



Preventable Hospitalizations in Older Adults: A Dream or Reality?

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Abstract

Preventable hospitalization is defined as hospitalization of patients in healthy conditions with the possibility of treatment by outpatient care. Preventable hospitalizations are seen commonly in patients aged 65 years or older. Congestive heart failure and chronic obstructive lung disease are among the leading causes of preventable hospitalizations. Chronic diseases, geriatric syndromes, and care challenges are the most important risk factors. The decrease in the rate of preventable hospitalizations may make important contributions for adopting better and improved health practices, ensuring cost-effectiveness, and effectively utilizing resources. To prevent these hospitalizations, the follow-up of patients at risk with the inter-disciplinary team, the implementation of advanced discharge planning during discharge, the control of used drugs after discharge, and care support out of hospital are needed.

Keywords: Aged, hospital charge, prevention and control

Sample Case-1

An 84-year-old male patient applied to a primary care clinic with the complaint of left hip pain. The patient was diagnosed with myalgia and was given nonsteroidal anti-inflammatory drug (NSAID) (dexketoprofen) and muscle relaxant (feniramidol). After 1 week, the patient was brought to the emergency service due to anorexia and nausea by his relatives. He had been continuously using escitalopram 10 mg and rivastigmine patch 10 cm² for depression and dementia comorbidities. According to the laboratory investigations, it was seen that serum creatinine was 2.53 mg/dL (1.07 mg/dL 3 months ago), urea was 89 mg/dL (30 mg/dL 3 months ago), and potassium was 6.02 mg/dL (3.79 mg/dL 3 months ago). The patient was hospitalized with the diagnosis of acute renal failure and dehydration.

Sample Case- 2

A 78-year-old female patient applied to the emergency care unit with the complaints of fever, cough, and respiratory disorder. It was found out that the patient had chronic obstructive pulmonary disease (COPD) and hypertension in her history. In physical examination, O₂ saturation was found to be 86%, arterial blood pressure was 95/55 mmHg, respiratory rate was 32/min, and there was a decrease in the respiratory sounds in the right lower lung zone. After the posteroanterior chest X-ray showed an infiltration zone on the right, the patient was hospitalized with the diagnosis of pneumonia and intravenous antibiotic therapy was started. On the second day of hospitalization, the patient had a complaint about chest pain. Clinical, laboratory, and electrocardiography (ECG) examinations were performed at the first evaluation. Following these examinations, cardiac catheterization was decided to be applied. A few days after cardiac catheterization, delirium developed in the patient with the symptoms of sudden loss of consciousness, attention disorder, and hyperactivity. The patient fell off the bed on the eighth day of hospitalization when she was in the delirium state and an intertrochanteric fracture developed in the right hip. The patient was transferred to the orthopedic clinic. After the preparation for surgery, a partial hip prosthesis replacement was performed in the patient.

The Key Points

- “Potentially preventable hospitalizations” are unnecessary hospitalizations despite the possibility of outpatient treatment.
- Frail and old people with multiple chronic conditions are under high risk for hospitalization.
- These hospitalizations put a heavy burden on the country’s economy.
- Heart failure, COPD, pneumonia, urinary infections, and dehydration are the most common causes.
- To prevent these hospitalizations, interdisciplinary team work, discharge planning, support for drug use, and residential care are needed.

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Introduction

The goal of reducing the hospitalization of the elderly has started to take an important place in the health policies of developed countries in recent years. Because unintended consequences such as medical errors, hospital acquired infections, delirium, patient falls, and nutritional problems can often develop in the elderly admitted to the hospital, and cognitive and functional losses after discharge can be unavoidable. Hospitalizations bring social problems and financial burdens to the patients and their families other than medical problems. Increased health expenditures affect the health system of a country the most. It is considered that a good care plan for the elderly can prevent most hospitalizations, and thus, it would be possible to get rid of unnecessary expenditures, which could affect the economy of the country.

Definition

Potentially preventable hospitalizations are defined as unnecessary hospitalizations despite the possibility of outpatient treatment (1). These hospitalizations can also be due to unnecessary or arbitrary practices. These hospitalizations can be seen in all age groups (2).

In this regard, the health problems that are considered to have hospitalization indications are preventable or avoidable through correct health practices. They are the hospital applications that can be avoided with the proper management of the patient's hospital admissions, correct discharge planning developed during or after the discharge, advanced care planning, and regular follow-ups. These can also be defined as the hospitalizations that can be prevented in outpatient clinics, in home environments, in nursing homes, or in long-term care centers with effective, fast, and patient-oriented practices (1, 3, 4).

