

The impact of socioeconomic status, feeding patterns, and age on eligibility for discharging medical patients

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Abstract

Aims: The study investigates the influence of socioeconomic, age, and nutritional status on discharge eligibility in older adults, focusing on recovery. Understanding discharge time based on patient criteria can aid in managing hospital policies and achieving optimal patient outcomes.

Methods: This retrospective observational research focuses on hospitalized individuals aged 65 and above at King Hussein Medical Centre in Amman, Jordan. The study adheres to Helsinki guidelines and focuses on demographic data, nutritional information, and socioeconomic statuses. Patients were categorized into two age groups: those over 75 years and those aged 65 to 75 years. The study used subjective global evaluation and resource-based metrics to evaluate nutritional condition and socioeconomic status. Lower nutritional statuses were classified as malnourished patients, while higher nutritional levels were classified as normal nourishment. Patients were divided into two groups based on their length of hospital stay (HLOS), with the latter being geriatric patients with an overall HLOS of 7 days or more. The study used serial binary logistic regression analyses to examine the association between prognostic factors, dietary patterns, and age, and the propensity for early discharge. The results were analyzed using chi-square statistical tests and 95% confidence ranges.

Results: A retrospective observational study found that 23.56% of geriatric patients admitted had hospitality days stay of less than one week, while 76.44% had longer admission stay days. Gender disparities were significant, with more men in Group II (longer admission stay days) than in Group I (shorter stay days). Longer admission days had greater distribution rates for patients aged ≥ 75 years, while shorter hospital stays were higher for younger patients. Hospital length of stay varied significantly among groups for patients with body mass indices (BMIs $> 30 \text{ kg/m}^2$). The majority of medically hospitalized patients had a BMI of less than 30 kg/m^2 . No significant differences were found between the two admission days comparative groups when assessing socioeconomic statuses.

Conclusion: Our statistical analyses revealed a significant regressional association regarding patients ageing against the propensity for extended HLOS (0.983 ± 0.192 , $p\text{-value}=0.000$) but insignificant for socioeconomic and nutritional statuses at admission (0.129 ± 0.201 , $p\text{-value}=0.521$) and (-0.143 ± 0.201 , $p\text{-value}=0.478$), respectively, with an estimate propensity ratios of 2.672 (95% CI; 1.834-3.892), 1.138 (95% CI; 0.767-1.688), and 0.867 (95% CI; 0.584-1.286), respectively.

Keywords: Socioeconomic statuses nutritional significance; Medically patient age; Duration of admission; Delayed discharge propensity; Early Discharge eligibility

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1. Introduction

The ability of hospitalized patients to be discharged successfully and rapidly from acute care depends on factors, including but not excluded to, such as patients' acuteness, comorbidity burden, frailty burden, nutritional status, ageing, institutional policy, and patients' socioeconomic statuses 1-5. Early discharge has a long-term impact on readmission propensity and overall quality of patients' life, but there is limited knowledge about potential factors associated with person-centered eligibility factors and discharging propensities in hospital 6-8. Acute care hospitals are subject to internal and local guidelines to ensure discharging is rapid and appropriate. Bed managers play a crucial role in screening patients for early discharge, with between 20-25% of the variation in complexity of patient discharge attributed to training 9-14.

In the demographic era of rapid aging, factors affecting sociodemographics and discharge planning of hospitalized patients have been overlooked 15-7. It is concerning that little is known about whether discharged living patients consider factors other than age, such as those influenced by social and nutritional status, and pay attention to discharge eligibility. The main hypothesis is that ineligible inpatients will have a higher frequency of diagnoses of infectious and ischemic problems 18-21.

The study aims to generate new ways of observing nutritional diagnosis in these inpatients and compare clinical findings related to sociodemographic data. The study's scope and significance are limited due to geographical constraints and the hospital from which the data was collected 22-26. Priority-based discharge decisions aim to identify patients who are medically fit to be discharged at the earliest, creating empty beds for those with higher priority. Timely discharge is essential for reducing financial burden on poor hospitalized patients, cost savings, and improving healthcare outcomes 27-30. Special healthcare packages focusing on patients from lower socioeconomic strata may be adopted through policy formulation 31-33.

