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Invited Research Article

Chief Complaints of Elderly Individuals on Presentation to Emergency Department: A Retrospective Analysis of South Korean National Data 2014

Misoon Song, RN, PhD, FAAN, [1, 2] Xianglan Jin, RN, MSN, [2, 3] Ha Na Ko, RN, GNP, MSN, [2, 3] Sunghee H Tak, RN, MPH, PhD [1, 2, *]

[1] College of Nursing, Seoul National University, Seoul, South Korea
[2] The Research Institute of Nursing Science, College of Nursing, Seoul, South Korea
[3] Graduate School, College of Nursing, Seoul, South Korea

S U M M A R Y

Purpose: We aimed to assess the chief complaints (CCs) of elderly individuals on presentation to the emergency department (ED) according to gender, age, and disease-related and injury-related visits.
Methods: The 2014 registry database of the National Emergency Department Information System in South Korea, which included data on 908,761 ED visits by individuals aged 65 years and over, was reviewed.
Results: We found that 80.7% ED visits were related to disease, whereas the remaining visits were related to injury. The most common CCs presented by elderly male and female individuals with disease-related visits were dyspnea and dizziness, respectively. The 10 most common CCs accounted for 45.5% and 49.2% of the total disease-related visits for male and female individuals, respectively. The most common CC in male and female individuals with injury-related visits was headache and hip pain, respectively. The CC rank showed minimal variance among the different age groups, but a difference was observed between male and female individuals. The most common mechanism of injury in elderly male and female individuals was slipping, wherein females showed a higher occurrence rate than their male counterparts.
Conclusions: These findings can be used to establish an ED training curriculum for nursing students and ED nurses, particularly for ED triage in the elderly.
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Introduction

According to the United Nations report, the pace of aging of the world population has increased, and the growth of elderly populations will be faster in Asia than in other regions between 1980 and 2050 [1]. Due to such an increase in the number of elderly individuals in Asian population in recent years, the demand for emergency department (ED) care has also markedly increased in Asian countries [2]. Elderly people account for approximately 12.0–21.0% of all ED visits [3,4]. In fact, patients aged 75 years and over are included in a new age group, and have the second highest annual ED visit rate after infants aged less than 12 months [5,6]. Moreover, these patients are likely to undergo additional diagnostic tests and consultations, and have a longer hospital stay and higher admission rate from the ED [6,7]. After ED visits, elderly individuals are discharged, admitted to the same hospital, or transferred to another hospital. Elderly patients are more likely to be admitted to the hospital than younger patients [2]. Recent studies indicate that an increasing proportion of elderly patients are discharged, after which they revisit the ED and are subsequently readmitted to the hospital [3].

Elderly people exhibit complex disease presentation and symptoms associated with chronic diseases and multiple comorbidities [3,8], thus leading to complications in ED triage [9]. A few studies have assessed the reasons for ED visits, which were classified based on diagnostic categories or body systems [10,11]. These studies demonstrated a broad view of reasons for ED visits based on the diagnostic terms reported at the time of discharge from the ED, rather than at the time of presentation to the ED.

In the last decade, there has been growing interest in chief complaints (CCs) presented at the ED as well as in the diagnosis made. A CC is defined as the patient's reason for seeking care or

* Correspondence to: Sunghee H Tak, RN, PhD, College of Nursing, Seoul National University, 103 Daehak-Ro, Jongno-Ku, Seoul, 03080, South Korea.
  E-mail address: shtak@snu.ac.kr

attention in the ED, which is captured by a clinician at initial presentation [12]. Diagnostic functions and triage represent the most common procedures performed by ED nurses in the presenting patients [13]. In fact, ED nurses often examine the patient before the physician [2]. The CC of the patient on presentation to the ED serves as the basis of triage, diagnosis, treatment, care planning, and care administration. CCs have particular relevance in ED care, since initial patient care is planned around the management of the CC, long before a diagnosis is made [14]. Hence, algorithms that first consider CCs have been developed and used for patients visiting EDs [15]. Moreover, the CCs at the ED have been categorized and developed into an ED curriculum for medical students [16], in order to enhance their ED training by promoting assessment and decision making based on CCs, as in actual ED settings. Moreover, studies on the standardization of CC terminology (vocabulary) were performed in order to develop ED electronic informatics systems and documentation [12,14]. The lack of consideration of the patient's complaint during initial ED care in elderly people may lead to greater triage error [17]. Moreover, it is known that presenting complaints when entering ED are different between elderly people and younger people in terms of the rank [18] and contents [19]. Although, it is not known what the differences between the two genders and sub-age groups are in elderly people.

