Geriatric consultation service in emergency department: how does it work?

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ABSTRACT

Background Hong Kong is having a significant prevalence of geriatric patients who usually require admission after presentation to the hospital through emergency departments. The geriatric consultation programme 'We Care' aims at lowering acute geriatric medical admission.

Objectives The study aims at analysing the impact of the geriatric consultation service on the acute medical admission, and to study the characteristics and outcome of geriatric patients.

Methods Retrospective study. Patients who received geriatric consultations during 1 January 2009 to 1 March 2011 were enrolled. The demographic information, diseases case mix, venue of discharge, clinical severity, community nursing service referrals and adverse outcomes were retrieved and analysed. The incidence of adverse outcomes under the presence of each factor was studied.

Results 2202 geriatric patients were referred. Their age ranged from 45 to 99 (mean 79.91, SD 7.45, median 80). These cases were categorised into: (1) chronic pulmonary disease (n=673; 30.6%), (2) debilitating cardiac disease (n=526; 23.9%), (3) geriatric syndromes (n=147; 6.7%), (4) neurological problems (n=416; 18.9%), (5) diabetes-related problems (n=146; 6.6%), (6) terminal malignancy (n=39; 1.8%), (7) electrolyte or input/output disturbance (n=137; 6.2%), (8) non-respiratory infections (n=36; 1.6%) and (9) others (n=82; 3.7%). Acute medical admission was evaded in 84.7% of all consultations with 1039 (47.2%) patients discharged home and 825 patients (37.5%) admitted to convalescent hospital. The incidence rate of adverse outcomes was 1.6%.

Conclusion Programme 'We Care' provided comprehensive geriatric assessment to suitable geriatric patients, resulting in an effective reduction of acute geriatric hospital admission.

INTRODUCTION

As a globally famous urbanised city with people having longer longevity, Hong Kong is confronting the problem of an ageing population with a noteworthy prevalence of geriatric patients.[1] Older people constitute a progressively key population served by emergency departments (EDs).[2] The majority of the geriatric patients are comparatively fit and well with walk-in attendance to the ED for non-urgent complaints,[3] but some of them are feeble and vulnerable requiring high levels of care and disability support.[2] [4–9]

It is a shared view that geriatric patients are somewhat responsive for the overloading of EDs.[6] [7] [9–11] Older patients share some features:

they may attend the ED with non-specific complaints, uncharacteristic presentation of illness with uncertain diagnoses. They have chronic medical or frailty support requirements with multiple drugs on their hands. After they are discharged from the acute hospital, they may frequently reattend the ED for similar complaints resulting in subsequent readmissions.[9]

Nevertheless, the demanding atmosphere and the overcrowded environment in the ED may not be favourable for the delivery of comprehensive care of geriatric patients. Thus, geriatric patients eventually require inhospital care via the ED and therefore they account for a significant proportion of acute medical ward admission. This will undeniably generate certain extent of heaviness on the acute medical healthcare by their consumption of more acute resources during the course of clinical management.[2] [7–9]