Medical nutrition and disease are closely interconnected, with individuals with inadequate nutrition at a higher risk of severe diseases, longer recovery periods, and hospitalization 34-37. Malnutrition is associated with the loss of weight or Body Mass Index, which highlights the impact of nutrition on health. After discharge, about one-third of patients experience weight loss and muscle loss, and many need to be re-hospitalized 38-41.

Functional determinants, such as patients' living place, financial resources, psychological and social variables, and physical living environment, can affect hospital discharge 42-45. Technological advancements accelerate discharge from the hospital, shorten waiting lists, and negatively impact hospital stays. Age is associated with a reduction in physiological reserve, enzyme function, cell structure, immune system, hormonal control, nutritional status, and changes in body composition 46-49.

Inadequate discharge planning from the hospital is a common cause of repeated readmissions or delayed hospital discharge. Low economic levels may decrease or increase susceptibility to malnutrition and inflammation, while those with low education levels have a higher risk of developing malnutrition after hospitalization 50-54. Indeed, advanced age is both positively and negatively affected by the nutritional status of the elderly. Older people are at risk of malnutrition and inflammatory conditions, and poor elderly individuals spend more time with malnutrition 55-58.

In the general population, sociodemographic factors are important predictors of disability and death, but in hospitalized patients, the evidence is outdated and incomplete 59-60. The study aims to explore the impacts of socioeconomic, age, and nutritional status on discharge eligibility in living older people and whether patients are eligible for hospital discharge. The main goal of discharge is recovery, and factors such as socioeconomic status, nutrition, and age can hinder this process. The discharge figure is a piece of the puzzle that summarizes thousands of adult patients' admissions, showing areas in outcomes at each unique step of their care. The optimal time of discharge is a complex process, and understanding discharge time based on patient criteria can help manage good hospital policy

2. Methods

This is retrospective observational research of patients admitted to our institution, King Hussein Medical Centre at the Royal Medical Services in Amman, Jordan, between 2023 and May 2024. The Jordanian Royal Medical Services (JRMS) Institutional Review Board (IRB) initially approved this study at 5 November 2024 with the registration number 33_16/2024. This approved study was formally cleared for publishing after being reviewed by our institution's directorate of professional training and planning at 18 Dec 2024. This study strictly adhered to the declarations of Helsinki guidelines.

The research concentrates on hospitalised individuals aged 65 and above. The eligibility criterion for including tested patients mandated a minimum admission duration of two days. Patients were removed based on specific criteria, including multiple diagnoses, uncertain diagnoses, missing patient data over 5% for each individual, inability to converse, and absence of patient consent. To exclude the impact of unobservable severity of acute illness, individuals who either died or required urgent transfer to other advanced critical care departments were eliminated from the study. This study mostly collected demographic data from patients. The evaluated patients' demographic data emphasised age and gender within the geriatric group. The patients were categorised into two age groups: individuals over 75 years and those aged 65 to 75 years. The duration of the patient's hospital stay was primarily documented in this study.

The data collection encompassed nutritional information evaluated by the registered dietitian and clinical chemist. Data on socioeconomic statuses were obtained from the registered nurse reporting system within the institutional electronic reporting platform (Hakeem). This study employed the subjective global evaluation to evaluate the nutritional condition of the hospitalised patients. The resource-based metrics, such as educational attainment, total family income, labour market earnings, and wealth, were utilised to evaluate the socioeconomic level of admitted medical patients through a composite socioeconomic score (cSES). This study dichotomised both nutritional and socioeconomic statuses into lower and higher ones. This study identified lower nutritional statuses as malnourished patients, whereas higher nutritional levels were classified as normal nourishment.

Patients eligible for this study were largely categorised into two principal comparative groups based on their length of hospital stay (HLOS). The admission duration of 7 days was established as a distinguishing criterion based on the estimated average length of patient stays. Group I comprised admitted senior patients with a hospital length of stay (HLOS) of less than 7 days, whereas Group II encompassed admitted geriatric patients with an overall HLOS of 7 days or more. All comparative patient variables were analysed for differences between the HLOS-related groups (Group I-II) using the chi-square statistical test to determine the significance of the distribution rates across these groups, while presenting the likelihood of extended hospital stays (HLOS \geq 7 days or Group II) for the examined variables as odds ratios.