History and Practices

The debate on potentially preventable hospitalizations and its use as a term first started in the United States in 1980s. It was started to be practiced in health systems in New York 30 years ago (4). In that period, the aim of this practice was to reach primary health care centers and evaluate and measure the performance of these institutions (4). Today, it is considered as an evaluation criteria of hospital performance (5). For the general health policies, it ranks as an indication of quality in effectiveness of residential care.

The increase in human lifespan and health expenditures, which has increased in parallel with the development in medicine have become the field of interest for the economists in many countries. Considering all age groups, frauding and billing for medical services that are not provided, unnecessary tests and procedures required for the patients, inappropriate or expensive treatment preferences, stage incompatibility in advanced examinations, and treatments are the leading causes in health care fraud in our country. Potentially preventable hospitalizations in elderly people also got involved in these problems (6).

Prevalence

When the general population is examined, it is reported that 10% of all hospitalizations are potentially preventable and

3.9% of them are potentially preventable acute conditions and 6.2% are chronic conditions (7). In the analysis of age groups, it was seen that 60% of these preventable hospitalizations occurred among individuals older than 65 years (7). According to the gender-based analysis, it was found that the number of hospitalizations for chronic conditions was found to be greater in men than in women (6.8% and 5.8%, respectively) and less for acute conditions (3.6% and 4.0%, respectively) (7).

The prevalence of multiple comorbidities among elderly individuals is increasing. While the rate of hospitalization within 1 year is 7.7% in patients with two or more comorbidities, it is 11.2% in patients with three or more comorbidities and 20.5% in patients with four or more comorbidities. It is estimated that about 20% of total hospitalizations are preventable. It was found that the rate of preventable hospitalization among those with cognitive disorder was 44.9% (8). In another study examining the number of days of hospitalization, 37.8% of the total number of days was found to be inappropriate (9). In the systematic analysis of 34 studies in which re-hospitalization was examined, it was reported that the mean proportion of preventable hospitalizations was 27.1% (between 5% and 79%) (5).

Types of Hospitalization

Preventable hospitalizations are basically divided into 4 categories (10):

- **Those that can be prevented through vaccination:** Influenza, some bacterial pneumonia, tetanus, diphtheria, pertussis, mumps, measles, some types of meningitis, hepatitis B, polio, etc.
- **Acute medical conditions:** The cases in which fewer hospitalizations are provided by reducing morbidity and relieving pain with rapid treatments (dehydration, gastroenteritis, cellulitis, bleeding or perforation ulcers, upper respiratory tract infections, appendicitis, epilepsy, gangrene, etc.).
- **Chronic medical conditions:** The cases in which the application of proper care and treatment reduces the number of hospitalizations (COPD, congestive heart failure, diabetes complications, hypertension, etc.)
- **Iatrogenic and drug side effects:** Those which are caused by medical errors and drug side effects rather than the progress of disease.

When evaluated according to the diagnoses, it was found in some studies that congestive heart failure and COPD are the most frequent reasons for preventable hospitalizations among the elderly people (11, 12). In order of frequency, these are followed by bacterial pneumonia, urinary infection, dehydration, drugs, and short- and long-term complications of diabetes mellitus.

Drug side effects in elderly people are more common than other age groups, and they are an important cause of morbidity. Considering the general population, the rate of hospitalizations due to drug side effects is 5.1% (13). Among the elderly group, this rate is 22.6% (13). It is considered that 52.9% of drug-related hospitalizations can be prevented. Cardiovascular drugs, central nervous system drugs, hypoglycemic agents, anticancer drugs, and antibiotics constitute the majority of drug-based causes of preventable hospitalizations (13).

Why is it Important?

Reducing the number of preventable hospitalizations can provide significant contributions to the improvement and development of health care practices to achieve economic savings and to efficient use of resources.

Frail old people with multiple chronic conditions are under high risk for hospitalization. Follow-ups of these patients with appropriate care plans prevent unnecessary use of health care facilities. Reducing the number of hospitalization of patients in this situation prevents possible hospital-acquired complications (hospital infections, medical errors, polypharmacy and related drug side effects, drug-drug interaction, drug reaction, delirium, falls, loss of function, bedsores, malnutrition, and venous thromboembolism) (14). In addition, hospitalizations affect the social life of patients and their relatives negatively.

In terms of acute care in the hospital, reducing these hospitalizations and a more efficient use of hospitals may prevent wasting the workforce of health care personnel and increase the quality of health care provided. In addition, patient waiting lists due to fullness in hospitals can be avoided.

Potentially preventable hospitalizations also increase health expenditures. The requirement and overstaffing for inpatient care, wasting materials in health care facilities, using beds in hospitals, hospital costs of health insurances, and families are major burden on the country's economy (15).

