Emergency Department Usage by Community Step-Down Facilities – Patterns and Recommendations

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Abstract

***Objective**: This study examines the interface between institutional community step-down facilities (CSDFs) and acute hospital's Emergency Department (ED). It also provides a comprehensive description of the usage of an ED's services by CSDFs in its vicinity. **Materials and Methods**: This is a prospective 12-week observational study conducted in the Accident and Emergency Department of Changi General Hospital in Singapore. All patients from CSDFs transferred to the department were eligible for the study. Hospital records were used to extract relevant clinical data after admission for the length of stay and final discharge diagnosis. **Results**: There was a total of 201 referrals to the ED over the 3-month period. The age of the patients ranged from 32 to 107 years, with a median of 83 years. Ninety-two patients (45.8%) were male residents. There were more referrals from CSDF on weekdays than on weekends. In particular, the number of referrals from CSDFs on Mondays were significantly higher (*P* <0.05, Poisson regression) than other days of the week. Fifty-one per cent of the ED visits occurred during regular working hours. Eighty-two per cent of the transfers were admitted. The main complaint was shortness of breath with cough, followed by fever and falls. The most common investigation ordered was chest radiograph, followed by electrocardiogram and other radiographs. The most common treatment procedure in the ED was placement of an intravenous line. For those admitted residents, average length of hospital stay was 8.27 ± 8.19 days (median, 5 days). Seventeen patients (10.3%) died within 3 days of admission, while 31 patients (18.8%) stayed less than 3 days. The admitted residents had an average turnaround time (from time of registration to time of leaving the ED and proceeding to ward) of 97.94 minutes. For patients discharged from the ED, the average turnaround time (time from registration to time of leaving the ED) was 177 minutes. **Conclusion**: Residents from CSDFs are transferred to the ED for a variety of medical reasons. The most appropriate role of the ED in evaluation of residents of CSDFs is not yet clearly defined. There is increasing need to streamline processes in acute hospitals to cope with an increasing ageing population and to ensure that quality care is delivered to the institutionalised sick.*

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Introduction

It is projected that elderly persons will make up 18.4% of Singapore's population by the year 2030.[1] Currently, there are 5189 residents staying in nursing homes. As the population ages, the number of institutionalised elderly will rise. To address the issue of rising healthcare costs, we have to ask ourselves where the elderly institutionalised should best be managed in. Nursing home residents are generally frail with multiple illnesses and functional impairment. When these patients become ill, they may be transferred to an Emergency Department (ED), sometimes with little documentation of their past medical history or current symptoms. Evaluation of these patients is a complex process, as history-taking is usually difficult because of pre-existing cognitive deficit. Many patients seem to move frequently between acute and long-term care settings.[2] In Singapore, the ED is the main portal of entry for the institutionalised residents into an acute hospital. The use of ED services by community step-down facilities (CSDFs) residents has not been widely studied locally. This study aims to describe one community's ED use by the residents of CSDFs in its vicinity.

Materials and Methods

Patients of CSDFs transferred to the ED of Changi General Hospital (CGH) over a 12-week period from 19 February 2001 to 13 May 2001 were studied. A standard form was devised. This was completed by the residents or

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emergency physicians on duty. The data captured included:

1. Patient's demographics (age, sex and race).
2. Time and date of transfer to the ED and time of discharge or admission.
3. Source of referral (names of individual and nursing home/CSDFs).
4. Date of referral, day of the week and whether it is a weekend or a weekday.
5. Investigations ordered in the ED.
6. Intervention in the ED such as intravenous line and nasogastric tube adjustment.
7. Length of stay, if admitted.
8. Admission/discharge diagnosis [International Classification of Diseases (ICD) codes].
9. Turnaround or processing time for those who are discharged from the ED back to the CSDF and those admitted to the wards.

The chief complaint leading to the referral was transcribed directly from the CSDF's referral letter (if one was written) and these were further grouped into convenient diagnostic clusters. If no referral letter was found, the chief complaint was obtained by asking the patient or the accompanying nurse. Statistical analyses were carried out using SPSS version 10.0 and SAS version 8.0 (for Poisson regression). The χ^2 test of homogeneity was used to determine associations between categorical variables and parametric tests for quantitative variables when normal assumptions were satisfied. Otherwise, non-parametric techniques were used. Statistical significance is achieved with $P < 0.05$.

