

Age-Related Emergency Department Utilization: A Clue of Patient Demography in Disaster Medicine

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Abstract

The purpose of this study is to construct a demographic of emergency department (ED) patients and determine the need of special attention on ED geriatric patients. We prospectively studied 16,925 patients who visited ED of a community teaching hospital (Upgraded to medical center in 2001) in Taipei City from April 9, 1999 to June 27, 1999.. The patients were stratified into pediatric (age <15 yr), non-elderly adult (age 15-64 yr), elderly (age 65-74 yr) and extremely old adult (age ≥75 yr) patients (the later 2 groups were defined as geriatric patients). Their statistical data in gender, ambulance utilization, disease severity, revisiting to ED, resources consumed, medical expenditures, and disease distribution were studied. The geriatric patients occupied 13.9% of the ED visits. According to triage criteria in this study, more than one third (38.4%) of the geriatric patients' visits were rated as "Triage I" or "II" (higher disease acuity) as compared to 16.0% in the pediatric and 24.0% in the non-elderly adult groups. Extremely old patients were more frequently arrived by ambulance than the elderly, non-elderly adult and pediatric patients (9.1% vs 5.5% vs 3.9% vs 0.6%, $P < 0.001$). The geriatric patients occupied 41.7% of the general beds and 45.0% of the ICU beds that used by ED admission. The rate of revisiting within 48-hr period was similar among the four groups whereas that within one-month period was highest in the extremely old aged (13.9% vs 10.9% vs 6.5% vs 6.0%, $P < 0.001$). The geriatric patients especially the extremely old consumed more ED resources and works, stayed a longer time in the ED (mean time of 14.8 hours vs 10.1 hours vs 5.3 hours vs 2.4 hours, $P < 0.0001$), and also incurred a higher mean expenditure per individual (NTD 4765 vs NTD 4487 vs NTD 1930 vs NTD 627, $P < 0.0001$). The leading illness of the geriatric patients was related to gastrointestinal disease as compared to trauma in the non-elderly adult and respiratory disease in the pediatric patients respectively. Our study provided the information that highlighted the escalating demand of geriatric medical service and had the implications on future medical facilities setup, teaching program, clinical research and financial planning. (*Ann Disaster Med.* 2003;1:56-69)

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Received: Aug 10 2002.

Revised: Sep 8 2002.

Accepted: Nov 8 2002.

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Key words: Emergency Department; Geriatric Patients

Introduction

Emergency department (ED) utilization is increasing globally; therefore there is a growing interest in the characteristics of the ED population. On the other hand, geriatric population is growing in many developed and developing countries. In Taiwan, the average life expectancy has increased from 56.3 years for women in 1952 to 77.8 years in 1998 and from 53.4 to 71.9 years in men; and elderly population of over 65 years old increased from 5.5% in 1987 to 8.3% in 1998¹. The impact of this issue to the national expenditures of health cares especially ED utilization by the geriatric patients will be of special concern. There were many studies especially concerning care of the geriatric patients in the ED in United States^{2, 5, 7-14}. These articles provided the invaluable information concerning the experiences of ED in United States. The specialty of emergency medicine is developing in Taiwan. The development has generally followed the same sequence of change experienced in the United States. ED utilization by the geriatric patients in the Taiwan medical community, had been reported in some studies^{4, 16-19}, however, still limited in the local literatures. This prospective consecutive cases study addressed the pattern of ED use of a community ED in terms of gender, age-group distribution,

ambulance use, rate of revisiting, disease severity and categories, time and resources consumed, patients disposition and specifically focused on the emergency services handling for the geriatric population. Our study has the following purposes: 1) to construct a demographic profile of the ED patients with according to age distribution; 2) to provide essential information that emphasizes the growing importance of the aged as consumers of emergency medical care; 3) to improve patient care, formation of guidelines concerning future medical facilities setup, clinical research and financial planning. 4) To highlight the need of geriatric medical services and knowledge for the emergency physicians (EP) and other hospital staffs.

Methods

Study Population

This prospective study was conducted in the ED of Shin-Kong Wu Ho-Su Memorial Hospital (SKH), a 750 beds community teaching hospital in Taipei, a city of 2,639,939 populations, in which 9.2 % are ≥ 65 years¹. SKH is one of the 13 qualified hospitals with EP training program in Taiwan. The 24-hour service ED serves approximately 80,000 patient visits annually with 750 beds available to handle patients that mainly came from

Taipei City and Taipei County. The study was carried out from April 9, 1999 through June 27, 1999 in a period of 80 consecutive days in which 17,446 consecutive cases visiting the ED. We divided the patients into 4 age groups. Group A was pediatric patients of age < 15 yr; Group B was non-elderly adult patients of age 15-64 yr; Group C was elderly patients of age 65-74 yr and Group D was extremely old patients of age ≥ 75 yr.

