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Short-term Outcome of Elderly Patients Discharged from an Emergency Department

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ABSTRACT

Background: Elderly people are at risk of higher morbidity and mortality rates whether in normal or medical conditions. In this research, the short-term outcomes of elderly and non-elderly groups discharged from the emergency department, Imam Hossein Hospital were studied.
Methodology: This cross-sectional study was conducted in 2012 on two groups of elderly patients (> 65 years) and non-elderly patients (< 65 years), all of who had been admitted to the emergency department. One week and three weeks after discharge, re-referral of the patients was followed up by phone conversation. The data was analyzed using SPSS Ver. 20 and the level of statistical significance was considered to be $p < 0.05$.
Results: Totally 286 patients participated in this study, including 143 elderly and 143 non-elderly patients, 48.3% of whom were females and 51.7% were males. Neurological problems were the most common disorder among the elderly (14.6%), and hypertension was the most common previous disease history in them (8.7%). In sum, 27.9% of the elderly were readmitted one week after discharge, and the rate was 8.3% for the next follow-up, i.e. three weeks after discharge, which was higher than the rate of re-referral for non-elderly patients ($p < 0.05$). The leading cause for re-referral of elderly people in the first follow-up was neurological diseases (11%) and heart diseases in the second follow-up (26.4%).
Conclusion: The re-referral rate after discharge among the elderly is high, so it is necessary that complete diagnostic and therapeutic measures and rehabilitation cares be performed to improve the conditions of the elderly and to reduce treatment costs and the length of stay (LOS).
KEYWORDS: The elderly, Re-referral, Emergency, Follow-up, Short-term outcome.

INTRODUCTION

Today, medical, social and economic development has increased life expectancy and has reduced mortality rate, and consequently the number of the senior in the world is increasing day by day. Elderliness means being over 60 years old. The elderly population is projected to be about 14% of the world population within the next thirty years. Population aging has also begun in Iran. Based on a population index, if more than 12% of the total population will be 60 years old and older, or if 10% of the total population will be 65 years old and older, the population will be called an aged one (1, 2).

Nowadays, many researches are conducted on outcomes of the elderly after discharge (6, 7). Most of such researches are performed regarding the mortality rate, readmission and the functionality of the elderly after discharge (8, 9). The elderly patients discharged from the emergency departments of the hospitals are often at the risk of readmission, hospitalization and loss of independence and even death (15-19). In addition, almost a quarter of elderly patients who are discharged from the hospital will be re-referred within three months after discharge (20). Studies show that the elderly are admitted to the emergency departments of the hospitals more than the youth due to three reasons (15, 16). They often suffer from chronic diseases at this age and need more care; their clinical and social problems are not resolved properly, and even when they are provided with suitable facilities, it may be difficult for them to access them. Recent studies regarding the short-term follow-up of the elderly have shown that patients who are discharged from the emergency departments are at risk of functional decline, readmission to hospital, hospitalization and death (21-26).

Up to 24% of the elderly will be re-referred to hospitals within three months after discharge; 24% of the elderly will be readmitted at the emergency departments and 10% will die (27-29). Old age, functional and independence decline, living alone, lack of social support, various diseases, taking multiple medications, hospitalization or emergency department admission are the most important undesirable consequences for this group (30, 31).

Due to the vulnerability of the elderly population, they require additional attention in terms of medical care; in other word, providing better medical care can reduce re-admission and associated additional costs of treatment for them drastically. The aim is to enable elderly people to live independently and perform their own

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daily activities (10). The physiological and psychological functions and treatment are of great importance in such researches (11-13). Furthermore, rehabilitation measures are among the necessities for the elderly.

Therefore, taking some measures to improve physical and mental conditions in this age group is of great importance. Elderly people are at risk of higher morbidity and mortality rates whether in normal or medical conditions compared with other age groups, and this is much more important in emergencies and critical conditions. Providing further cares for the elderly in such conditions is considered to be among the most important issues in emergency medicine and requires that the aspects of the issue to be determined for this age group and be compared with other age groups. Then the action plan to improve the health conditions of the elderly can be devised. Therefore, in this research the short-term outcomes in elderly and non-elderly groups discharged from the emergency departments of the hospitals affiliated with Shahid Beheshti University were studied for 2011 and 2012.