In view of the foreseeable ageing population in Hong Kong, the Department of Medicine and Geriatrics of Tai Po Hospital (TPH) and the ED of Alice Ho Miu Ling Nethersole Hospital (AHNH) have started a pilot cross-specialty collaboration programme which aims to improve the geriatric consultation service programme 'We Care', in order to cut down the number of acute medical admission by direct admission of suitable non-acute geriatric patients to convalescent hospital for further comprehensive geriatric management, or by a direct discharge with community nursing service (CNS) follow-up after formulation of a discharge plan in the emergency medicine ward (EMW) by geriatricians. This service was a local initiative of the two participating hospitals, and started its logistics in EMW in mid-December 2008 (figure 1).
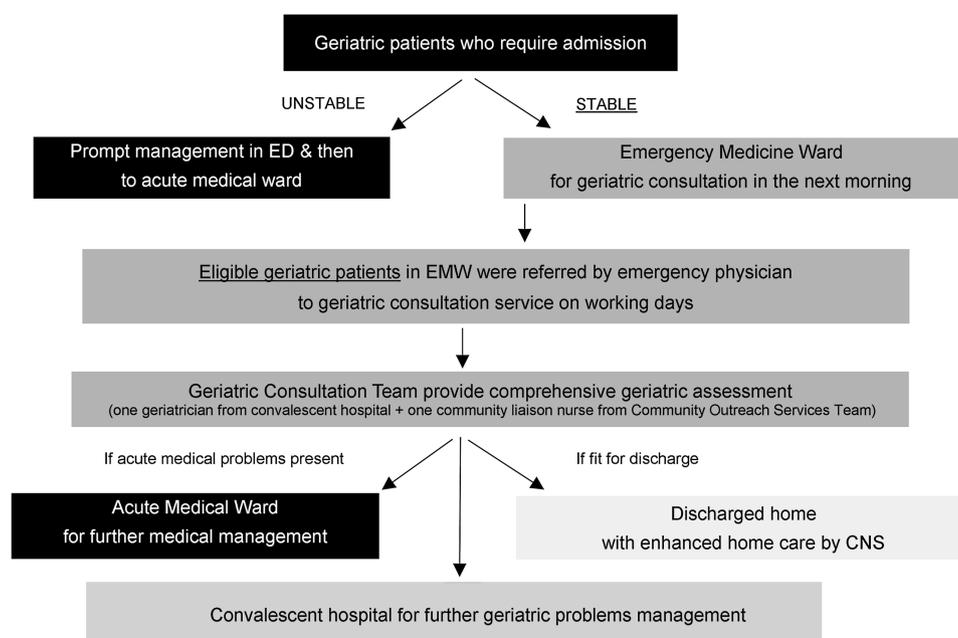
OBJECTIVES

This retrospective study aimed at finding out which diseases case mix had the most prevalent geriatric patients for geriatric convalescent admission and acute medical admission, studying the reattendance and death rate in patients with different interested factors, and the characteristics of the patients enrolled in the geriatric consultation service.

METHODS

AHNH is an acute care hospital in the New Territories East Cluster under the Hospital Authority of Hong Kong SAR. It has more than 110 000 ED attendances yearly and serves about 300 000 people living in Tai Po district. Geriatric consultation service is provided at the AHNH EMW. Eligible

Figure 1 Flowchart showing the logistic of geriatric consultation service. CNS, community nursing service; ED, emergency department; EMW, emergency medicine ward.

Geriatric patients who require admission

UNSTABLE — Prompt management in ED & then to acute medical ward

STABLE — Emergency Medicine Ward for geriatric consultation in the next morning

Eligible geriatric patients in EMW were referred by emergency physician to geriatric consultation service on working days

Geriatric Consultation Team provide comprehensive geriatric assessment (one geriatrician from convalescent hospital + one community liaison nurse from Community Outreach Services Team)

If acute medical problems present — Acute Medical Ward for further medical management

If fit for discharge — Discharged home with enhanced home care by CNS

Convalescent hospital for further geriatric problems management

older patients are referred by emergency physician every weekday morning and screened by a geriatric consultation team that consists of a geriatrician from Department of Medicine and Geriatrics of TPH and a CNS nurse. They provide comprehensive geriatric assessment for eligible patients in the EMW (table 1). After the patients have been assessed, they are detoured to acute medical admission (AHNH) via either direct admission to convalescent hospital (TPH) for further care or discharge with CNS support (figure 1).

Data collection

The data were retrieved retrospectively through ED records, EMW progress sheets and hospital authority medical records on the Clinical Management System, a Hong Kong-wide computerised patient data records system. The data collected in the period between 1 January 2009 and 31 March 2011 were retrieved. Patient demography, diseases case mix, patients' venue of discharge, total number of CNS referrals and adverse outcomes including reattendance less than 48 h and death less than 14 days after discharge from the EMW were recorded. Any adverse outcomes after the geriatric consultation service were studied.

