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Emergency transfers of home care patients in Fukui Prefecture, Japan

A retrospective observational study

Makoto Kosaka, Hirotomo Miyatake, MD, Satoshi Arita, MS, Hidehisa Masunaga, MS, Akihiko Ozaki, MD, Yoshitaka Nishikawa, MD, Hiroyuki Beniya, MD*

Abstract

Little is known about how emergency transfers take place and what outcomes they lead to in the patients who receive home care in Japan. We aimed to assess outcomes of emergency transfers and factors associated with such outcomes in the Japanese home care setting.

A retrospective analysis of patient data from a home care clinic in Fukui, Japan, included all patients who experienced emergency transfers which were reported to the clinic during 2018 and 2019. We collected data on patients' sociodemographic and clinical characteristics, as well as the transfer process and its outcome, using patient charts and other administrative records. We first analyzed the overall outcome and then evaluated whether transfer outcomes would differ according to by whom and from where the emergency medical service (EMS) was called, by univariate and multivariate analyses.

We considered 63 patients who experienced emergency transfers during the study period. Of the total, 10 (15.9%) returned to their residences without being admitted or being dead on arrival. Although only 2.6% (1/39) of patients whose transfers were determined by health care professionals (HCPs) returned home without being admitted, a direct return was observed for 37.5% (9/24) of patients whose transfer was determined by those other than HCPs (odds ratio of direct return to residences 22.80, 95% confidence interval 2.65–195.87). There was no other variable which was significantly associated with the outcomes after the emergency transfers, although all the patients who have no available caregivers resulted in hospitalization.

In this preliminary analysis in the Japanese home care setting, only a small proportion of patients returned to their residences without being admitted following emergency transfers. Patients whose EMS transfer was requested by an HCP usually resulted in an admission to the clinic, whereas transfers requested by non-HCPs frequently did not.

Abbreviations: DOA = dead on arrival, EMS = Emergency Medical Service, HCPs = Healthcare Professionals, ICD-11th = International Statistical Classification of Disease and Related Health Problems 11th version, NCD = noncommunicable diseases, USA = United States of America.

Keywords: assessment, Emergency Medical Services, home care services

1. Introduction

Globally, the number of people with noncommunicable diseases (NCDs) has been dramatically increasing for several decades.[1] For example, the number of healthy life years lost due to disability from NCD causes increased 61.1% between 1990 and 2017.[2] Consequently, it has been increasingly important to appropriately manage patients with those conditions. This has resulted in a priority shift away from acute care in hospitals to chronic care in community settings. Accordingly, home care, a type of medical care in which health care professionals (HCPs) visit and attend to patients' in their residences, has become increasingly important.[3] For example, in the United States of America (USA), 4.2 million patients were reported to have received home care in 2015.[4] This trend is also apparent in Japan, a Super-Aged society where the elderly population (those aged 65 years or older) accounts for 28.4% of the total population.[5] In the Japanese setting, a team of HCPs, physicians, and other HCPs (eg nurses, rehabilitation staff, and social workers) visit patients' residences.[6] According to Ministry of Health, Labour and Welfare, 180,000 patients reportedly received home care in Japan in 2017.[7]

Japanese home care covers a variety of patients, including those whose conditions are stable but gradually worsening or those with life-limiting illnesses, such as advanced stage cancer.[6]

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Orange Home-care Clinic, Fukui City, Fukui Prefecture, Japan.

** Correspondence: Hiroyuki Beniya, Orange Home-care Clinic, Fukui City, Fukui 910-0018, Japan (e-mail: beniya@orangeclinic.jp).*

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Naturally, these patients may require emergency transfers but it is to be noted that a considerable proportion of these transfers may not be urgent or essential, placing extra burden on both patients and HCPs.[8] For example, previous research in the United States found that more than half of emergency department visits by nursing home residents eventually resulted in a return to home without admission to hospital.[9] However, information is lacking regarding the proportion of emergency transfers which do not necessitate hospital admission among patients receiving home care in Japan. Furthermore, little is known regarding whether the person actually requesting the EMS transfer has any effect on the relatively immediate outcome of the transfer.

The purposes of this study were to clarify processes of emergency transfers and their outcomes, and to assess factors associated with such outcomes in the Japanese home care setting.