Study Items

A form sheet was designed to record the data. This form sheet was attached to each of the ED medical record during arrival and was collected by the counter when patient discharged. Arrival time, mode of arrival and triage category were recorded by a triage nurse on the form sheet. Triage category was also made by the EP when patient was examined. In case of existent of controversial between the triage nurse and EP, medical chart were reviewed, final triage category were made by the authors. Information about revisiting within 48-hrs and recent 1 month (both were regardless the same hospital or not prior to this visit) were obtained during history taking by the EP. Disease categories, final disposition of the patients were also recorded on the form. The time of leaving the ED was recorded at the counter and hence the length of stay was known. The application of intravenous catheterization, ancillary laboratory tests,

as well as diagnostic aid utilization were also recorded on the form during patients' staying at ED, this was done by the nurse specialist, any uncompleted form was checked by reviewing the billing records. The medical expenditure to be refunded from the National Health Insurance (NHI) by the hospital of each individual patient was obtained from the computer billing records. The uncompleted data were checked and completed with reviewing the medical logbooks, ambulance dispatch records and computer records (arrival and leaving time records).

All the collected forms and hence the final data were keyed into the data bank by an assistant and were analyzed by the authors.

Triage Classification

The triage classification used in this study ED was listed in Table 1. The criteria used for the triage were modified from criteria that announced by NHI Department, Taiwan, April 1998.

Disease Categories

The diseases presented to the ED were classified into the following categories: 1) cardiovascular diseases; 2) respiratory & pulmonary diseases (including the URI, tonsillitis); 3) neurological diseases; 4) infection, 5) DOA (Death on arrival), out of hospital death; 6) gastrointestinal diseases; 7) trauma and injuries; 8) other

miscellaneous conditions (genitourinary, dermatologic, endocrine, intoxications, hematologic etc). All the patients were coded with at least one ICD-9 (International Code of Disease) number for the aid of disease identification.

Laboratory Test Classification

For ancillary laboratory tests, patients were categorized into those who underwent: 1) no test; 2) 1-3 tests and 3) ≥ 4 tests. Tests were grouped under the specific group or panel regardless of how many items (this was ticked in the same panel sheet), for example, “one test “of “Blood Chemistry panel” was considered when Blood glucose, Aspartate amino-transferase, Sodium, Potassium, Lipase level were checked. Other examples of specific panel group which were considered as “one test” included: “Hematology panel “(complete blood count and differential, Prothrombin time, Activated partial thromboplastin time, etc); “Urine Study” (routine, pregnancy test etc) and “Cultures” (blood, urine, sputum etc).

Statistic Analysis

Statistical procedures and analysis were performed using the Microsoft Excel, Access version 98 and SAS 6.12. Proportion variables among the groups were compared by using Chi-square (X^2) analysis. Continuous (length of stay, medical expenditure) variables among the groups were compared using and

ANOVA (analysis of variance) technique.

Results

ED Patients Characteristics

There were 17,446 patients visited the ED in the study period. The finally completed forms were 16,925 (97%) cases. Three percent of the form sheets (521 cases) were either missing during the collection or the main items could not be identified (no name, birth date, register number and arrival time for the same individual) and were discarded from the study. The gender ratio of men to women was 1.03:1 at an overall, but inversely altered with increasing of age (Table 2). The stratification of patients according to age and their percentage were shown in Table 3. The Group C and Group D had a sum of 13.9% (2,343 visits). Thus, the geriatric patients in the ED exceeded the expected portion measured by the distribution of general population when accounted for the 9.2% of aged (≥ 65 yr) in the city. Our subdivision of geriatric patients showed that 45.0% of the geriatric patients were ≥ 75 years old.

Severity of Disease

The degree of emergency of illness in these four groups of patients could be seen in Table 3. 38.4% of the geriatric patients' visits were rated either as “Category I” or “ II” according to triage classification in Table 1.

Rate of Ambulance Use

It is difficult to determine the inappropriate use of ambulance from the data. Regardless of this problem, the rate of ambulance use was disproportionately high in the geriatric patients especially in Group D (9.1%, $P < 0.001$). (Table 3).