Data analysis

The data were statistically analysed with the use of Statistical Package for Social Science (SPSS) program V.17. Descriptive statistics were used to demonstrate characteristics of enrolled patients concerning the demography, diseases case mix and venue of discharge. χ^2 Tests were employed to determine any associations between specific characteristics of the patients with the occurrence of interested outcomes. t Tests were used to study the means of the interested parameters. Binary logistic regressions were used to determine the relationships between different case mix and different interested outcomes. A p value <0.05 was considered to be statistically significant.

RESULTS

The results are presented in two different parts, descriptive and statistical analyses.

Descriptive analysis

During the study period, a total of 2202 geriatric patients were referred to the geriatric consultation service after their admission to our EMW. The proportion of male patients (1079/2202, 49.0%) was similar to that of the female patients (1123/2202, 51.0%) in the study population. Patients referred to the geriatric consultation service had an age range of 45 to 99 years (mean 79.91, SD 7.45). There was a statistically significant difference between the mean ages of both sexes (male subjects: mean 78.10, SD 7.35, female subjects: mean 81.65, SD 7.14, p<0.001). Most of the geriatric patients (1581/2202, 71.8%) were younger

Table 1 List of eligible and ineligible cases of programme 'We Care'

List of eligible cases for programme 'We Care'	List of ineligible cases for programme 'We Care'
Patient aged 65 OR <65 years who was an old age home resident with the following presentation	
1. Patient is recently discharged from TPH, AHNH or recurrent A&E attendances	1. Patient clinically and socially can be discharged by emergency physician
2. Patient with known terminal cancer for palliative care	2. Patient <65 years old except old age home resident
3. Patient with known end organ failure who decided not for active resuscitation or renal replacement therapy and displayed coping problem	3. Cases with fever
4. Patient with recurrent hospital admission (mild COAD, CHF, etc)	4. Cases diagnosed with gastroenteritis
5. Patient with multiple medical problems, but not indicated for direct acute hospital admission	
6. Patient with poor social support and recent decline in functional level. For example, fall or dizziness, preferably CT scan of brain has been done in selected cases	
7. Rehabilitation either in inpatient or outpatient setting is beneficial	
8. Patient presented with adverse drug reaction and polypharmacy	
9. Patient presented with fever but infectious cause is adequately excluded	

A&E, accident and emergency; AHNH, Alice Ho Miu Ling Nethersole Hospital; CHF, congestive heart failure; COAD, chronic obstructive airway disease; TPH, Tai Po Hospital.

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than 85 years. Female patients were more than twice as likely to occur in the age group older than 85 years (OR=2.46, 95% CI 2.03 to 2.99, p<0.001). A small proportion of the patients (19/2202, 0.9%) were younger than 65 years, while at the other extreme, around 2.0% of the patients were older than 94 years. Around half of the patients (1069/2202, 48.5%) belonged to the age group 75—84 years (table 2).

In all, 15.3% (338/2202) cases required acute medical admission for further management, while the remaining majority could be either admitted to the convalescent hospital for further geriatric management or discharged home directly after geriatric consultation service. For those patients who were discharged

home, 16.7% (174/1039) of them received CNS referral for better follow-up care.

The majority of the patients (98.4%) did not suffer from any adverse outcomes in the study period. There were only 1.6% (36/2202) reattendance and 1.6% (35/2202) mortality cases after discharge from the geriatric consultation service. Most of the patients (72.7%, 1600/2202) were relatively urgent cases with triage categories 1—3 given upon their ED attendance. Despite 0.3% of them being classified as critical (Category 1) on arrival at the ED, which required prompt attention and resuscitation in the ED, they were stabilised successfully and admitted to the EMW for geriatric consultation service.