Factors

While there are many factors increasing the risk of preventable hospitalization, chronic diseases, geriatric syndromes, and health care problems for elderly people can further complicate the current relationship. The risk factors increasing the preventable hospitalization for elderly population are as follows:

- ✓ Age of 75 and over (16)
- ✓ Male gender (16)
- ✓ Cardiovascular diseases (heart failure, peripheral vascular disease), COPD, renal insufficiency, cancer, diabetes mellitus (16)
- ✓ Having five or more comorbidities (8, 17)
- ✓ Depression story (17)
- ✓ Having been discharged from the hospital within the last 30 days (17)
- ✓ Low socioeconomic level (4)
- ✓ Drug-related factors:
 - o Polypharmacy (18)
 - o Inability to use medication
 - o Inappropriate drug use (19)
 - o Other medications: first-generation antihistamines, anti-thrombotics, warfarin, anticoagulants, digoxin, NSAIDs, diltiazem, verapamil, nifedipine, alpha-blockers, pioglitazone, rosiglitazone, insulin, sulfonylureas, benzodiazepines, non-benzodiazepines, corticosteroids, anticonvulsants, pseudoephedrine, theophylline, metoclopramide, etc. (20)
 - o Strong anticholinergic medications: amitriptyline, chlorpheniramine, darifenacin, diphenhydramine, fesoterodine, hydroxyzine, olanzapine, oxybutynin, paroxetine, quetiapine, solifenacin, tolterodine, trospium (21),
 - o Drug side effects and drug-drug interactions (22)

- ✓ Frequent visits and visits by other doctors
- ✓ Low education level (4)
- ✓ Living in the city center (23)
- ✓ Smoking story (23)
- ✓ Discharge and post-discharge factors:
 - o Early discharge (22)
 - o Inadequate post-discharge medical support (24)
 - o Post-discharge follow-up problems (24)
- ✓ Insistence of family members (25)
- ✓ Mild cognitive impairment and dementia (26, 27),
- ✓ Fever, fall, dehydration (28, 29)
- ✓ Inadequate social support (30)
- ✓ Failure to provide appropriate treatment (31)

How is it Diagnosed?

Different methods have been tried to be developed so that preventable hospitalizations can be predicted (32, 33). At this stage, some problems arise since many factors contribute to the recognition of risky patients (34). In addition, the fact that the developed methods have been prepared for different diseases also prevents their general use (35). So, far, there is no method started to be applied in health care systems.

The Rothman Index (RI) is a broad method of patient assessment in which 26 medical measurements are recorded. Vital findings, nurse evaluations, Braden wound scale, cardiac rhythm monitoring, and laboratory results are used in this index. In a study in which the validity of re-hospitalizations within 30 days was tested, the risk of re-hospitalization was found to increase among patients with high RI scores. The authors noted that residential care can be used more effectively through the identification of risky patients with this index (36).

In an observational cohort study, Nguyen et al. (37) examined whether the use of recorded clinical information during hospitalization is beneficial for estimating the patient's hospitalization in the near future. They found that hospital-acquired clostridium difficile infection, irregularity of vital signs during discharge, hyponatremia, and duration of hospitalization were important determinants. Particularly, they stated that the model was better at discriminating patients, but the development in predicting was moderate in comparison to the other applicable models. They inferred that the psychosocial and behavioral factors also need to be included in analyses so that the model they created can be further developed (37).

What can be done?

For elderly individuals, a coordinated approach is needed involving elaborate geriatric assessment, which will be performed by multidisciplinary team work at every stage of acute, post-acute, and chronic care of comorbidities. Leadership support, team work, early detection of patients at risk, improved care planning, drug management, and participation of patients and their families come to the forefront as factors that improve the quality and make it reliable in the transitions between care stages of the elderly patient. These practices can be performed in outpatient clinics set up to provide care for the elderly, as consultation services in clinics, and by including in-home care programs outside the hospital.

In recent years, in addition to care needs, various programs have begun to be used so that a more effective coordinated approach

Table 1. Components of an appropriate care plan for the elderly under the risk of hospitalization

Components of an appropriate care plan	Implementation
Interdisciplinary team	<ul style="list-style-type: none"> The interdisciplinary team will include geriatric or internal medicine specialist, nurse, physiotherapist, nutritionist, social care specialist and psychologist.
Improved discharge planning	<ul style="list-style-type: none"> Training of patients, family members and/or caregivers on chronic disease management and treatment Patient visit before discharge Follow-up through home visits or via telephone after discharge Staying in contact with family and/or other caregivers
Improved drug use support	<ul style="list-style-type: none"> Implementation of the polypharmacy mitigation program by using the evidence-based medicine guidelines (Beers Criteria) (AGS Beers Criteria 2015) Decision-making and education in drug use Training of the patient and family members about the benefits and side effects of drugs Following up the patient whether the medication has been taken or not via telephone Medication evaluations before and after discharge
Residential health care practices	<ul style="list-style-type: none"> Home or nursing home visits after discharge Outpatient evaluation via telephone, and through home or nursing home visits Regular review of medication Standardized communication and information transfer after discharge Motivating and supporting the patient and caregiver
Advanced health care planning	<ul style="list-style-type: none"> Although it is not available in Turkey for now, it is evaluated that it will be applied in the future