METHODOLOGY

In this cross-sectional study, elderly patients (> 65 years) and non-elderly patients (< 65 years) discharged from emergency departments of the hospitals affiliated with Shahid Beheshti University were studied in 2011 and 2012, and were subject to two short-term follow-ups (i.e. one week and three weeks after discharge). Demographic and clinical data such as disease diagnosis and history, causes of readmission and treatment outcome were included in the checklist. Morbidity, i.e. nonfatal complications, and mortality rates during one-week and three-week follow-up periods were determined and compared. The data was analyzed using SPSS Ver. 20. Frequency and its percentage were determined for qualitative variables and mean and standard deviation were calculated for quantitative variables. For comparison of the variables, chi-square test and independent samples T-test were used and the level of statistical significance was considered to be $p < 0.05$.

RESULTS

Totally 286 patients participated in this study, including 143 elderly and 143 non-elderly patients, 48.3% of whom were females and 51.7% were males. The mean and standard deviation of length of stay were 4.57±3.65 hours for elderly patients and 4.23±2.94 hours for non-elderly patients; thus, there was no significant difference between the two groups in this regard Disease diagnoses of the patients are shown in Table 1. Problems related to nervous system diseases were the most common diagnosed cases both in the non-elderly (n=45, 15.7%) and the elderly (n = 40, 14.6%).

Table 1 shows the previous disease history among patients, where 69 non-elderly patients (24.1%) and 128 elderly people (44.8%) had previous disease history. The number of people with previous disease history was significantly higher in the elderly ($p < 0.05$)

Results of one-week follow-up are shown in Table 2; 79 elderly patients (27.9%) and 30 non-elderly subjects (10.6%) were re-referred one week after discharge from the emergency department; thus the elderly showed higher re-referral rate during one-week follow-up ($p < 0.05$).

Among the elderly who were re-referred within a week after their discharge, 60 patients (55%) were referred to hospitals and 19 patients (17.4%) were referred to clinics or offices. Among the non-elderly, 17 patients (15.6%) were referred to hospitals and 13 patients (11.9%) were referred to clinics or offices. The mean and standard deviation of hospital readmission after discharge were 2.41±1.4 days for non-elderly patients and 2.4±1.6 days for elderly patients; thus, there was no significant difference between the two groups.

Among the non-elderly, 13 patients (11.9%) and among the elderly, 41 patients (37%) cited that their re-referral was due to no remission; meanwhile, 17 non-elderly patients (15.5%) and 38 elderly patients (34.8%) were re-referred for follow-up.

Table 1: Disease history and diagnosis of the patients

Disease diagnosis	Disease: N (%)	Non-elderly: N (%)	Elderly: N (%)
	Pulmonary	12(4.1)	27(9.9)
	Cardiovascular	20(6.9)	33(12)
	Gastrointestinal	22(7.6)	22(8)
	Nervous system	45(15.7)	40(14.6)
	Blood	3(1.1)	2(0.7)
	Genitourinary	16(5.8)	6((2.2)
	Diabetes	1(0.3)	5(1.8)
	Musculoskeletal	15(5.2)	0
	Other	9(3.3)	2(0.7)
Disease history	Diabetes	5((1.7)	15(5.2)
	Hypertension	6(2.1)	25(8.7)
	Cardiovascular	5(1.7)	16(5.6)
	Pulmonary	4(1.4)	15(5.2)
	Cancer	5(1.7)	3(1)
	Other	21(7.3)	16(5.6)
More than one disease		23(16.1)	38(26.6)

Re-referral of non-elderly patients within one week after the discharge was due to the following reasons: 5 patients (4.6%) because of cardiovascular disorders, 6 patients (5.5%) for gastrointestinal problems, 12 patients (11%) due to neurological issues, 4 patients (3.7%) because of genitourinary problems, 1 patient (0.9%) due to diabetes, 1 patient (0.9%) for bone and muscle disorder, and 1 patient (0.9%) because of other problems. However, re-referral of elderly patients were due to the following issues: 16 patients (14.7%) due to cardiovascular problems, 16 patients (14.7%) as a result of pulmonary diseases, 11 patients (10.%) because of gastrointestinal problems, 28 patients (25.7%) due to neurological disorders, 3 patients (2.8%) for genitourinary problems, 1 patient (1.8%) due to diabetes, 1 patient (0.3) due to bone and muscle disorder and 3 patients (2.8%) for other problems.