2. Methods

2.1. Study setting and participants

This is a retrospective, observational study of patient records maintained at Orange Home Care Clinic, a clinic specializing in home care in Fukui Prefecture, Japan. This clinic regularly provides home care to approximately 300 patients annually, of whom around 80 patients usually pass away. We considered all the recorded home care cases who experienced emergency transfers from January 1, 2018 to December 31, 2019. We only considered initial transfers of the patients for the sake of simplicity in the main analyses but we considered all of the transfers in the sensitivity analyses. In Japan, when people call for the EMS, each local fire station sends an ambulance which generally transfers patients to appropriate medical institutions depending on the patients' medical situation, excluding cases in which patients are obviously dead or refuse to be transferred.

With regard to the information on emergency transfers and simple outcomes, in case of dead on arrival (DOA), the clinic is usually informed by the emergency facility which has dealt with the patient of the patients' death, usually within a few days. In a case of hospitalization, the clinic usually receives a referral letter when patients are discharged. When patients return home the same day as an emergency transfer, the clinic receives a transfer report from the facility involved or from care managers or visiting nurses who are in charge of the patient.

2.2. Data collection

We collected data on age, sex, primary disease, the level of the need for care or support, and availability of caregivers. In addition, we abstracted data on reasons for emergency transfers, individuals who called for the EMS transfer, the circumstances in which the EMS transfer was requested, the institutions which received the transfer and the outcome of each transfer. Primary diseases were categorized basically based on International Statistical Classification of Disease and Related Health Problems 11th version (ICD-11th). Japan's 7-level categorization of the need for care or support is a unique and official mechanism used by the nation's municipalities.[10] This indicator stipulates the level of long-term care required by an individual patient and is used to assess how much they can use public long-term care, with a scale from support level 1 or 2 plus a care level from 1 to 5, based on physical disabilities and the extent of dementia.[10] Availability of caregivers indicates whether the patient has a caregiver or not; "Informal caregiver available" means that the patient lives with family members or friends, "Formal caregiver available" means that the patient lives in facilities for people in need of care, and "No caregiver available" designates that the patient lives on their own. Reasons for emergency transfers were categorized based on the primary symptoms of the patients. We combined data on the individuals who called the EMS and the circumstances in which the EMS was contacted and created a categorization as follows: by physicians while visiting patients; physicians following telephone or video contact; HCPs other than physicians during patient visits; and those other than HCPs. Outcomes were classified into hospitalization, death, or return home without admission.

2.3. Data analysis

First, to evaluate decisions to call for emergency transfers, we examined a proportion of the patients who returned home without admission following the transfers. Second, to clarify the influential factors determining a return home without admission, we analyzed relationships between individuals and home care settings which influenced the use of the EMS and the outcomes. For the same purpose, using a univariate logistic regression model for the outcome following the transfers, we calculated association between the outcome and variates. We considered as covariates the following factors: age, sex, availability of caregivers, whether certified for the level of the need for care or support or not, whether the transfer was decided by an HCP or not, and which institution received the transfer. Furthermore, with regard to reasons of transfers and primary diseases, their associations with outcomes following the transfers were investigated. Lastly, we also descriptively analyzed the data on the characteristics of patients who returned home the same day following an EMS transfer. All the analyses were performed using Stata/MP 15.0 (Stata Corporation, College Station, TX) and Microsoft Excel Version 16.16.8 (Microsoft Corporation, Redmond, WA).

2.4. Ethical Review

This research adheres to the Ethical Guidelines for Medical and Health Research Involving Human Subjects and meets Japan's local legal requirements. The study approval was granted by the Ethics Committee of the Medical Governance Research Institute on March 6, 2019 (MG2018-18-20200604).

3. Results

In total, 76 emergency transfers took place involving 63 patients during the study period. Of the patients, 11 experienced more than a single transfer. Among them, 9 (14.3%) experienced 2 transfers, whereas 2 (3.2%) patients experienced 3 transfers during the study period. Supplementary Material 1, http://links.lww.com/MD/E542 shows the characteristics of patients who experienced multiple transfers.

Table 1 shows the characteristics of the patients who experienced emergency transfers. Of the 63 included, 35 (55.6%) were male, and the median age was 81 years, with the oldest and youngest case being 100 years' old and <1-year old, respectively. As for the Japanese scale of the level of need for care or support, 18 (28.6%) cases were not certified, and 10 (15.9%) were assigned the highest level. Of the total, 44 (69.8%) lived with an informal caregiver. Respiratory distress symptoms

Table 1

Sociodemographic of patients who utilized the emergency medical services (N = 63).