can be implemented in order to reduce preventable hospitalizations. Through these programs, the current treatment guidelines for geriatrics are aimed to be implemented at the hospital and through post-discharge health care team systematically. The BOOST “Better Outcomes for Older Adults through Safe Transitions” project is a program based on the recognition and evaluation of high-risk patients, and the training of patients and caregivers was aimed and put into practice. As a result of the project, there was a decrease in re-hospitalization rates within 30 days after discharge (38). The “Bridge Model” is a project in which a special care plan is applied to the patient and in which a contact is provided with the caregivers after discharge. Through this practice, re-hospitalizations have been reduced, caregivers were enabled to understand discharge plans and drug indications given to the patients, participation in post-discharge doctor visits were ensured, and a reduction in the stress on patients and caregivers was achieved. (39). “Care Transitions Program” is a project created for the purpose that a health personnel monitors and manages drug treatment, understands the signs and symptoms requiring medical intervention, and makes visits at home or via telephone. According to the results obtained, re-hospitalizations were reduced and the time until the next re-hospitalization was extended (40).

It was indicated in evidence-based studies that the following components should be included in the programs to be prepared in order to ensure a coordinated and effective care (Table 1).

Interdisciplinary team work (41):

This team is formed by a leading physician (geriatric or internal medicine specialist) and health care personnel (nurse, physiotherapist, nutritionist, social care specialist, and psychologist) trained in geriatrics. If required, doctors from different branches are consulted. Through on-patient or regular case review meetings, the medical condition of the elderly patient at risk in terms of hospitalization can be reviewed, and discussions and implementations for necessary interventions can be carried out.

talization can be reviewed, and discussions and implementations for necessary interventions can be carried out.

Improved discharge planning (38, 39):

Education related to chronic disease management and treatment should be given to both patients and the family members and/or caregivers prior to the discharge of elderly patients who are at risk in terms of re-hospitalization. The interdisciplinary team reevaluates the patient again before discharge. Soon after discharge (within the first 72 hours) and in the first month, the nurse who has been trained in geriatrics visits the patient at home or gets information about the patient’s health condition via telephone and shares the information with the interdisciplinary team. The cases that are thought to have worsening conditions are invited to the outpatient clinic. The social care specialist in the team consults with the patient and the family members upon discharge procedure.

Improved drug use support (20):

For elderly patients, the doctors in charge, and, if possible, a team with a pharmacologist should decide on the medication by using evidence-based medicine guidelines (20). The patient, the relatives of the patient, and, if any, caregiver should be informed about the effects, benefits and possible side effects of the new medication. Purchasing the medication from the pharmacy, using the right dose, stopping the use of it should be controlled via telephone. If the patient is in the hospital, the medication should be re-assessed at the outpatient clinic visits before and after discharge. Medication reduction programs need to be implemented for individuals having polypharmacy.

Residential health care practices (40, 42):

These patients are visited by the health care team at the place where the patients are (home or nursing home) after discharge or after the treatment and applications that are started in outpatient

clinics. In addition, the patient's latest condition can be monitored via telephone, by home, or nursing home visits and/or through polyclinic evaluation. Medications used by the patient are reevaluated during the interviews particularly in the first month. The social care specialist is constantly in contact with the family and/or other caregivers and provides guidance about social problems encountered. When necessary, the patient and caregiver should be motivated and supported by a social care specialist and/or a psychologist. The family physician need to be informed and be kept in contact with for the care of patient's comorbidities.

Advanced health care practices (43):

In this care application which is not yet available in our country, the patient and patient's relatives are told what kind of decision-making situations they may face in the patient's declining years. Following the interview, the decisions made on these matters were formalized and they were applied when the patient developed cognitive impairment. These decisions are cardiopulmonary resuscitation application, ventilator attachment, the placement of percutaneous endoscopic gastrostomy tube or intravenous fluid feeding, and receiving palliative or hospice care.

Conclusion

Preventable hospitalizations are conditions that affect the quality and duration of the patient's life that lead to social and financial burdens on the family as well as unnecessary expenditures affecting the country's economy. In order to prevent these hospitalizations, a follow-up by an interdisciplinary team, an implementation of discharge planning developed at the time of discharge, a control mechanism of the drugs that the patients use, and a residential care support are required for risky patients. There is a need for new investigations to make the determination of this problem in our country.

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