Results

A total of 201 referrals were made during the study period. CGH is a secondary hospital which receives referrals from CSDFs located in the eastern part of the island. It is staffed from 8 am to 11 pm with at least 1 consultant ED physician and 5 resident doctors; and from 11 pm to 8 am with 3 to 4 resident doctors. The doctors in the ED saw an average of 320 patients a day, 12.8% of which were above 65 years old. Referrals to the ED per organisation are reflected in Table I. There are several differences among the CSDFs. Some are voluntary welfare organisations whose operations are heavily subsidised by the government. Others are privately run centres where the fees are borne entirely by the residents or their care providers.

The demographics of the residents are shown in Table II.

There was little variation in referral frequency by calendar month. It was noted that there were more visits on weekdays than on weekends. In particular, the number of referrals from CSDFs on Monday was significantly higher ($P < 0.05$, Poisson regression) than any other days of the week

TABLE I: NUMBER OF REFERRALS TO CGH ED PER CSDF

Facility	Type of CSDF	Bed capacity	Total no. of patients (occupancy rate)		No. of Category 3 and 4 patients	No. of referrals (% muster)		Under the umbrella of	Set-up
1	VWO	210	184	(87.6%)	182	39	(21.2%)	MOH	Up to 80% of residents are categories 3 and 4 patients requiring both medical and nursing care. The VWOs have either volunteer doctors or contracted GPs who see patients on a regular basis of once or twice a week.
2	VWO	339	261	(77.0%)	206	32	(12.3%)		
3	VWO	154	154	(100%)	127	19	(12.3%)		
4	VWO	120	119	(99.2%)	61	7	(5.9%)		
5	VWO	70	58	(82.9%)	41	3	(5.2%)		
6	VWO	180	176	(97.8%)	114	3	(1.7%)		
7	VWO	102	102	(100%)	-	9	(8.8%)		
8	COM	136	67	(49.3%)	40	16	(23.9%)	Self-funded	Most private homes buy services from GPs who either do rounds regularly or provide *ad hoc* services, whenever required.
9	COM	41	38	(92.7%)	21	6	(15.8%)		
10	COM	118	103	(87.3%)	56	10	(9.7%)		
11	COM	110	79	(71.8%)	41	7	(8.9%)		
12	COM	200	135	(67.5%)	21	3	(2.2%)		
13	COM	50	50	(100%)	30	2	(4%)		
14	COM	190	175	(92.1%)	141	7	(4%)		
15*	COM	110	109	(99.1%)	45	1	(0.9%)		
16	COM	90	83	(92.2%)	-	9	(10.8%)		
17	SH	186	165	(88.7%)	NA	7	(4.2%)	MCDS	Patients are well and do not require medical and nursing care.
18	SH	52	50	(96.2%)	NA	4	(8.0%)		
19	SH	150	85	(56.7%)	NA	9	(10.6%)		

COM: commercial home; CSDF: community step-down facility; ED: emergency department; GPs: general practitioners; MCDS: Ministry of Community, Development & Sports; MOH: Ministry of Health; NA: not applicable; SH: sheltered home; VWO: voluntary welfare organisation

* This home is not in the zone of CGH.

TABLE II: DEMOGRAPHICS OF RESIDENTS

	Male	Female	Total
Number	(n = 92)	(n = 109)	(n = 201)
Age (mean ± SD)	76.7 ± 12.8	82.6 ± 11.6	79.9 ± 12.5
Minimum	40	32	32
Maximum	96	107	107
Median	79	84	83
Race			
Chinese	79 (85.9%)	106 (97.2%)	185 (92%)
Malay	5 (5.4%)	1 (0.9%)	6 (3%)
Indian	6 (6.5%)	0 (0%)	6 (3%)
Others	2 (2.2%)	2 (1.8%)	4 (2%)

