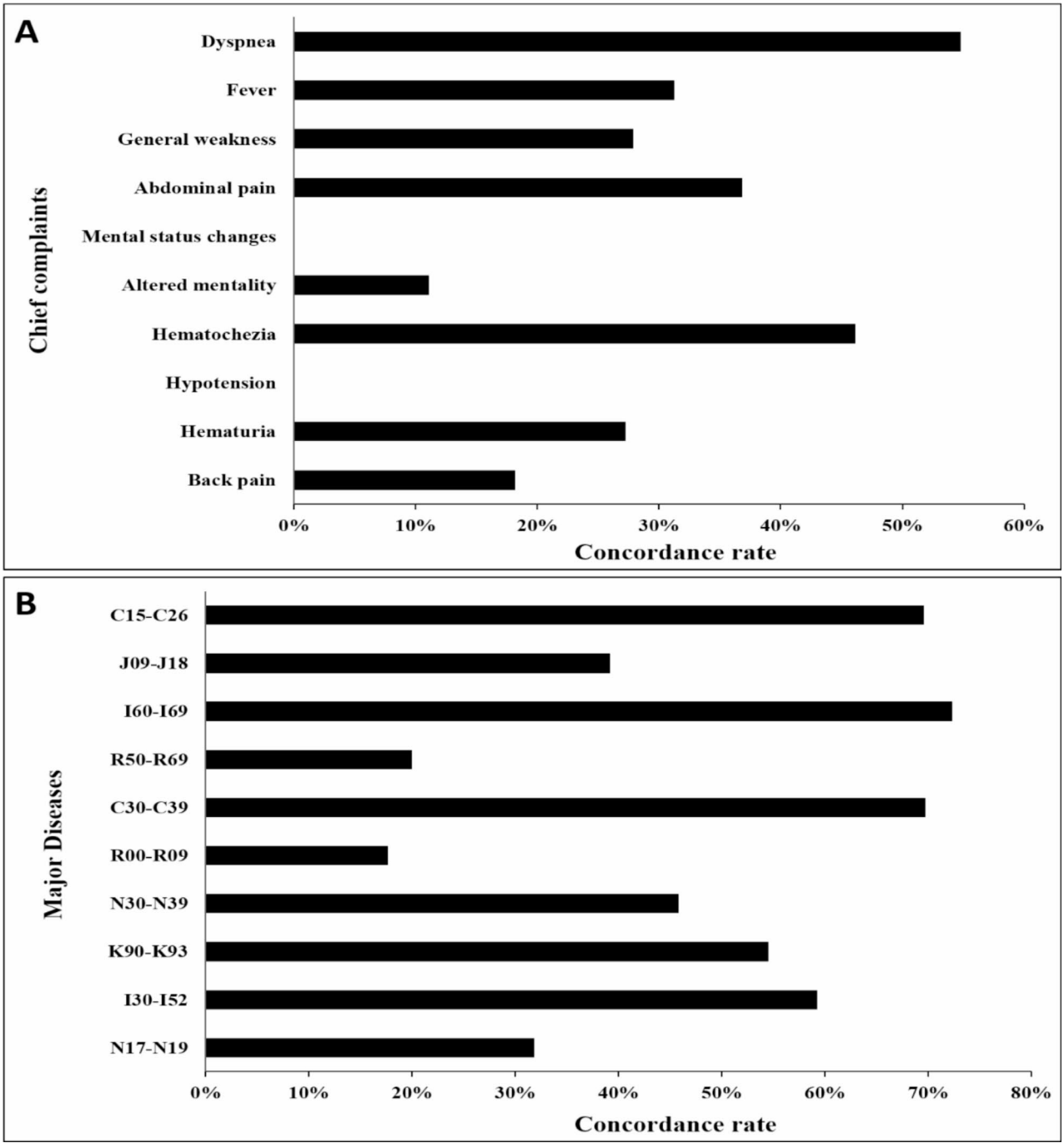

Fig. 1 Concordance rate of chief complaints (**A**) and major diseases (**B**) at the time of initial transfer and re-transfer in elderly patients re-transferred from long-term care hospitals to the emergency department within 48 h. *Only the top 10 chief complaints and major diseases at the time of initial transfer were presented in the graph for patients re-transferred from the long-term care hospitals. (B) Major diseases were ascertained using diseases code (International Classification of Diseases, 10th revision).C15-C26: Malignant neoplasms of digestive organs, J09-J18: Influenza and pneumonia, I60-I69: Cerebrovascular diseases, R50-R69: General symptoms and signs, C30-C39: Malignant neoplasms of respiratory and intrathoracic organs, R00-R09: Symptoms and signs involving the circulatory and respiratory systems, N30-N39: Other diseases of the urinary system, K90-K93: Other diseases of the digestive system, I30-I52: Other forms of heart disease, N17-N19: Renal failure

consistent between initial transfers and re-transfers, with over 70% concordance. However, general symptoms and signs (R00-R09, R50-R69) were less frequent at re-transfer (below 20%) (Fig. 1 B).

Discussion

Patients who arrive at the ED should ideally receive immediate and definitive care. However, various factors often lead to these patients being transferred to

other hospitals without comprehensive treatment, which may increase the risk of mortality. Compared to those receiving complete care at their initial healthcare facility, transferred patients—particularly elderly, severely ill individuals, or those transferred from other facilities—face a heightened risk of mortality when transferred again to another hospital [9, 13–16].