This study largely employed serial binary logistic regression analyses to examine the association with the inclination to postpone discharge beyond one week or, alternatively, the risk of ineligibility for early discharge. This study focusses on serially examined criteria, including the socioeconomic position of admitted patients, their dietary patterns or nutritional condition, and the age of the admitted patients. The serial binary logistic regression analysis identified the connections between the examined prognosticators and the propensity for early discharge. Furthermore, we abstracted the estimated propensity ratios together with their 95% confidence ranges in these regression analyses. This study employed Microsoft Excel version 20 and IBM SPSS Statistics version 25 for the collection, filtration, modification, and analysis of patient data.

3. Results

Approximately 23.56% (151 patients) of the 641 geriatric patients who were medically admitted had an overall length of hospital stay of less than one week (< 7 days), whereas approximately 76.44% of the admitted medically tested patients (490 patients) had a longer admission stay days (HLOS \geq 7 days), according to this retrospective observational study.

The gender disparities between the two compared HLOS groups were statistically significant in this study; the overall percentage of tested medically admitted females who participated in the trial was roughly 49.6% (318 patients), whereas the percentage of male participants was roughly 50.4 (323 patients). We discovered that there were more men in Group II (longer admission stay days) than in Group I (shorter admission stay days) [283 (57.8%) vs. 283 (57.8%), respectively]. Conversely, we discovered that the shorter stay group had a statistically greater distribution rate of female medically admitted patients [111 (73.5%) vs. 207 (42.2%)].

We found statistically significant differences between Group I and Group II when we looked at the patients' ages, which were divided into two groups based on a predetermined 75-year threshold (p-value=0.000). The longer admission days group had greater distribution rates for medically hospitalised patients aged \geq 75 years than the shorter admission days group [303 (61.8%) vs. 57 (37.7%), respectively]. In contrast, the distribution rates for shorter hospital stays (less than 7 days) were statistically significantly higher for younger medically admitted patients (less than 75 years old) than for those who had longer hospital stays (more than 1 week) [94 (62.3%) vs 187 (38.2%), respectively].

Using anthropometric analysis, we found that hospital length of stay (HLOS) varied statistically significantly (p-value=0.034) among the comparable groups (Group I-II) for medically admitted patients with body mass indices (BMIs

> 30 kg/m²). Compared to the group with a BMI of 30 kg/m² or higher, the majority of the medically hospitalised patients in this study had a BMI of less than 30 kg/m², including 391 individuals (61.0%). When comparing the prolonged admission days group to the abbreviated admission days group, this study showed a statistically significant greater distribution rate for the non-obese admitted cohort [310 (63.3%) vs. 81 (53.6%), respectively].

There were no statistically significant differences (p-value=0.082) between the two dichotomised admission days comparative groups when we assessed the socioeconomic statuses of the admitted patients at admission and categorised them as lower, standard, and higher to express their contribution role in the admitted patients' extended admission days. All tested medical patients with similar socioeconomic categories were admitted to our institution at rates of 208 (32.4%), 224 (34.9%), and 209 (32.6%), respectively. The comparison analysis results for the categorical variables of the previously evaluated patients across lower admission days (Group I) and higher admission days (Group II) are displayed in Table 1.

Table 1 Patients' comparative tested variables across HLOS related comparative Group I-II

	Group I	Group II	Overall	OD (95% CI; LL-UL)	P-Value
	Shorter HLOS	Longer HLOS			
	(HLOS<7 d)	(HLOS≥7 d)			
	(151, 23.56%)	(490, 76.44%)			
Gender			641		
F	111 (73.5%)	207 (42.2%)	318 (49.6%)	3.794 (95% CI; 2.534-5.679)	0.000
M	40 (26.5%)	283 (57.8%)	323 (50.4%)		
Age (Years)					
<75	94 (62.3%)	187 (38.2%)	281 (43.8%)	2.672 (95% CI; 1.834-3.892)	0.000
≥75	57 (37.7%)	303 (61.8%)	360 (56.2%)		
BMI (Kg.m2)					
<30	81 (53.6%)	310 (63.3%)	391 (61.0%)	0.672 (95% CI; 0.465-0.972)	0.034
≥30	70 (46.4%)	180 (36.7%)	250 (39.0%)		
SEC					
Lower	60 (39.7%)	148 (30.2%)	208 (32.4%)	NA	0.082
Standard	45 (29.8%)	179 (36.5%)	224 (34.9%)		
Higher	46 (30.5%)	163 (33.3%)	209 (32.6%)		

A chi-square analysis was conducted on several predefined investigated variables across Group I, comprising medically admitted patients with an overall length of stay (HLOS) below one week, and Group II, consisting of medically admitted patients with an overall HLOS of at least one week or more.; HLOS: Hospital length of stay days.; OD: Odd ratio.; CI: Confidence interval.; LL: Lower limit.; UL: Upper limit. SEC: Socioeconomic status.; F: Females.; M: Males; BMI: Body mass index in Kg per m2.