The outcomes of re-referral during the one-week period for the elderly were as follows: 57 patients (51.4%) were discharged, 12 patients (10.8%) were readmitted to emergency department, and 12 patients (10.8) were hospitalized. Meanwhile among non-elderly patients, 19 patients (17.1%) were discharged, 5 patients (4.5%) were readmitted to emergency department and 6 patients (5.4%) were hospitalized (Table 2).

Table 2: Results of the first follow-up (after one week)

Number of referral*		The elderly: N (%)	The non-elderly: N (%)
		79(27.9)	30(10.4)
Cause of referral	No remission	41(37)	13(11.9)
	Follow-up	38(34.8))	17(15.5)
Result*	Discharge	55(51.4)	19(17.1)
	Hospitalization	24(21.6)	11(9.9)
Hospitalization* Result	Wellness	21(61.7)	11(32.3)
	Death	3(8.6)	0

*p<0.01

The mean and standard deviation of length of stay for the first follow-up were 5.3±2.5 days for elderly patients and 5.3±2.1 days for non-elderly patients, and there was no significant difference between the two groups in this regard. The outcomes of readmission of the patients were as follows: among the elderly patients, 21 patients (61.7%) remitted and 3 patients (8.6%) died; meanwhile, among the non-elderly, 11 patients (32.3%) remitted.

Results of the three-week follow-up are shown in Table 3; 24 elderly patients (8.4%) and 10 non-elderly patients (3.5%) were re-referred. Re-referral rate was significantly higher in the elderly group ($p < 0.05$).

The mean and standard deviation of re-referral for the second follow-up, i.e. three weeks after discharge, were 12±7.1 days for elderly patients and 11.2±5.8 days for non-elderly patients; thus, there was no significant difference between the two groups in this regard. In sum, 15 elderly patients (44.2%) and 4 non-elderly patients (11.7%) were readmitted to hospitals, while 9 elderly subjects (26.5%) and 6 non-elderly subjects (17.6%) were referred to clinics or offices.

Re-referral occurred for 18 elderly patients (23.5%) and 3 non-elderly patients (8.8%) due to no remission, while 16 elderly people (47%) and 7 non-elderly people (20.6%) were re-referred for follow-up.

Table 3: Results of the second follow-up (after three weeks)

Number of referral*		The elderly: N (%)	The non-elderly: N (%)
		24(8.4)	10(3.5)
Cause of referral	No remission	18(23.5)	3(8.8)
	Follow-up	16(47)	7(20.6)
Result*	Discharge	15(44.1)	8(23.5)
	Hospitalization	9(26.4)	2(5.8)
Hospitalization* Result	Wellness	5(45)	2(18)
	Hospitalization	4(36)	0

*p <0.01

Re-referral of elderly patients within three week after the discharge was due to the following reasons: 3 patients (8.8%) due to pulmonary diseases, 9 patients (26.4%) because of cardiovascular diseases, 4 patients (11.7%) because of neurological diseases, 5 patients (14.7%) for gastrointestinal problems, 1 patient (2.9%) due to bone and muscle disorder, and 2 patients (5.8%) for other reasons. Non-elderly patients were re-referred because of the following issues: 1 patient (2.9%) due to pulmonary disorder, 7 cases (20.5%) due to cardiovascular diseases, and 2 patients (5.8%) due to neurological problems.

Among the non-elderly, 8 patients (23.5%) were discharged, 1 patient (2.9%) was readmitted to emergency department, and 1 (2.9%) was hospitalized. However, among the elderly patients: 15 patients (44.1%) were discharged, 3 patients (8.8%) were readmitted to emergency department and 6 patients (17.6%) were hospitalized.