Our study found that the average time between the initial ED visit and re-transfer back to an LTCH was approximately 9.97 h (SD: 12.5). This swift return suggests that many patients did not receive adequate care during their initial ED visit. Such situations can exacerbate patients' conditions, increase the likelihood of ED revisits or readmissions, extend hospital stays, and raise healthcare costs [10, 17, 18].

Tertiary hospitals are often the preferred choice for patients seeking advanced medical care. However, these facilities frequently become overcrowded, leading to early discharges after only acute treatment [19]. In our study, 65.1% of initially transferred patients went to tertiary hospitals, only 21.4% returned to these hospitals upon re-transfer. Instead, most short-term re-transferred patients opted for general hospitals, likely due to overcrowding and bed shortages in tertiary hospitals. The high demand for tertiary care often results in transfers without definitive treatment. Consequently, when symptoms worsen, patients are more likely to seek care at general hospitals, which may offer more stable inpatient care and fewer delays [6].

This pattern is reflected in our findings: short-term re-transferred patients admitted to general hospitals had a higher ward admission rate (80.4%) compared to those admitted to tertiary hospitals (37.9%). Furthermore, the re-transfer rate from tertiary hospitals to other facilities was higher (13.1%) than from general hospitals (2.9%), suggesting that tertiary hospitals may discharge patients sooner due to capacity constraints.

Our study's comparison of chief complaints and major diseases revealed no significant difference in chief complaints between short-term re-transferred patients and those who were not re-transfer. Both groups frequently presented with symptoms such as dyspnea, fever, abdominal pain, and general weakness. However, differences were noted in the underlying diseases. While not re-transferred patients predominantly suffered from influenza and pneumonia, urinary tract diseases, and general symptoms, short-term re-transferred patients more often had digestive malignancies, cerebrovascular diseases, and severe respiratory conditions.

Thus, the persistence of symptoms and conditions such as dyspnea and abdominal pain in short-term re-transferred patients suggests that initial ED treatment may have been insufficient. Short-term re-transfer patients often present with complex conditions—such as malignant neoplasms or cardio-cerebrovascular diseases—that require more intensive care. This was evident from the concordance between initial and re-transfer complaints and diagnoses, with dyspnea and malignant neoplasms frequently recurring in re-transferred cases.

Elderly patients from LTCHs often have multiple chronic conditions. Re-transfers may result from symptom recurrence or inadequate management of these chronic illnesses [20, 21]. However, diagnosing such patients can be challenging due to factors like hypotension or mental confusion, which complicate diagnostic methods like history-taking and blood tests. Overcrowded hospitals often exacerbate these difficulties by discharging patients as soon as symptoms improve without sufficient observation or definitive treatment [22].

This cycle of insufficient treatment and re-transfer is prevalent in Korea, where many patients do not receive final treatment during their initial ED visit. They leave the ED only to return shortly afterward, repeating the same process. This inefficiency leads to avoidable hospitalizations, strains emergency resources, causes staff fatigue, and worsens patient outcomes [23–25].

To address these issues, a well-coordinated patient transfer system between LTCHs and hospitals is essential. Rather than transferring patients to larger, overcrowded hospitals, it would be more effective to direct them to facilities capable of providing definitive care during the initial transfer. Improved pre-transfer communication and information exchange regarding patient conditions could enhance care quality and safety [22]. Additionally, regular training for LTCH staff is crucial for the early detection and management of deteriorating patient conditions, allowing timely intervention within LTCHs and reducing unnecessary transfers [23].

Our study has several limitations. First, it focused only on patients transferred to tertiary and general hospitals, as these institutions provided the necessary variables for analysis.

However, the exclusion of patients transferred to other types of hospitals is unlikely to significantly impact the findings given their small numbers. Second, the study did not account for prior ED visits before the study period. Since the focus was on re-transfers within 48 h, this limitation likely has minimal effect on the results. Finally, the descriptive nature of the study limits the ability to establish causality. Future research, potentially employing case-control studies, will be needed to confirm these findings and explore causality. Despite these limitations, our study holds significance as it addresses the underexplored issue of short-term re-transfers to EDs among patients in LTCHs.

Conclusion

Our study found that elderly patients re-transferred to LTCHs shortly after initial care in the ED were often re-transferred back to the ED with the similar symptoms and diseases. Many of these re-transferred patients required hospitalization, indicating that the initial ED care may have been insufficient. Based on these findings, future efforts should focus on establishing a more coordinated care pathway for emergency patients across relevant institutions. Such coordination could help reduce unnecessary transfers and re-transfers caused by inadequate medical care during initial transfers from LTCHs, ultimately improving patient outcomes.

Abbreviations

LTCH	Long-Term Care Hospital
ED	Emergency Department
NEDIS	National Emergency Department Information System
KTAS	Korean Triage and Acuity Scale
LOS	Length of stay in emergency department

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Author contributions

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No.

Data availability

The NEDIS databaseis available to use by researchers via the National Emergency Medical Center(http://dw.nemc.or.kr/nemcMonitoring/mainmgr/Main.do).

Declarations

Ethics approval and consent to participate

This study utilized secondary healthcare data, it was exempt from review by the Institutional Review Board of the National Medical Center (IRB No. NMC-2024-01-015). Therefore, it was not necessary to obtain informed consent from patients.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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