Despite the importance of CC at the ED, only few attempts have been made to analyze and describe the types and prevalence of CCs presented at the ED, particularly in the elderly population with representative data. Moreover, in studies related to the CCs in the ED, analyses have been limited to disease-related visits excluding injury [15], injury-related ED visits (a U.S. study) [20], or have used a small sample size from a single hospital without differentiating between age groups [16]. Thus, the CCs on ED visits need to be reviewed while considering subpopulations, such as gender, age, and disease-related or injury-related visits. The analysis of big data could provide valuable insight into the CCs of elderly people presenting to the ED. Moreover, these results will serve as important information for developing ED nursing curricula for students as well as in-service education modules for ED nurses, as there is an urgent need for training emergency medicine personnel in Asian countries [2].

Thus, in the present study, we aimed to examine the CCs of ED visits among elderly individuals by using national data from South Korea, in order to obtain a critical understanding of the foundations for triage and to better plan ED care in elderly people with different features (disease-related or injury-related visit, male or female, and older age groups).

We addressed three research questions in this descriptive study, including the following: (a) What are most frequent CCs among elderly individuals presenting to the ED for disease or injury? (b) What are the differences in the CCs made between male and female elderly individuals presenting to the ED? (c) What are the differences in the CCs made between elderly people presenting to the ED according to sub-age groups?

Methods

We performed a retrospective review of the CCs and patient characteristics available in the registry of the National Emergency Department Information System (NEDIS). The NEDIS database from January 1, 2014, to December 31, 2014, was used, as it is the most up-to-date database available. The NEDIS was created by the National Emergency Medical Center in 2007 in Korea. We used data collected in NEDIS from 143 regional ED centers. Following a review of the data utilization proposal, the National Emergency Medical Center released the data to our research team after excluding items related to personal identification.

The initial data included 909,663 ED visits by individuals aged $\geq$ 65 years. The data were filtered by excluding cases with missing information on age and/or sex ($n = 902$, 0.099%); finally, data on 908,761 ED visits were included in the study. The ratio of the missing variables after cleaning for unavailable age and sex data ranged from 0% to 1.4%. Individuals were categorized into three age groups—young-old group (65–74 years), middle-old group (75–84 years), and old-old group ($\geq$ 85 years)—and the data were compared among the groups.

Analyses were performed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used for the demographic variables and the characteristics of the ED visits. The 10 most common CCs on ED visits were analyzed separately based on disease or injury-related presentation, age groups, and gender.

Ethical considerations

Ethical approval was obtained for the study, from the Institutional Review board of Seoul National University (IRB No. E1512/ 001-002), prior to study initiation.

Results

Characteristics of elderly people who visited ED

The characteristics of the sample are presented in Table 1. The number of elderly female patients (52.3%) was greater than the number of elderly male patients visiting the ED in 2014. Approximately half (49.2%) of the patients were assigned to young-old group. Overall, 85.6% of ED visits were made for emergency conditions and 14.4% of ED visits were made for nonemergency conditions, based on the criteria of the Korean National Emergency Medicine Act. Patients in the middle-old group had the highest rate of presentation for emergency conditions.

The number of disease-related ED visits was greater than the number of injury-related ED visits. A total of 80.7% ED visits were related to disease and 18.5% were related to injury. The proportion of injury-related visits was highest in the young-old group group. With regard to the level of consciousness, 90.9% of the sample were alert at the time of the ED visit. The proportions of cases with other levels of consciousness, response to verbal stimulus, response to painful stimulus, and no response were 3.9%, 2.8%, and 2.4%, respectively. Most of ED visits occurred in the morning and afternoon. The mean duration between symptom onset (or injury) and ED visit was 68.63 ± 638.93 hours. The mean length of ED stay prior to discharge or transfer was 6.15 ± 13.19 hours. Approximately half of the ED visits (51.6%) resulted in discharge to home (community), whereas 42.0% of ED visits resulted in the patient being admitted to an inpatient unit; only 2.2% of ED visits resulted in death.

CCs presented during disease-related ED visits

The 10 most common CCs on ED visits were analyzed separately for disease-related and injury-related visits. Table 2 shows the 10 most common CCs among disease-related visits. The ranks and contents of the CCs differed between male and female patients. In male patients with disease-related visits, dyspnea was the most common CC, followed by abdominal pain, dizziness, fever, chest pain, asthenia, headache, difficulty passing urine, painful micturition, and syncope in that order. In female patients with disease-related visits, the 10 most common CCs included dizziness, abdominal pain, dyspnea, fever, asthenia, chest pain, headache, vomiting, epigastric pain, and chest discomfort in that order. The 10