SD: standard deviation

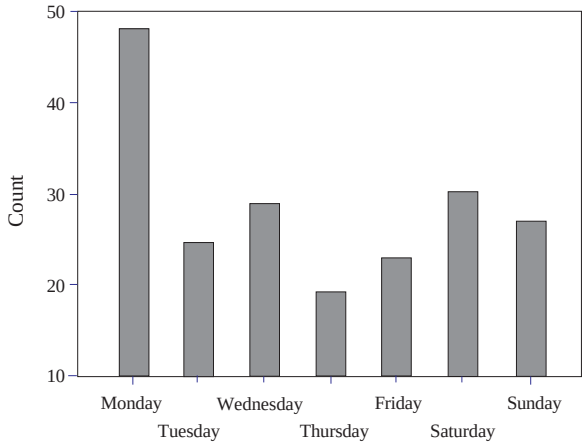

Fig. 1. Day of the week seen.

(Fig. 1). Fifty-one per cent [95% confidence interval (CI), 43.6% to 57.9%] of the ED visits occurred during regular working hours (8 am to 5 pm, Monday through Friday). The average number of referrals a day was 2.3 patients. There was no increase in frequency of referrals before, on or after a public holiday.

Eighty-two per cent (95% CI, 76.1% to 87.1%) of the cases referred were admitted (n = 165). Twenty-two patients (10.9%) were discharged with follow-up appointments and 11 (5.5%) were discharged without any follow-up. Two patients died in the ED and 1 patient was transferred to another restructured hospital (Institute of Mental Health).

Table III lists the referral sources. The rate of admission did not vary with regards to who wrote the referral, that is, whether referral by a doctor or nurse.

Table IV shows the chief complaint of the patients. There were 8 residents who arrived in the ED without any referral letter. The most common complaint was shortness of breath and chesty cough, followed by fever and falls/trauma.

TABLE III: SOURCE OF REFERRAL

Referral source	No. (n = 201)	%	Cumulative %
Nursing home (NH) nursing officer	11	5.5	5.5
Registered nurse of NH	155	77.1	82.6
Resident doctor	23	11.4	94.0
Other doctors	3	1.5	95.5
Upon relatives' request	1	0.5	96.0
No referral letter	8	4.0	100.0

TABLE IV: REASONS FOR REFERRAL TO THE EMERGENCY DEPARTMENT

Complaint	%
Shortness of breath with/without cough	18.9
Fever	12.9
Trauma/falls (from bed, in toilet: witnessed/unwitnessed)	10
Limb swelling/pain	7
Bleeding gastrointestinal tract (including coffee ground vomitus, haemetemesis, bleeding per rectal, passing black stools)	4
Altered mental status	4
Abdominal pain	3
Vomitting	3
Lacerations	3
Hypotension	<2
High blood pressure/uncontrolled hypertension	<2
Fits	<2
Urinary symptoms (pain on passing urine/haematuria, etc)	<2
Pulled out urinary catheter	<2
Collapse	1
Others (not feeding well, refusal to eat, looks weak, abscess for incision and drainage, chest pain, heart failure)	<2*

* for each complaint

The most common investigation ordered was chest radiograph (48.2%). This was followed by electrocardiogram (31.3%) and other radiographs, which include skull, pelvic and hip radiographs (23.4%). Blood cultures were done for 3 patients and 1 patient had a computed tomography (CT) scan of the head ordered.

Table V shows the procedures/interventions performed in the ED. The most common treatment provided to nursing home residents in the ED was placement of an intravenous line. Two patients arrived in the ED in a collapsed state, for which active resuscitation was performed.

For admitted residents, the average length of hospital stay was 8.27 ± 8.19 days (median, 5 days; range, 0 to 54 days). Seventeen patients (10.3%; 95% CI, 6% to 16%) died within 3 days of admission. Twenty (12.1%; 95% CI, 7.6% to 18.1%) died 3 days after admission. Thirty-one (18.8%; 95% CI, 13.1% to 25.6%) stayed less than 3 days. When an audit of the admission diagnosis versus the

TABLE V: INTERVENTION/PROCEDURES PERFORMED ON PATIENTS IN THE EMERGENCY DEPARTMENT (PRIOR TO ADMISSION/DISCHARGE)