Table 2 Demographic data, characteristics and outcomes of patients

	Number		Percentage	
Total	**2202**		**100%**	
Sex				
Female	1123		51.0%	
Male	1079		49.0%	
Age (mean)	Mean: 79.91 SD 7.45			
Age group				
<85				
<65	19	1581	0.9%	71.8%
65—74	493		22.4%	
75—84	1069		48.5%	
≥85				
85—94	576	621	26.2%	28.2%
>94	45		2.0%	
Clinical severity				
Triage category				
Urgent				
1	6	1600	0.3%	72.7%
2	46		2.1%	
3	1548		70.3%	
Non-urgent				
4	594	602	27.0%	27.3%
5	8		0.3%	
Venue of discharge				
Acute Medical Ward (AHNH)	338		15.3%	
Convalescent Medical Ward (TPH)	825	1864	37.5%	84.7%
Home	1039		47.2%	
CNS referral (for those who were discharged home)				
No	865		83.3%	
Yes	174		16.7%	
Adverse outcomes				
Death within 14 days				
No	2167		98.4%	
Yes	35		1.6%	
Reattendance within 48 h				
No	2166		98.4%	
Yes	36		1.6%	
Case mix				
Chronic pulmonary diseases (eg, COAD, occupational lung disease)	673		30.6%	
Debilitating cardiac diseases (eg, cardiac arrhythmias, heart failure)	526		23.9%	
Geriatric syndromes (eg, dementia, falls, functional decline)	147		6.7%	
Neurological problems (eg, dizziness, Parkinsonism)	416		18.9%	
Diabetes-related problems (eg, hypoglycaemia/hyperglycaemia, pharmacy intolerance)	146		6.6%	
Terminal malignancy	39		1.8%	
Electrolyte or input/output disturbance (eg, hypoNa/hyperNa, dehydration)	137		6.2%	
Non-respiratory infection (eg, urinary tract infection, gastroenteritis)	36		1.6%	
Others (eg, dermatological problems, pain management)	82		3.7%	

AHNH, Alice Ho Miu Ling Nethersole Hospital; CNS, community nursing service; COAD, chronic obstructive airway disease; TPH, Tai Po Hospital.

Table 3 Top 10 ED diagnoses for programme 'We Care' geriatric consultation

ED diagnosis	Number of cases	%
COAD	521	23.7
Heart failure	244	11.1
Dizziness	242	11.0
Chest pain	122	5.5
Decreased GC	117	5.3
Hypoglycaemia	83	3.8
Hypertension	80	3.6
Bronchitis	47	2.1
Hyperglycaemia	46	2.1
Syncope	45	2.0

ED, emergency department; GC, general condition.

The most prevalent case mix was chronic pulmonary disease, which was made up of 30.6% (673/2202) patients, followed by debilitating cardiac disease and neurological problems, which were made up of 23.9% (526/2202) patients and 18.9% (416/2202) patients, respectively. Small proportions of patients (1.8%, 39/2202) suffered from terminal malignancy and non-respiratory infection (1.6%, 36/2202) such as urinary tract infection. Diabetes-related problems, geriatric syndromes and 'electrolyte or input/output disturbances' occurred in comparable proportions of patients in the study (6.6%, 6.7% and 6.2%, respectively). The top five commonest ED diagnoses of the admitted geriatric patients for referral to the geriatric consultation service were: COAD (23.7%), heart failure (11.1%), dizziness (11.0%), chest pain (5.5%) and decreased general condition (5.3%) (table 3).

Statistical analysis

The following three outcomes are our interests: patients detoured to acute medical admissions, reattendance of the patients within 48 h after discharge from the geriatric consultation service and mortality within 14 days after discharge from the geriatric consultation service (tables 4 and 5).

We did not discover any statistically significant relationship between the patients' age and the three outcomes of interest. Male patients were twice as likely to die within 14 days after discharge from the geriatric consultation service (OR 2.02, 95% CI 1.00 to 4.07, p=0.046). However, there was no statistical significant difference between both sexes in outcomes regarding the venue of discharge and reattendance incidence.