In sum, 14 elderly patients (41.1%) and 6 non-elderly patients (17.6%) remitted, while 10 elderly subjects (29.4%) and 4 non-elderly subjects (11.7%) were not remitted. None of the patients died; 2 patients (18%)

among admitted non-elderly people remitted. Among the elderly, 5 patients (45%) were remitted and 4 patients (36%) were still hospitalized. The mean and standard deviation of length of stay for the second follow-up were 8.2±2.6 days for elderly patients and 5.5±2.2 days for the patients aged less than 65 years; there was no significant difference between the two groups in this regard.

The results of the final regression model show that the odds ratio of elderly patients (age ≥ 65 years) for readmission to the hospital within one week is 4.25 times higher (OR = 4.25, CI: 95%, 2.4-7.4). In addition, the odds ratio of elderly patients for readmission to the hospital within three weeks was found to be 2.7 times higher (OR = 2.7, CI: 95%, 1.2-5.8)

DISCUSSION

In this study, short-term outcomes for elderly and non-elderly patients discharged from emergency department, Imam Hossein Hospital were compared. The findings of this study showed that after discharge the elderly populations (i.e. aged above 65 years) are more prone to re-referral and hospital readmission.

Emergency department is a place where many elderly patients with various diseases are admitted, and undergo early diagnosis and treatment. In the present study, the diagnosis by emergency department physicians for the elderly included neurological (14.6%), cardiovascular (12%), pulmonary (10%) and gastrointestinal (8%) diseases. It should be noted that 44.8% of the elderly subjects had previous disease history, including hypertension (8.7%), heart failure (5.6%), diabetes (5.3%) and pulmonary disease (5.2%), while 24.1% of the non-elderly subjects also had previous disease history.

Cardiovascular diseases are the most common problems that the elderly are facing with. Studies have shown that the risk of chronic diseases in the elderly will increase significantly as age increases (41). In addition, 80 percent of seniors suffer from at least one chronic disease and this will put them at higher risks of mortality and morbidity than others (42, 43). Besides the quality of life of the elderly decreases due to lack of exercise and being homebound and this leads to greater incidence of obesity and overweight in them, this is associated with increased risk for cardiovascular diseases (44, 45). One of the most common diseases of aging is hypertension or high blood pressure, which in turn is the cause for other diseases such as kidney failure, heart diseases and stroke (46). With population aging, cardiovascular diseases have become a common disorder among the elderly (47). Aging is associated with more diseases or chronic disabilities among individuals. In the United States, 80 percent of the people aged 65 years or over have one or more chronic disease(s). Heart failures, cancers, diabetes, respiratory diseases, musculoskeletal disorders, and digestive and neurological diseases are among the most common problems at this stage. Nevertheless, the incidence of these disorders have shown to be significantly related with age; so that in the United States, 5% of the elderly aged 65-70 years, 12% of the elderly aged 75-84 years and 35% of the elderly aged more than 85 years suffer from disabilities and diseases. In Iran, despite the relatively high elderly population, few studies have been conducted on the prevalence of chronic diseases and associated symptoms with aging.

A study performed in Chile showed that 33% of the subjects had experienced malnutrition (56). In another study conducted in Italy on 569 patients with gastrointestinal problems, it was found that 2.5% of patients were older than 65 years (57). In our statistical population 44 patients had gastrointestinal problems, of whom 22 patients were elderly and 22 were non-elderly. The cause for higher level of gastrointestinal problems in the present study vs. the previous one is "multi pharmacy", i.e. multiple drug use, among the elderly, which in turn leads to further gastrointestinal problems.

In our study, 29.6% of the patients (n = 85) were diagnosed with neurological problems and approximately half of them aged 65 years or over (n = 40). Neurological diseases and mental health problems were prevalent among the elderly and we found no detailed statistics of their prevalence in our country. In our statistical population, 18.5% (53 patients) were diagnosed with cardiovascular diseases, and 62% of them were older than 65 years. It is an indication of high incidence of cardiovascular diseases in the elderly, and this is consistent with the previous studies concerning the prevalence of cardiovascular problems among the elderly in Iran and elsewhere in the world. Moreover, 13.6% of the subjects (n = 39) had pulmonary diseases, 70% of whom aged 65 years or over. It should be noted that the prevalence of cardiovascular and pulmonary problems in the statistical population is high and a major reason for such a high rate can be high levels of air pollution in Tehran. Unfortunately, due to excessive air pollution and drastic reduction of clean air in this city, the number of patients with cardiopulmonary diseases has increased by about 30 percent.

