

Cost Analysis of Emergency Department Visits by Geriatric Patients Living in Nursing Homes

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ABSTRACT

Objective: To determine the cost analysis of emergency department (ED) visits by geriatric patients living in nursing homes.

Study Design: Cross-sectional study.

Methodology: Medical records of geriatric patients living in nursing homes who were admitted to the emergency department of the Hospital, between 2011 and 2015, were retrospectively reviewed. Number of visits, reason, and cost of treatment was determined.

Results: In total 63 patients (21 females [33.3%], 42 males [66.6%]) with mean age of 76.3 ± 8.16 years were included. The total number of emergency department visits by those 63 patients was 243. Twenty-three (9.5%) of the total emergency department visits were due to trauma. Six patients (9.5%) were admitted to the emergency department with cardiopulmonary arrest. The mean cost of each patient was \$358.30 (53.90 - 1734.10), the maximum cost was \$10,095.10, and the minimum cost was \$7.42.

Conclusion: Emergency department visits and hospitalisation are common among elderly patients living in nursing homes. However, emergency department visits by this frail population put a heavy burden on the economy. Essential measures should be taken to reduce the financial burden of emergency department visits and hospitalisation of this geriatric population.

Key Words: *Emergency medical services, Geriatrics, Cost analysis, Nursing homes, Old homes.*

INTRODUCTION

Over the last few decades, there has been a rapid increase in the number of elderly people in almost all the countries.¹ Worldwide, the total number of people aged >60 years is expected to increase from 900 million in 2015 approximately to 2 billion by 2050.¹ Dramatic changes in world population demographics have led to an increase in the number of functionally dependent older people requiring personal and medical care,² thereby contributing to the cost of healthcare.

A geriatric population represents a special group for emergency department (ED) physicians. In addition to a high prevalence of systemic comorbidities in geriatric patients, these patients generally report atypical or non-specific symptoms.³ These complex symptoms can be a manifestation of an acute and reversible condition or even life-threatening illness. The objective of emergency care for these patients is to promptly diagnose the life-threatening conditions and appropriately treat it to improve the quality of life.

Consequently, the role of families in elderly care has gradually decreased. Therefore, the number of older people living in nursing homes has dramatically increased over the past years.⁴ The general characteristics of this older population are the presence of chronic illnesses that require periodic care. Patients aged ≥65 years account for >15% of all ED visits each year in the United States;⁵ and the financial burden and high healthcare cost of the ED visits by these individuals affect the economy.

Therefore, the present study aimed to investigate the demographic characteristics and cost analysis of ED visits by the nursing home residents.

METHODOLOGY

The study was approved by the Pamukkale University Ethics Committee for Non-Interventional Clinical Investigations (dated 07/07/2015, numbered 60116787-020/12816). A search of the computerised patient database was performed to identify all patients aged ≥65 years, living in a nursing home, and who were seen at the ED of Hospital, between January 2011 and December 2015.

Age, gender, number of ED visits in each year between 2011 and 2015, presence of trauma, laboratory investigations, imaging techniques, and consultations were recorded. The mean age was calculated based on the age of the patient at the first ED visit during the study period. Admission for cardiac arrest, duration of hospitalisation, and stay in the intensive care unit were also recorded.

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The cost analysis per patient visit and/or hospitalisation was estimated in United States dollars (USD) according to actual data from the Central Bank.

All data were entered into a spread sheet, and statistical analyses were performed using SPSS 17.0 for Windows (SPSS Inc, Chicago, IL). Data are shown as mean ± standard deviation for continuous variables, as median (interquartile range-IQR) for ordinal variables, and as frequency with percent for categorical variables. Kolmogorov-Smirnov test was used to assess normality. Categorical comparisons were made using the Pearson Chi-square or Fisher Freeman Halton test, wherever appropriate. A p-value of <0.05 was considered statistically significant.

RESULTS

Sixty-three patients were included in the study with mean age of 76.3 ±8.16 (65-98) years; and female/male ratio of 1:2. Two hundred and forty-three ED visits by the 63 patients were analysed. Twenty-three of the total ED visits were for trauma, and six patients (9.5%) were admitted for cardiopulmonary arrest. The highest number of visits by the same patient, according to year, was 27 by a 69-year-old man in 2014. This was followed by 15 ED visits by another two male patients in 2011 and 2014, separately.

Visits to the ED by nursing home residents resulted in a total of 47 complete blood counts, 37 blood biochemical analysis tests, and 30 cardiac panel tests. Direct radiography was performed for 38 patients; and other imaging modalities, such as computed tomography (22 patients), magnetic resonance imaging (6 patients), ultrasonography (4 patients), color-Doppler ultrasonography (4 patients), and echocardiography (2 patients), were also performed.