Disposition of the Patients (Admission and Transferal)

Group C and Group D together was 3.3 times more likely to need admission than Group B (23.7% vs 7.3%) and 21.3 times (23.7% vs 1.1%) to that of Group A patients in this hospital of the study. Group C and Group D together also had a higher mean of transferal rate than Group B (1.3% vs 0.5%) and Group A (1.3% vs 0.1%). (Table 3).

Rate of ED Revisiting

6.3% of Group A revisited within 48-hours, while 6.8% of Group B, 7.7% of Group C and 6.7% of Group D patients did respectively. For ED revisit within 1 month, 6.0% of Group A had the experience as compared to 6.5% of the Group B, 10.9% of Group C and that of 13.9% of the Group D patients. (Table 3).

ED Resources Consumed

When accounting for hospital admissions via ED, the geriatric patients occupied 41.7% of the general beds and 45.0% of the ICU beds used by ED admission (Table 3). The ED resources

utilization were significantly high in the geriatric patients and especially highest in the Group D patients.

Length of Stay in the ED

The length of stay (LOS) in the ED of the four groups of patients was shown in Table 4. The geriatric patients stayed a longer time in ED than the younger counterparts.

Medical Cost Expenditure

Table 4 also indicated the total medical cost expenditure that was claimed from the NHI by the hospital in these cases. There were some missing data (of those patients who paid themselves, overdue bills, escaped without payment or without the application of NHI), 595 of the 16,925 billing records (3.5%) were not available during the processing. These missing parts might confound the data but was assumed to be to a less degree. The remaining 16,330 cases made an expenditure of NT 31,727,747. The average medical expenditure per individual was significantly higher in the geriatric patients especially in the Group D (Table 4).

Disease Distribution

The disease distribution in ED patients of the study hospital can be revealed in Table 5.

Table 1. Guidelines for Triage Classification in SKH ED

Category I:

Definition: Life threatening, treated immediately

e.g.: Cardiac arrest, apnea, cardiac cause of chest pain, arrhythmia with unstable hemodynamics, respiratory distress, uncontrolled bleeding, coma, status epilepticus, drug induced conscious change, major trauma, HR < 50 / > 150, SBP < 80 mmHg, RR > 40 / < 10 breaths per min.

Category II:

Definition: Potential risky, treated within 3 minutes

e.g.: Severe vomiting, acute abdomen, vertigo, psychosis with violent/ attack behavior, chest pain with history of heart disease, suspected fractures, open wounds with bleeding.

Category III:

Definition: Emergency condition not serious enough for category II, treated in 20-30 min.

e.g.: Tarry stools, hematemesis, hemoptysis, convulsions but have stopped, suspected CVA, Drug overdose with clear consciousness.

Category IV:

Definition: Not emergency condition, treated within 30-60 min.

e.g.: Cold, allergy, CVA sequelae, chronic disease and patients with stable vital signs.

(The triage criteria was modified from that announced by National Health Insurance Department, Taiwan, April 1998)HR: Heart rate SBP: Systolic blood pressure RR: Respiratory rate CVA: cerebrovascular accident**Table 2.** Sex and Gender distribution of the age stratified patients

Items	Age <15 yr	Age 15-64 yr	Age ≥65-74 yr	Age ≥75 yr
Sex				
Male	2778	4698	628	501
Female	1965	5141	653	561
Gender ratio	1.41:1	0.92:1	0.96:1	0.89:1

Table 3. Comparison of the clinical characteristics of the four groups of age stratified patients