In our study, 46% of people aged less than 65 years and 90% of those aged 65 years or over had previous disease history. Of the 20 patients who had a history of diabetes, 15 of whom were the elderly. In a study conducted in New Zealand, the prevalence of diabetes in the elderly population was reported to be 6%, while in another study in the United States, the incidence of diabetes was reported as 25% (5, 7, 16). The incidence of diabetes in the elderly in our study was 10%. This difference may be associated with the number of the samples, different study areas, different nutritional habits and genetic and hereditary background (50-55). History of hypertension among the elderly in our study was 8.7%, and such high rate of prevalence of hypertension is

consistent with the results of the studies in other countries. History of heart diseases among the elderly was 5.6% (n = 16) indicating that the condition is more common in the elderly (5). History of pulmonary diseases among the elderly was 5.2%, which is still high and indicates a high prevalence of the disease among the elderly.

The first follow-up, i.e. after a week, showed that 79 elderly patients and 30 non-elderly patients were readmitted to the hospitals; among which, 39 patients were re-referred due to no remission and 38 patients for follow-up. The mean of re-referral was 2.5 day onward and 27% of the elderly failed to remit after initial admission to the emergency department; this problem may be because of a number of reasons, including poor and insufficient performance of the emergency departments for treatment of these patients, chronic diseases and severe conditions of the elderly patients. In a previous study conducted in Albania, among 100 patients, 11% of them re-referred in the first day (5). In our study, after the first follow-up that was carried out a week later, 27% of seniors were re-referred, which reflects that their concerns were still unresolved.

The causes for referral of the most of elderly patients included neurological diseases (n = 30), cardiovascular diseases (n = 21), pulmonary diseases (n = 20) and gastrointestinal disorders (n = 13), respectively. In a study conducted in Chicago on the short-term outcomes of discharged elderly patients, 16% of the patients were readmitted within 1 to 3 months after discharge, and this is consistent with our study (30). This suggests that the problems associated with the physical and psychological health cause some complications after discharge among the elderly. In the follow-up conducted three weeks after discharge, 24 elderly patients were re-referred, while only 10 people under 65 years were re-referred; 18 elderly patients were readmitted due to no remission and 16 elderly patients for follow-up purpose. Re-referral of elderly patients was due to the following reasons: 9 patients because of cardiovascular diseases, 5 patients for gastrointestinal problems, 4 patients because of neurological diseases and 3 patients due to pulmonary diseases; while 15 elderly patients were discharged, 3 patients were readmitted to emergency department and 6 patients were hospitalized. These results also show that the readmission of elderly in the emergency departments is mainly due to complications associated with the initial admission (5).

Limitations

This study had some limitations, the most important of which was small statistical population, so it is better that in future studies larger populations are used for follow-up of the treatment of the elderly. Since the symptoms, treatment and severity of various diseases are different, it is better to design separate studies for the different types of diseases the elderly are involved with, in order to obtain results that are more practical. In this study, some elderly patients had multiple diseases and we have not investigated this issue in details, because multi pharmacy and suffering from a number of diseases simultaneously in the elderly can cause other complications that make the disease even more chronic in them. Today in emergency medicine, rehabilitation and home care services are widely used for providing the elderly with higher standards of welfare and reducing length of stay; this issue was not dealt with in this study. Therefore, it is better that in future researches, such services and their impacts on diseases of the elderly be studied.

Conclusion

The findings of this study show that a large number of the elderly are not fully remitted by being referred to the emergency department and go back to the doctor within a short period of time after discharge and with the same symptoms; this imposes huge medical expenses and the diseases become even more chronic. It is necessary that more appropriate and comprehensive measures will be taken to improve the conditions of elderly patients in their early referral to the hospitals and this should be managed so that full and conclusive remission can be achieved; consequently the elderly can continue their treatments independently at home without having to go to the doctor and be readmitted within a short period of time after discharge. In addition, rehabilitation and home care measures can greatly reduce the treatment costs and increase the life expectancy of the elderly.

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