	No. (%)
Sex	
Male	35 (55.6)
Female	28 (44.4)
Age	
≥100	2 (3.2)
90–99	14 (22.2)
80–89	18 (28.6)
70–79	9 (14.3)
60–69	7 (11.1)
50–59	2 (3.2)
40–49	2 (3.2)
30–39	2 (3.2)
20–29	0 (0.0)
10–19	1 (1.6)
0–9	6 (9.5)
Level of the need for care and support	
Not certified	18 (28.6)
Support level ½	2 (3.2)
Care level 1	3 (4.8)
Care level 2	7 (11.1)
Care level 3	7 (11.1)
Care level 4	16 (25.4)
Care level 5	10 (15.9)
Availability of caregivers	
Informal caregiver available	44 (69.8)
Formal caregiver available	10 (15.9)
No caregiver available	9 (14.3)
Primary disease	
Mental, behavioural or neurodevelopmental disorders	16 (25.4)
Diseases of the nervous system	13 (20.6)
Neoplasms	12 (19.0)
Endocrine, nutritional or metabolic diseases	5 (7.9)
Injury, poisoning or certain other consequences of external causes	5 (7.9)
Diseases of the circulatory system	4 (6.3)
Diseases of the genitourinary system	3 (4.8)
Others	5 (7.9)
Reasons of transportation	
Respiratory symptom	26 (41.3)
Trauma (fall)	11 (17.5)
Disturbance of consciousness	5 (7.9)
Spasm	3 (4.7)
Abdominal pain	3 (4.7)
Seizure	3 (4.7)
Pain	2 (3.2)
Weakness	2 (3.2)
Paralysis	2 (3.2)
Cardiopulmonary arrest	1 (1.6)
Others	5 (7.9)
Institutions which received transfers	
Fukui Prefectural Hospital	25 (39.7)
Fukui-ken Saiseikai Hospital	10 (15.9)
Japanese Red Cross Fukui Hospital	9 (14.3)
Fukui General Hospital	9 (14.3)
University of Fukui Hospital	6 (9.5)
Takefu Memorial Hospital	1 (1.6)
Otaki Hospital	1 (1.6)
Tannan Regional Medical Center	1 (1.6)
Fukui Aiiku Hospital	1 (1.6)

were the most frequent reason for emergency transfers (26, 41.3%), followed by trauma (from a fall) (11, 17.5%), and disturbance of consciousness (5, 7.9%). Fukui Prefectural Hospital received emergency transfers most frequently (25, 39.7%), followed by Fukui-ken Saiseikai Hospital (10, 15.9%) and Japanese Red Cross Fukui Hospital (9, 14.3%) and Fukui General Hospital (9, 14.3%).

Table 2 displays outcomes following the emergency transfers, according to the individuals who called the EMS and settings where the EMS was called. Of all the transfers, 48 (76.2%) were hospitalized, 5 (7.9%) were DOA and 10 (15.9%) directly returned home after receiving medical attention.

Among the 20 patients for whom physicians called the EMS during visits, none (0%) returned home following the transfer, all of them were either hospitalized or DOA. Of 17 transfers where physicians took a decision over the phone, only 1 (5.9%) returned home and the remaining 16 (94.1%) were hospitalized or DOA. Among 2 transfers decided by nonphysician HCPs visiting patients, none (0%) returned home both being hospitalized. In contrast, of 24 patients for whom those other than HCPs called the EMS without first contacting HCPs, 9 (37.5%) returned home, the remaining 15 (62.5%) being hospitalized. Supplementary Material 2, http://links.lww.com/MD/E543 shows the analysis covering all 76 emergency transfers, and there was no meaningful difference with the main analysis, meaning that our criteria to exclude the second and third transfers during the study period appear not to have affected the study findings.

Table 3 shows the findings of the logistic regression analysis for direct returns to residences. When individuals other than HCPs called the EMS, the patients were significantly more likely to directly return home compared with when HCPs called the EMS (odds ratio 22.80, 95% confidence interval [CI] 2.65–195.87, $P = .004$). The remaining factors were not statistically associated with the outcomes following the transfers. However, all the cases in which the patients lived alone resulted in hospitalization. Supplementary Material 3, http://links.lww.com/MD/E544 shows the detailed relationships between reasons for transfers and outcomes following transfers. Of the 11 patients who were transferred due to a trauma, 4 (36.4%) returned home following medical attention. Supplementary Material 4, http://links.lww.com/MD/E545 shows the relationships between primary diseases and outcomes following the transfers. For 4 (40.0%) of 10 patients who returned home the same day as the emergency transfer, their primary disease was cancer. We did not perform multivariate analysis because there were no factors which were considered significant in univariate analysis other than by whom the transfers were decided.