Intervention/Procedure	No. of patients
None	52
Observation (head chart, pupil size, etc)	12
Catheterisation	9
Adjust nasogatsric tube	0
Intravenous drip	64
Toilet and suture	10
Blood culture and intravenous antibiotics	6
Pain relief (parental injection)	4
Nebulisation	15
Oxygen supplements	26
Dressing	5
Manipulation and reduction of fractures	7
Fleet enema	2
Treatment for heart failure (intravenous frusemide, morphine, nitroglycerin)	7
Fluid resuscitation	6
Intubation and cardiopulmonary resuscitation	2
Chest tube insertion	1

discharge diagnosis was performed for those who stayed less than 3 days, it was found that 28 of 31 cases correlated with the admission diagnosis. Six patients (19.4%) were admitted for falls/trauma-related reasons. Other diagnoses in this subgroup of patients included bleeding of the gastrointestinal tract, pneumonia, urinary tract infection and cerebrovascular disease.

There was 1 re-attendance out of the 34 patients discharged by the ED during the study period. This patient was discharged with a diagnosis of gastritis and returned the next day in a collapsed state. Resuscitation was unsuccessful and she was pronounced a coroner's case.

The average turnaround time (from time of registration to time of leaving the ED and proceeding to ward) for admitted patients was 97.94 minutes. This included time spent on consultation, preliminary investigations and waiting for an available bed in the ward. All patients were seen within 15 minutes of arrival in the ED. For patients who were discharged from the ED, the average processing time (time from registration to time of leaving the ED) was 177 minutes.

Discussion

This study was not specifically designed to assess whether ED visits by nursing home residents were medically appropriate.[2-4] However, certain observations suggest that some of the referrals may not have been necessary if evaluation had occurred in the CSDFs. In this study, it is not possible to comment on the number of referrals per organisation, although it was noted that for certain CSDFs the number of referrals appear to be relatively high. This has to be seen in the context of the number of category 3 and 4 patients in each home. Category 3 and 4 patients refer to residents who are non-ambulatory. Certain private nursing homes would only receive residents who are ambulant and can perform some activities of daily living.

The elderly *per se* represents a substantial and increasing proportion of patients attending the ED.[5] CGH's ED charges a flat rate of S$65 per visit, which is inclusive of consultation, investigations, treatment and observation. The low (and heavily subsidised) cost may be the reason many CSDFs choose to send their patients for further assessment, although the complaints may not sound urgent. Other reasons for the usage of ED services by CSDFs are postulated to be as follows:

1. There is a lack of support in the nursing homes to manage deteriorating patients. This includes numbers of nurses and doctors, as well as the level of skill.
2. Advance Medical Directive (AMD) issues are seldom brought up. Staffs in most nursing homes are uncomfortable with discussing death and AMD issues with family.[6]
3. When the patient deteriorates acutely, it is often a junior staff that is on duty and, hence, the immediate response is to transfer the patient out. Only 12.9% of referrals were written by a doctor.
4. Most nursing homes are served by non-resident doctors who are not involved in overall service quality and standards of care. They provide *ad hoc* services and often do not provide on-site night cover. Hence, in the event of acute deterioration, the preference is to transfer the patient out.
5. For trolley-bound patients, the ED is more easily accessible compared to polyclinics or general practitioner clinics and provides comprehensive one-stop service where laboratory tests, radiograph services, toilet and sutures, catheterisation and observations could be done.

The community-dwelling elderly seen during the same study period constituted 12.8% of the total attendance and 33.2% of the total ED admissions. This corroborated with the findings of Lim and Yap,[7] who found an attendance rate of 12.4% and an admission rate of 34.5% among the elderly at another local ED. In contrast, the admission rate for residents of CSDFs is 82.1%. We postulate that this is due to the following reasons:

1) Information provided by the nursing home is often very limited.
2) Elderly patients are difficult to assess and have multiple medical problems.
3) Relatives are often not around at the time of assessment to give feedback.
4) Staff accompanying the patient are often the most

junior assistant nurses and cannot provide any useful information. This is also true at the polyclinic level.
5) Doctors at the ED are aware of the limitations of the current nursing home system and, hence, prefer to admit the residents.
6) Faced with an already heavy workload of patients, doctors at the ED are unable to take detailed medical history and, hence, prefer to admit the patients for further work-up.