Non-urgent cases on arrival at the ED had about 40% higher chance to be either admitted to convalescent hospital for further management or discharged home after geriatric consultation service, when compared with the urgent cases (OR 1.38, 95% CI 1.05 to 1.82, p=0.021). Non-urgent cases showed four times lower incidence of mortality when compared with the urgent

cases on arrival to ED (OR 0.245, 95% CI 0.075 to 0.804, p=0.012) (table 4).

In the analysis of case mix versus different outcomes, case mix 'Others' was chosen as the reference group for binary logistic regression analysis because its acute medical admission rate was the highest among all case mix (20/62, 32.2%). Diabetes-related problems were 15 times more likely to be diverted from acute medical admission (OR 15.38, 95% CI 4.41 to 53.65, p<0.001). Non-respiratory infections, for example, urinary tract infection, were more than five times more likely to be diverted from acute medical admission (OR 5.48, 95% CI 1.21 to 24.89, p=0.027). Chronic pulmonary diseases, for example, COAD, were around twice as likely to be diverted from acute medical admission (OR 1.83, 95% CI 1.06 to 3.16, p=0.031). Patients having terminal malignancy were more than eight times as likely to die within 14 days after geriatric consultation (OR 8.75, 95% CI 1.725 to 44.39, p<0.01) (table 5).

In the analysis of case mix versus clinical severity, again, case mix 'Others' was chosen as the reference group for binary logistic regression analysis as it had the highest proportion of clinically less severe and non-urgent cases (37/82, 45%). Patients having chronic pulmonary diseases (OR 3.75, 95% CI 2.33 to 6.05, p<0.001), diabetes-related problems (OR 3.32, 95% CI 1.83 to 6.02, p<0.001), debilitating cardiac disease (OR 2.18, 95% CI 1.36 to 3.51, p=0.001) and geriatric syndromes (OR 2.44, 95% CI 1.38 to 4.33, p=0.002) were clinically more severe upon their attendance to ED with very high statistical significance (table 5). Despite their clinical severity and urgency, these patients could still be managed well under geriatric consultation service with reference to the low acute medical admission rate as mentioned before (15.3%) (table 2).

DISCUSSION

In Hong Kong, the population is ageing rapidly at an unprecedented speed. With reference to Hong Kong government's latest territorial population projections, the older population, with the age over 65, in Hong Kong in mid-2009 was 0.9 million (13% of the total population), but will approach 2.4 million (28% of the total population) in 2039.[1] Therefore, development planning is essential and important to provide the ageing population in Hong Kong with the healthcare needs.

We believe that the management of geriatric chronic diseases will progressively dominate the whole healthcare delivery in the ageing population of Hong Kong. Therefore, our geriatric consultation service has set up a good initiation in Hong Kong hospitals. In our study, only 15.3% of the cases required acute medical admission for further inhospital management while 84.7% could be either discharged home with CNS referral or admitted to a convalescent geriatric ward. It was a very encouraging result that geriatric consultation service did play

Table 4 Patients' characteristics versus outcomes

	Not required acute medical admission after consultation?				Death <14 days after discharge from geriatric consultation?			
	No AHNH	Yes TPH/home	p Value	OR (95% CI of OR)	No	Yes	p Value	OR (95% CI for OR)
Clinical severity								
Urgent (triage category 1–3)	263	1337	0.021	1.382 (1.049 to 1.821)	1568	32	0.012	0.245(0.075 to 0.804)
Non-urgent (triage category 4–5)	75	527			599	3		
Sex								
Female	180	943	0.367	1.113 (0.882 to 1.403)	1111	12	0.046	2.016(0.998 to 4.073)
Male	158	921			1056	23		

AHNH, Alice Ho Miu Ling Nethersole Hospital; TPH, Tai Po Hospital.