Table 4 shows the characteristics of patients who directly returned to their residences following emergency transfers. Among 10 patients, 4 (40.0%) were male and the median age was 84. With respect to primary disease, 6 (60.0%) had cranial nerve diseases. Of the patients, 7 (70.0%) were assigned Care level 4 or 5 in the Japanese grading system for care or support, and formal or informal caregivers were available in all the patients. Reasons for transfer significantly differed between patients, such as fall and respiratory distress, but 9 (90.0%) of these transfers were decided by individuals other than HCPs.

4. Discussion

In our assessment of patients regularly receiving home care, <20% returned home following their emergency transfer, the majority either being admitted to hospital or being DOA. It can

Table 2

Outcomes following emergency transfers according to individuals deciding to call the EMS.

	Physicians (during visits) (N = 20), N (%)	Physicians (on the phone) (N = 17), N (%)	HCPs other than physicians (during visits) (N = 2), N (%)	Those other than HCPs (N = 24), N (%)	Total (N = 63), N (%)
Hospitalized	18 (90.0)	13 (76.5)	2 (100.0)	15 (62.5)	48 (76.2)
Dead on arrival	2 (10.0)	3 (17.6)	0 (0.0)	0 (0.0)	5 (7.9)
Returned home	0 (0.0)	1 (5.9)	0 (0.0)	9 (37.5)	10 (15.9)

EMS = emergency medical service, HCP = healthcare professional.

therefore be concluded most of the decisions for EMS transfers were justified.

Previously, Cornillon et al[11] investigated the emergency transfers of terminally ill patients in France and suggested that only of 52 emergency department visits, 23 (44.2%) contacted HCPs before calling for emergency transfers and that 66% of the cases were admitted or DOA. Although our findings cannot be directly compared with those of the previous study due to the difference of study settings, judgments calling for EMS transfers were generally justified in our study.

The most significant finding was that the decisions to call the EMS by HCPs were particularly justifiable. Of the 10 patients who directly returned home on the same day as the emergency transfer, HCPs were involved in only a single case. Moreover, patients whose transfers were decided by those other than HCPs were more likely to return home the same day than patients whose transfers were decided by HCPs. These findings mean that the HCPs involved in the home care did a proper assessment of patients based on the severity and urgency of their symptoms. In addition, our results are consistent with a previous study by Trahan et al[12] which suggested that a visit by a physician or nurse practitioner may potentially prevent unnecessary transfers of nursing home residents.

Nevertheless, it is also worth mentioning that caregivers or patients themselves made a largely reasonable judgment regarding the need for the EMS involvement. Indeed, 15 (62.5%) out of 24 cases resulted in hospitalization. A previous study by Pulst et al clarified that the transfer decision by family members from nursing homes to hospitals is affected by an assessment of the quality of nursing-home care and hospital-care and the perceived severity of the clinical situation.[13] Taking the previous findings into consideration, this result suggests that patients and their caregivers largely provided an accurate assessment of the patient's need for emergency medical attention and highly evaluated the home care provided by the clinic.

Nonetheless, rather than leaving the patients or caregivers to call the EMS at their discretion, it may be better for clinic staff to instruct patients and caregivers to always consult HCPs before calling for EMS transfers, since a proper medical assessment of the patient is beyond the capability of most patients and caregivers, unless they have had medical training. In this respect, it is important to establish frameworks in which the patients and caregivers can easily consult HCPs. For this purpose, further studies should be made to detect potential communication barriers. In the meantime, to reduce burdens on HCPs, telemedicine should be more widely implemented, since our study suggests that on-site home care decision making may not be essential with respect to accurate assessment of the need for emergency medical attention.

Although no factors other than who makes the decision to call the EMS were statistically significant on the outcomes in the univariate regression analyses, it should be noted that all patients who lived alone were hospitalized. It is generally considered that availability of caregivers is critical, specifically in cases where the conditions are not stable.[14] In this respect, it may be reasonable to speculate that physicians in an emergency department decide on the necessity for hospitalization not only by the severity of the medical situation but also with regard to the patients' social background, such as caregiver availability.

Table 3

Unadjusted odds ratios of patients returned home related to sociodemographic of patients, individuals who decided to use the emergency medical services and institutions which received the transfer.