Given the above factors, an admission rate of 82.1% may be reasonable. The admission rate of nursing home residents in the study by Ackermann et al[2] and the review by Bergman and Clarfield[3] was 42.4% and 34%, respectively. Although, when compared to these overseas figures, the admission rate in our study was relatively higher, it is to be remembered that the numbers and levels of staff in the nursing homes overseas are much higher. Ackermann et al[2] also suggest that even when the patient was admitted to the hospital, the ED visit may not have been truly appropriate. This is because chronically ill patients may appear to need hospital admission in the judgement of ED personnel who have not previously evaluated the patient. They also suggest that exacerbations of chronic diseases, such as heart failure, usually occur gradually and, if early symptoms were detected and treated, ED transfer would often be prevented.

The most common complaints of the residents, which resulted in referral, were shortness of breath and cough followed by fever and falls. This is comparable with overseas figures.[2,8] The rate of admission for respiratory complaints was 100% in this study. Interestingly, Lim and Yap[7] found abnormalities of breathing to be the most common presenting symptom of the elderly to the ED and falls to be the next most common symptom. This seems to suggest that the pattern of illness between the chronic institutionalised sick and the well community-dwelling elderly is similar.

It is also noted that transfers on Mondays was significantly higher than on the other days. This could be that senior staff are usually absent over the weekends and, hence, problems tend to be picked up only on a Monday.

Assessing the healthcare costs of elderly institutionalised patients requires an overall review, including services and costs, within each organisation and other services, including ambulance transfers, ED referrals and admissions to acute hospitals.[9-11]

Strategies must be put in place to optimise the management of patients in nursing homes.[9,10] These strategies must take into account the following issues:

1) Where are patients who deteriorate best managed?
2) What are the factors limiting their care in the nursing homes?
3) How are fiscal policies influencing this?

If the preference is for patients who acutely deteriorate to be managed in the nursing homes, a multi-pronged approach is required. This would include the following:

1. Training and upgrading of staff. This includes doctors and nurses. Resident doctors could be sent for diploma courses to upgrade themselves in the care of the institutionalised elderly.
2. Increasing the level of trained staff, including the possibility of nursing practitioners.
3. Increasing the input of doctors.
4. Audit nursing homes on the transfer back rates and following this up with visits by geriatricians to nursing homes with high ED usage or those with high numbers of category 3 and 4 patients.
5. Explore the possibility of routinely asking families whether they wish the patients to be transferred back and other issues related to an AMD.[6] However, it is to be noted that legislation with regards to this is not yet present in Singapore and AMD, in the context of Singapore, is a self-initiated request. The vast majority of patients in nursing homes are cognitively impaired.
6. Proper documentation and clerking of patients in nursing homes so that as detailed a medical history is available at all times, including transfers back.
7. The setting up of more care pathways to guide junior staff when senior staff are not on duty, such as telemedicine,[12] consultation with doctors in acute hospital.

Of note is that in April 2001, the Ministry of Health implemented the Framework for Integrated Health Services for the Elderly. Under this scheme, the 3 geriatric departments of the acute hospitals are affiliated with community hospitals and nursing homes, and provide professional leadership to geriatric step-down care development in their respective zones. The components of the framework include auditing of approved service providers to ensure they meet specified criteria and standards, increased standards of care – especially in institutional community step-down services – to include rehabilitation and discharge back to community. The ministry, in turn, provides additional funding of approved providers to enable them to fulfil their responsibilities.

Conclusion

Healthcare is a continuum from acute hospital to home and is not divorced from each other. Residents from CSDFs are transferred to the ED for a variety of reasons and there is wide variation in the use of ED services by these patients (reflected in their referral letters and their outcomes). In this study, 82% of the ED visits resulted in hospitalisation. Much more research is necessary to define the most

appropriate role of the ED in the evaluation of residents from CSDFs. In view of the complexity of illness and unique presentations of disease in institutionalised elders, the ED physician would likely to benefit from more training in geriatric medicine.[13-15] There is an increasing need to streamline processes in acute hospitals to cope with an ageing population and to ensure quality care is delivered to the institutionalised sick.

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