Items	Age <15 yr	Age 15-64 yr	Age ≥65-74 yr	Age ≥75 yr	P value
Visits	4743 (28.0%)	9839 (58.1%)	1281 (7.6%)	1062 (6.3%)	-
Triage I	59 (1.2%)	237 (2.4%)	82 (6.4%)	107 (10.1%)	P<0.001
II	699 (14.8%)	2127 (21.6%)	353 (27.6%)	357 (33.7%)	P<0.001
III	3817 (80.5%)	7292 (74.1%)	820 (64.1%)	585 (55.2%)	-
IV	165 (3.5%)	180 (1.8%)	25 (2.0%)	11 (1.0%)	-
Arrived by Ambulance	29 (0.6%)	383 (3.9%)	70 (5.5%)	97 (9.1%)	P<0.001
GB	24 (0.5%)	655 (6.7%)	244 (19.0%)	241 (22.7%)	P<0.001
ICU	29 (0.6%)	58 (0.6%)	29 (2.3%)	42 (4.0%)	P<0.001
TF	3 (0.1%)	53 (0.5%)	12 (0.9%)	18 (1.7%)	P<0.001
Revisiting Within 48 hrs	297 (6.3%)	668 (6.8%)	99 (7.7%)	71 (6.7%)	P=0.181
ED visit in Recent 1M	283 (6.0%)	642 (6.5%)	139 (10.9%)	148 (13.9%)	P<0.001
IVC	38 (0.8%)	2785 (28.3%)	761 (59.4%)	747 (70.3%)	P<0.001
Lab tests					
1-3 tests	314 (6.9%)	3080 (31.4%)	643 (50.3%)	577 (54.5%)	P<0.001
>3 tests	22 (0.5%)	369 (3.8%)	139 (10.9%)	155 (14.6%)	P<0.001
ECG	28 (0.6%)	999 (10.2%)	446 (34.8%)	443 (41.7%)	P<0.001
Ordinary X-rays	1239 (26.1%)	3950 (40.2%)	750 (58.6%)	677 (63.8%)	P<0.001
Special Films	75 (1.6%)	496 (5.0%)	179 (14.0%)	166 (15.6%)	P<0.001
Diagnostic Aids	31 (0.7%)	374 (3.8%)	85 (7.0%)	98 (9.2%)	P<0.001

IVC: Intravenous-catheterized

GB: General Bed ICU: Intensive Care Unit TF: Transferal

ECG: Electrocardiogram NTD: Currency in New Taiwan Dollar

Table 4. Length of stay and medical expenditure of the age stratified patients

Items	Age <15 yr	Age 15-64 yr	Age ≥65-74 yr	Age ≥75 yr	P value
Length of Stay (hours)	2.4	5.3	10.1	14.8	P<0.0001
Medical Expenditure (in NTD)					
Total	2,863,782	18,264,,107	5,648,564	4,951,294	P<0.0001
Average	627 (n = 4569)	1,930 (n = 9463)	4,487 (n = 1259)	4,765 (n = 1039)	

Table 5. Main diseases distribution of the age stratified patients

Items	Age	Age	Age	Age
	<15 yr	15-64 yr	≥65-74 yr	≥75 yr
Main Diseases				
1	Respiratory (41.2%)	Trauma (25.0%)	Gastrointestinal (20.5%)	Gastrointestinal (20.6%)
2	Gastrointestinal (25.2%)	Gastrointestinal (24.2%)	Cardiovascular (13.1%)	Respiratory (13.4%)
3	Trauma (12.8%)	Respiratory (11.1%)	Respiratory (12.1%)	Neurologic (12.7%)
4	Infection (9.3%)	Infection (7.6%)	Trauma (12.7%)	Cardiovascular (12.3%)
5	Neurologic (1.1%)	Neurologic (4.7%)	Neurologic (12.3%)	Trauma (10.9%)

Discussion

The aging of population had created a great pressure to the society in many countries. With the rapid growth of size in the aged, providers, practitioners and administrators of health care system can expect an increasing medical demands and health care costs for the geriatric patients. This will meet an even greater impact during the next several decades. The statistical data from The Bureau of Census in Taiwan showed that geriatric population older than 64 years old had accounted for 8.3% of the total population in 1998, and will continue to increase triple fold to 23.9% in the next 50 years¹. In the future, a greater share

of emergency physicians' time and efforts will consist of treating the elderly, and more of the resources will be encountered for the special needs of the aged.

In our study, the geriatric patients older than 65 years old occupied 13.9% of all the visits to the ED although they comprised 9.2% of the population in this city, this is compatible with the results of previous studies^{2,3}. The rate however was relatively less as reported by Hu et al⁴ in their combine study of eight hospitals of Taipei City in which 24.3% of ED visits were by geriatric patients. However, there were some possible confounders in our study. Firstly, our

data was collected in 80 days; this was subjected to seasonal variations of disease pattern and volume. Secondly, although our sample size was large, only one community hospital was surveyed, it might not represent the whole ED use pattern of this city. The difference between our study and Hu et al⁴ also indicated that the range of variation between hospitals was great in this city. For example, in Taipei Veteran General Hospital, geriatric patients might be relatively higher in proportion with comparison to other hospitals. Nevertheless, both of them showed the disproportion of geriatric patients as mentioned. In the American population the fastest growing segment was the group over 85 years of age^{2, 5-7}. In our study, group D comprised 45% of the geriatric patients; this group will definitely deserve special attention in the future since this segment of population will continue to grow as medical improvement tends to "extend human's lives".