	Unadjusted odds ratio (95% confidence interval)
Age	
≤59	1.00
60–79	2.77 (0.25–30.38)
≥80	2.57 (0.28–23.73)
Sex	
Male	1.00
Female	2.11 (0.53–8.39)
Availability of caregivers	
Formal/informal caregiver available	1.00
No caregiver available	Not Available
Level of the need for care or support	
Not certified	1.00
Certified	4.25 (0.50–36.30)
Individuals who decided the emergency medical service use	
HCPs	1.00
Those other than HCPs	22.80 (2.65–195.87)**
Institutions which received the transfer	
Fukui Prefectural Hospital	1.00
Other than Fukui Prefectural Hospital	0.98 (0.25–3.91)

*$P < .05$.
**$P < .01$.
***$P < .001$.
HCP = health care professional.
The result of logistic analysis of the availability of caregivers was not available because all the patients who have no available caregivers resulted in hospitalization.

5. Limitations

The study has several limitations. First, a generalizability of the findings is limited by the small sample size collected at a single clinic specializing in home care. Future studies should seek to confirm whether our findings are applicable to other clinics in Japan, and to other settings where different home care systems are implemented. Second, we may have not included transfers which were decided by those other than HCPs and which resulted in a return home without our clinic being informed. Third, our records only included the data on the outcome which were

Table 4

Characteristics of patients who returned to their residences following an emergency transfer (N = 10).

Sex	Age	Primary disease	Level of the need for care or support	Availability of caregivers	Reason for transfer	Individual deciding EMS use
Female	88	Lumber compression fracture	Care level 4	Formal caregiver available	Suspected fracture	Physician (on the phone)
Female	64	Glioblastoma	Care level 4	Informal caregiver available	Seizure	Those other than HCPs
Female	69	Chronic renal failure	Care level 5	Informal caregiver available	Hypoglycemia	Those other than HCPs
Female	82	Alzheimer disease	Care level 2	Formal caregiver available	Fall	Those other than HCPs
Female	88	Parkinson disease	Care level 4	Informal caregiver available	Fall, hemorrhage	Those other than HCPs
Female	91	Alzheimer disease	Care level 4	Informal caregiver available	Suspected intracranial lesion	Those other than HCPs
Male	17	Neurofibromatosis type 1	Not certified	Informal caregiver available	Excess phlegm	Those other than HCPs
Male	78	Lung cancer	Care level 4	Informal caregiver available	Respiratory distress	Those other than HCPs
Male	86	Atherothrombotic cerebral infarction	Care level 4	Informal caregiver available	Pneumonia, loss of consciousness	Those other than HCPs
Male	90	Prostate cancer	Care level 3	Informal caregiver available	Fall	Those other than HCPs

EMS = emergency medical service, HCP = health care professional.

reported by the institutions where patients were transferred or by visiting nurses or care managers. Therefore, the appropriateness of each hospitalization or the quality of medical interventions during transfers could not be evaluated. Further studies are required to utilize the detailed patient records at the institutions where the patients were transferred, as well as an evaluation of other factors, such as the abilities of the EMS teams which were in charge of each transfer and any complications associated with the transfers.

6. Conclusion

Emergency transfers in a home care setting were generally justified, particularly when HCPs made the decision to call the EMS. Judgments by non-HCP caregivers are appropriate to some extent but it would be better to require that HCPs be contacted before an emergency transfer is requested in order to reduce unnecessary work for the EMS.

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Author contributions

Kosaka M analyzed the data and wrote the manuscript. All authors conceptualized and designed the study and revised the paper.

Conceptualization: Makoto Kosaka, Hirotomo Miyatake, Satoshi Arita, Hidehisa Masunaga, Akihiko Ozaki, Yoshitaka Nishikawa, Hiroyuki Beniya.

Investigation: Makoto Kosaka, Satoshi Arita.

Project administration: Hirotomo Miyatake, Akihiko Ozaki, Hiroyuki Beniya.

Writing – original draft: Makoto Kosaka.

Writing – review & editing: Makoto Kosaka, Hirotomo Miyatake, Satoshi Arita, Hidehisa Masunaga, Akihiko Ozaki, Yoshitaka Nishikawa, Hiroyuki Beniya.

Corrections

In the original publication, the number for the ethical review appeared incorrectly in the original publication as "MG2018-18-0306" and has now been corrected to "MG2018-18-20200604."

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