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Table 5 Case mix versus outcomes and clinical severity on attendance to ED

Outcome variables Case mix (no. of cases)	Not required acute admission after consultation?				Death <14 days after discharge from geriatric consultation				Clinical severity on attendance to ED			
	No (AHNH)	Yes (TPH+home)	p Value	OR (95% CI of OR)	No	Yes	p Value	OR (95% CI of OR)	No (triage cat 4–5)	Yes (triage cat 1–3)	p Value	OR (95% CI of OR)
Pulmonary (673)	101	572	0.031	1.827 (1.058 to 3.156)	664	9	0.439	0.542 (0.115 to 2.553)	121	52	<0.001	3.751 (2.327 to 6.046)
Cardiac (526)	92	434	0.136	1.522 (0.876 to 2.643)	515	11	0.840	0.854 (0.186 to 3.926)	144	382	0.001	2.181 (1.356 to 3.508)
Geriatric (147)	25	122	0.180	1.574 (0.811 to 3.054)	146	1	0.294	0.274 (0.024 to 3.068)	37	110	0.002	2.444 (1.379 to 4.334)
Neurological (416)	67	349	0.073	1.680 (0.952 to 2.965)	415	1	0.057	0.096 (0.009 to 1.076)	161	255	0.278	1.302 (0.808 to 2.100)
Diabetes related (146)	3	143	<0.001	15.376 (4.407 to 53.645)	145	1	0.296	0.276 (0.025 to 3.090)	29	117	<0.001	3.317 (1.829 to 6.017)
Malignancy (39)	7	32	0.428	1.475 (0.564 to 3.854)	32	7	0.009	8.750 (1.725 to 44.394)	8	31	0.011	3.186 (1.308 to 7.764)
Electrolyte or I/O imbalance (137)	21	116	0.099	1.782 (0.898 to 3.537)	143	3	0.905	0.896 (0.146 to 5.475)	53	84	0.349	1.303 (0.749 to 2.269)
Non-respiratory infection (36)	2	34	0.027	5.484 (1.208 to 24.887)	36	0	0.998	NA	12	24	0.233	1.644 (0.726 to 3.727)
Others (82) (reference group)	20	62		1.0	80	2		1.0	37	45		1.0

AHNH, Alice Ho Miu Ling Nethersole Hospital; ED, emergency department; I/O, input/output; TPH, Tai Po Hospital.

a significant role in cutting down of the acute medical admission rate in hospital.

The majority of our patients (98.4%) did not reattend after discharge from the geriatric consultation service. The incidence rate of the reattendance cases in the geriatric consultation service is 1.6%, which is lower than that of our ED in the same study period (3.4%). For those who died (1.6%), they had diseases with poor prognosis on admission to EMW. In all, 20% (7/35) of them were patients with terminal malignancy and 43% (15/35) had very poor cardiorespiratory function with the presentation of heart failure (17.1%, 6/35) and COAD/bronchi-ectasis exacerbation (25.7%, 9/35) on admission to EMW. Terminal malignancy had a statistically significantly higher mortality rate (p=0.009, OR=8.75, 95% CI 1.725 to 44.394) than the other case mix after discharge from the geriatric consultation service. It was an expected result as the eligible patients for geriatric consultation under this case mix were those with terminal cancer for palliative care. Therefore, their mortality may not be directly related to the deficiency of, and preventable by, the geriatric consultation services. A study by Lu et al in Taiwan screened early mortality as death within 24 h after presentation to ED[12] while another study by Tabassum et al in the UK used 1 week (7 days) as cut-off;[13] we used 14 days for our study group to allow a higher chance of picking up latent errors. In the study by Tabassum et al, the majority of the deaths were related to respiratory problems (26%), which is quite comparable with our results (25.7%, 9/35).

COAD (8/36, 22.2%) and dizziness (8/36, 22.2%) are the two commonest ED diagnoses of patients who reattend within 48 h after discharge from the geriatric consultation service. Some of the reattendance cases were actually due to the reattendance of the same patients, who were known to be frequent attendees in our ED. A study by Gunnarsdottir and Rafnsson showed the mortality of those who had used the ED and been discharged home to be higher than that of the general population,[14] and the frequent users of the ED had a higher mortality than those visiting the department no more than once a year. However, we cannot conclude the same results in our study because only two patients (<0.001%) belonged to both reattendance cases within 48 h and mortality cases within 14 days after discharge from our service. And the frequent attendees in our ED did not suffer from mortality.