The possible factor that caused the disproportional gender ratio in this study would be the gender distribution in this community, but we had no sufficient statistical data to prove it.

38.4% of our geriatric patients had remarkably higher disease acuity and had life threatening or emergent medical conditions. This was similar to those in other studies^{2,8-12}. Therefore, a relatively high percentage of geriatric patients use the ED appropriately as

compared to the other subgroups. On the other hand, they have the lowest percentage of non-emergent ED visits relatively to the younger counterparts.

The decreased mobility of the geriatric patients when sick, and their higher position in triage classification, made them the frequent user of ambulance services. This was especially true in the extremely old aged group (9.1%) as compared to the elderly patients (5.5%), non-elderly adults (3.9%) and pediatric patients (0.6%). There were even more remarkable outcomes in Western country studies in which EMS was highly developed. Strange et al² showed that 36.0 % of geriatric patients arrived the ED by ambulance. Dickinson et al¹⁴ even reported of 39% of total EMS call volume was by the geriatric patients.

The increase in the admission rate of the aged particularly to ICU also reflected the increase in their disease severity. Our data indicated that 22.7% of extremely old patients were admitted to the general beds, compared with 19.0% of the 65-74 yrs patients, 6.7% of the non-elderly adult patients and 0.5% of the pediatric patients. This was consistent to other studies^{2,8,9,15}. In consideration of the need of ICU admission, our data showed that 4.0% of the extremely old patients required critical care, whereas this was 2.3% for the elderly of age 65-74 yrs, 0.6% for the non-elderly adults, and 0.1% for the pediatric patients. These data were

consistent with others studies^{2,4}. Our survey also indicated a higher proportion of transferal in the geriatric population in the ED, which was 1.7% of the extremely old patients compared to 0.9% of the elderly, 0.5% of the non-elderly adults and 0.06% of the pediatric patients. The higher transferal rate also in some degree indicated that the supply (beds, facilities..) was unable to meet the demand in this group.

Revisiting rate can reflect the severity of the patients' illness. Lowenstein et al⁹ postulated that the high rate of revisiting probably reflected multiple factors, including the number and complexity of older patients' medical problems and the difficulties in providing frail elders with episodic and follow-up care. It was expected that the rate of 48-hr revisiting rate to the ED (including those visited other ED of other hospital(s) previously) by the geriatric patients would be much higher than the younger subjects, our pilot study however, showed less difference of the rate of returning within 48 hours among the four groups. We postulated that this was probably due to the escalating ED use of the public (mostly the younger patients) as a faster route of solving their medical problems if symptoms did not subside after their previous visit(s), therefore there was almost equal rate of return regardless of the age group. Taiwan had adopted a national health insurance program that nearly covered all the citizens, this made

ED visit was rather affordable. Many patients utilize ED as the alternative of OPD follow-up and some were indeed hospital shopping to seek different opinion. Another possibility that lessened the difference was the more acuity of illness of the geriatric patients that resulted in their longer observation in ED or admissions and even transfers to other higher medical centers, these would make the rate of revisiting within 48 hours lower in the aged in this community hospital.

When extending the revisiting period to one month, the geriatric patients showed a higher rate of ED visits. It explained that the geriatric often suffered from a variety of chronic diseases and in some part were more likely to return for additional care.

As previously noted, the geriatric patients occupied more admission. They were also more likely to receive other medical resources in ED. This was related to their higher likelihood of serious disease and vaguer of their symptoms. As a result, EPs tended to investigate them more thoroughly. We agreed with Baum and Rubinstein's⁸ idea that these tests and investigations were not overordered instead was helpful for the elderly who presented with atypical complaints.

Geriatric cases were much more associated with admission and observation due to their disease complexity and severity, therefore more time was spent to gather the laboratory

data and more procedures and diagnostic evaluation were performed before their disposition. As a result, they had a longer length of stay in ED.

The medical cost expenditure in ED care was strikingly different between the geriatric and young subjects. This was consistent with Singal et al's¹⁰ finding. Our survey on mean ED expenditure per individual for the different categories showed that this was NT 627 for the pediatric patients, NT 1,930 for the non-elderly adult patients, NT 4,487 for the elderly patients and was up to NT 4,765 for the extremely old patients. Due to their severity of illness and complexity in differential diagnosis, geriatric patients received a great deal of tests, diagnostic examinations, procedures, medications, and longer length of stay in ED, therefore they were, not surprisingly had higher charges during their ED care.