Patients were referred to departments of pulmonary disease (15 patients, 23.8%), cardiology (13 patients, 20.6%), internal medicine (11 patients, 17.5%), neurology (5 patients, 7.9%), anesthesia (5 patients, 7.9%), urology (4 patients, 6.3%), general surgery (4 patients, 6.3%), orthopedics (2 patients, 3.2%), infectious diseases (2 patients, 3.2%), and neurosurgery (1 patient, 1.6%).

After laboratory and imaging studies and essential consultations, the total number of hospitalisations from the 243 ED visits was 38 (15.6%). Twenty-three patients (60.5%) were hospitalised in the trauma intensive care unit, six (15.8%) in the coronary intensive care unit, four (10.5%) in the chest disease intensive care unit, two (5.3%) in the anesthesia intensive care unit, and three (7.9%) in other intensive care units. The mean duration in the intensive care unit was 10.02 ±6.06 (1-28) days. Eight of the 38 hospitalised patients (21.05 %) died despite treatment.

The median cost of each ED visit was \$31.74 (13.29-89.71). The maximum cost was \$10,095.10, and the minimum cost was \$7.42. The median cost of hospi-

Table I: Mean cost of the nursing home residents per emergency department visit, according to gender and age range.

	Cost (\$) Median (IQR)	p
Gender		
Male	28.83 (12.98-83.77)	0.096*
Female	45.62 (17.36 - 104.45)	
Age (years)		
65-74	30.1 (10.6 - 89.71)	0.503**
>85	40.31 (16.74 - 97.53)	

*Mann-Whitney U-test; **Kruskal-Wallis test.

talisation per patient was \$1702.67 (833.51-3208), and the mean cost of only ED visit without hospitalisation per patient was \$51.67 (16.23-127.71). The maximum cost of a single ED visit without hospitalization was \$3196.80. Table I shows the mean cost per ED visit of the nursing home residents, according to gender and age range.

DISCUSSION

The increasing number of elderly people worldwide is leading to an increase in the number of nursing home residents. Current estimates demonstrate that the population of nursing home residents will increase over time despite reductions in the prevalence of disability.⁶ In the present study, we analysed 243 ED visits by 63 geriatric patients from a single nursing home from 2011 to 2015.

Because elderly patients living in nursing homes tend to have more complex illnesses, ED visits, longer ED stays, and hospitalisation are common.⁷ Elderly people residing in nursing homes use the ED at a particularly high rate, with an estimated number of visits exceeding one visit per patient annually.⁸

It is extremely difficult to predict the impact of healthcare utilisation by nursing home residents on economic status for various reasons. First, the link between emergency care and utilisation is weak in older patients, particularly for nursing home residents. Patients tend to visit health care services significantly more frequently than younger patients.⁹ In the present study, we found that the mean cost of an ED visit was \$337.3. Laboratory analysis, radiologic investigations, and, in particular, hospitalisation increased the cost of the visit. In the present study, 38 (15.6%) of the 243 ED visits resulted in hospitalisation during the five-year study period. One study has suggested that age-related increases in the cost were much higher in Canada and the United States than in Spain and Sweden, with costs in Australia, Japan, and the United Kingdom existing somewhere in-between.¹⁰

Nursing homes play a pivotal role in the care of the elderly population in developed and developing countries.¹¹ An estimated 42% of the US population aged ≥70 years spend some time in a nursing home before they die.¹² As age is independently associated with residence in nursing homes, the number of elderly people living in such institutes of care is likely to increase drastically

over the next several decades.¹³ Therefore, the economic burden of healthcare for this particular population will increase.

Stephens *et al.* found that ED visits and hospitalisations are common in tube-fed nursing home residents and have speculated that a significant proportion of both ED visits and hospitalisations are preventable.¹⁴ In the present study, 23 of the 243 ED visits were due to preventable trauma. Preventive measures should be taken in nursing homes to decrease trauma and related healthcare utilisation. Kabiri *et al.* stated that a 554-step-per-day increase in mobility would reduce total medical expenditures by 0.9% among older adults in the United States.¹⁵

This study has several limitations. First, the study was conducted at a single ED with study patients from a single nursing home from one of the west provinces of Turkey. A more comprehensive assessment of the medical records (e.g., disease diagnosis and type of trauma) would increase the accuracy of measures. Second, it is a retrospective cross-sectional design of the study. Therefore, results of this study may not be similar in other parts of the country so a longer multicenter study would be ideal on the subject.

New strategies need to be developed for the increased ED visit, cost, and length of hospital stay of geriatric patients living in nursing homes. New healthcare service applications along with potential solutions to prevent a substantial proportion of ED visits and hospitalisations should be the first of these measures to be implemented. Precautions should also be taken on preventable traumas. Providing a safe, cost-effective, and timely emergency healthcare service for this elderly, frail, and vulnerable population, may help resolve this important geriatric health-related problem and improve the quality of life.

CONCLUSION

Emergency department visits and hospitalisation are common among elderly patients living in nursing homes. However, emergency department visits by this frail population put a heavy burden on the economy. This cost burden increases especially in patients who need to go to intensive care.

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