In our study, patients having chronic pulmonary diseases, diabetes-related problems and non-respiratory infections were statistically more likely either to be admitted to convalescent hospital or discharged home after geriatric consultation service. It is because for the patients having chronic pulmonary diseases, most of them are COAD patients. Their chest conditions can be managed in a convalescent hospital with the regular adminis-tration of steroid, antibiotics and puffs, after stabilisation of their exacerbation phase in ED. An exception is when they present to ED with COAD exacerbation with respiratory failure on arrival. Diabetes-related problems, both hyperglycaemia and hypoglycaemia, can be managed easily with regular monitoring of patients' blood glucose levels while they are receiving diabetes medications adjustment in a convalescent hospital, except when they were having diabetes emergency such as DKA which may require intensive medical care in an acute medical hospital. Most of the patients with a non-respiratory infection in our study had a urinary tract infection. They could be managed easily by the injection of antibiotics in the convalescent hospital, instead of being admitted to acute hospital for the same reason, except when they had septic shock which requires aggressive fluid resuscitation and close monitoring in an acute hospital.

The mean age of the patients in the geriatric consultation service was 79.91 (SD 7.45). However, two special cases in the geriatric consultation service were relatively younger, and our ED physicians did refer them for consultation as exceptional cases. This made our study as containing patients' age ranging from 45 to 99 years old. One of them was a 52-year-old resident of an old age home with terminal colon carcinoma. He was admitted for palliative care. The other patient was a 45-year-old resident of an old age home who had severe COAD with very poor lung function and he was waiting for a lung transplant. Both of them were finally admitted to an acute medical hospital for further management after geriatric consultation service.

In our study, non-urgent cases had about 40% higher chance to be either admitted to convalescent hospital for further management or discharged home after geriatric consultation service, when compared with the urgent cases (OR 1.38, 95% CI 1.05 to 1.82, p=0.021). Also, non-urgent cases on arrival showed four times lower incidence of mortality after geriatric consultation when compared with the urgent cases (OR 0.245; 95% CI 0.075 to 0.804; p=0.012). These observations could be explained by the fact that the more stable the clinical condition of the cases on arrival at the ED, the more suitable they were for admission to the EMW for geriatric consultation. Also the more stable the clinical condition of the cases on arrival at the ED, the lower was the mortality incidence after the patients had received suitable management from the ED or from the ward after their admission.

Limitations

Several limitations should be acknowledged in relation to the present study. First, our geriatric consultations were only provided on working days, instead of every day, and some geriatric patients were directly admitted to the acute hospital for further management on Saturdays and public holidays. This made the sample size smaller. Second, some patients might present with complex symptoms and signs which made the diagnosis difficult on arrival at the ED. For example, a patient may present with heart failure and COAD symptoms at the same time. The final decision in categorising a patient into the appropriate case mix was dependent on the geriatrician's final diagnosis in the EMW. Third, the number of cases to be admitted to EMW depends on the bed availability in the EMW. When the EMW is full, potential suitable cases may be admitted to acute hospital directly. This made the sample size smaller. Fourth, the case mix of the patients being admitted to the EMW was dependent on the EMW physician's clinical decisions; there were some variations between each EMW physician. Fifth, the limitation of the retrospective study is the need to rely on recall and records to determine which risk factors the patients were having and which case mix the patients were put into. Finally, it is not good for studying the temporal relationship between the risk factors and the outcomes.

CONCLUSION

The geriatric consultation service has proved its success in our EMW, which is a good platform for the smooth running of the service. It provides comprehensive geriatric assessment in suitable geriatric patients leading to an effective reduction of acute geriatric admission rate. It is an innovative programme in Hong Kong and should be promoted in other hospitals in Hong Kong, in view of the foreseeable ageing population in the city.

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