The disease distribution in ED patients was different as well. Respiratory illness was the leading disease in the pediatric. Due to the physical activity and the environmental exposure of their daily life, trauma was the leading cause of ED visit in the non-elderly adult patients. Whereas for the geriatric patients gastrointestinal disease was the leading cause of ED visit. The rate of cardiovascular and neurological diseases also higher in the aged than the younger counterparts. This is consistent with other studies^{4,9}. The high prevalence of gastrointestinal

disease in these four groups also emphasized the growing importance of practicing abdominal ultrasonography by EPs to handle those present with acute abdomen.

Attention should be paid to the social and care problems of geriatric patients. Early social service intervention in the ED may be beneficial to the geriatrics. Social workers might staff EDs and the high-risk geriatric patients should be followed-up.

Our study had some limitations, as mentioned earlier, our data was collected in a consecutive 80 days; this was subjected to seasonal variations of disease pattern and patients' volume which would confound the above collected data. Besides only one community hospital was studied, the administration and management patterns, for example admission criteria, triage, specific bed availability (e.g. pediatric ICU) and role of ED among different hospitals are quite varied in Taiwan and thus this study would not represent the total ED use pattern of Taiwan.

ED provides a vital service for the health care consumers in the past and future especially for the geriatric patients. Our prospective study had constructed a demographic profile of ED population seeking medical care in a community hospital. It also pointed that the geriatric patients use the ED differently and uniquely as compared to the younger counterparts. The high rate of resources used by the aged also

suggested that the health care planning and adequacy of resources delivery must be evaluated. ED providers, administrators, health policy analysts and government organizations should prepare to meet the escalating health care demands of the geriatric patients. The more severity and urgency and complexity of illness of the aged patients suggested that attention should be paid. There is also a need for reassessing the knowledge of ED staffs toward elderly patients. As suggested by Sanders AB⁵, Geriatrics should be incorporated into the training program of EPs as well as other ED staffs.

Acknowledgements

We thank the staff of the ED of Shin-Kong Wu Ho-Su Memorial Hospital for their help in data collection in this study; Eve Chin and Shin-Ru Sheay for their assistance in data processing and statistical analysis.

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與年齡有關的急診使用率： 災難醫學中病患的人口學之一窺

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摘要

為建構一個急診病患的人口學型態及證明應給予急診之老年患者特別之注意，我們對於西元 1999 年 04 月 09 日至 1999 年 06 月 27 日期間到台北某區域教學醫院急診部門求診之 16,925 位病患進行前瞻性的研究。這些病患被劃分成小兒組(年齡<15 歲)、非老年成人組(年齡 15-64 歲)、老年組(年齡 65-74 歲)及極老年組(年齡≥75 歲)，並將後兩組總稱為老年患者(geriatric patients)。本研究針對他們的性別、救護車使用率、疾病嚴重度、再次回急診率、醫療資源之消耗、醫療費用及疾病之分佈給予統計分析。老年患者佔了急診求診病患的 13.9%，其中之 38.4% 被列為檢傷分類第一及第二級。極老年組利用救護車的頻率較老年組、非老年成人組、小兒組要高 (9.1% VS 5.5% VS 3.9% VS 0.6%, $P<0.001$)。經急診住院之老年患者佔了急診住入普通病房床位之 41.6% 及加護病房床位之 55.0%。四十八小時內回診率於四組間是近似的，但在一個月內回診率則以極老年組最高 (13.9% VS 10.9% VS 6.5% VS 6.0%, $P<0.001$)。老年患者尤其極老年組在急診停留時間較久 (平均時間為 14.8 小時 VS 10.1 小時 VS 5.3 小時 VS 2.4 小時, $P<0.001$)，並有更高的平均花費(新台幣 4765 元 VS 4478 元 VS 1930 元 VS 627 元, $P<0.001$)。老年患者首要疾病為腸胃疾病，而非老年成人患者為外傷，小兒患者則為呼吸道疾病。我們的研究可提供一些訊息以加強注意老年醫療服務需求的逐增，及對未來醫療設備的建構、教學計劃、臨床研究、醫療經費的策劃有所影響。(Ann Disaster Med. 2003;1:56-69)

關鍵詞：急診；老年患者

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收件：91 年 8 月 10 日

修正：91 年 9 月 8 日

接受刊載：91 年 11 月 8 日

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