A serial binary logistic regression analyses emphasized the impactful regression coefficient of each of the aforementioned tested prognosticators, patients ageing (<75 years vs ≥75 years), socioeconomical status (lower versus higher), and the nutritional status (Malnourished vs Normal nourished) against the propensity for longer staying in the hospital (HLOS≥7 days). However, our statistical analyses revealed a significant regression association regarding patients ageing against the propensity for extended HLOS (0.983±0.192, p-value=0.000) but insignificant for socioeconomical and nutritional statuses at admission (0.129±0.201, p-value=0.521) and (-0.143±0.201, p-value=0.478), respectively, with an estimate propensity ratios of 2.672 (95% CI; 1.834-3.892), 1.138 (95% CI; 0.767-1.688), and 0.867 (95% CI; 0.584-1.286), respectively. We depicted the binary logistic regression analyses' results below as shown in Table 2.

Table 2 The binary logistic regression analyses' results

	B±S.E.	Sig.	Exp(B) (95% CI; LL-UL)
Age (<75 vs ≥75)	0.983±0.192	0.000	2.672 (95% CI; 1.834-3.892)
Constant	0.688±0.126	0.000	1.989
SEC (Lower vs Higher)	0.129±0.201	0.521	1.138 (95% CI; 0.767-1.688)
Constant	1.136±0.112	0.000	3.114
Nutritional status (Malnourished vs Normal)	-0.143±0.201	0.478	0.867 (95% CI; 0.584-1.286)
Constant	1.220±0.112	0.000	3.388

SEC: Socioeconomical; B: Regression coefficient; SE: Standard error; EXP (B): Propensity risk; CI: Confidence interval; LL: Lower limit; UL: Upper limit.

4. Discussion

The study's most critical practical implication is the evidence provided of the association between low socioeconomic status and malnutrition, as well as an association between inappropriate eating patterns and delayed eligibility for discharge due to nutritional status 61-63. The implications of this observation are significant in the acute care setting where hospital populations are increasingly elderly. Researchers should build on and test hypotheses generated by the study through corroboration in other samples or settings 64-65. Promotion of increased allocation of resources in public health arenas to correct nutrient intake of hospital patients will ensure greater equity among the community 66-67.

Literature reviews revealed that medical nurses often choose age, general condition, cognitive condition, hearing impairment, living environment, and doctor's decision as grounds for not discharging patients 68-69. Psychiatric nurses also consider general condition, cognitive function, current symptoms, doctor's decision, and intelligence for the same purpose 70-71. Nutrition and educational background were also considered by some nurses. Several significant inter-correlations appeared between factors possibly associated with patients' discharge, with the majority of these correlations observed by psychiatric nurses 72-73.

The analyses of this diverse studied in published systematic reviews and meta-analysis studies for medically admitted elderly patients showed that women are more likely to be discharged than men, and married patients are more likely to be discharged than those who are single, divorced, or widowed 74-75. Those who lived with family had a higher percentage of discharge than those who lived alone or in an institution. There was no relationship between occupational status and the estimated percentage of patient discharge 76-77.

Socioeconomic factors such as income, education level, and employment status related to discharge readiness varied from studies included. A cohort study found that participants with a higher monthly income were less likely to develop any discharge problems, while six of the seven studies evaluating education level found that lower education was related to discharge readiness 78-79. Participants without any labor contract were less ready for discharge. Higher age translates to a higher need for the implementation of personalized discharge protocols to maintain the proper transfer of patients. The decision-making capacity decreases with age, which might have implications for the discharge criteria 80-81.

Nutritional status was found to be one of the determinant factors for prolonged hospital stays of people in various patient groups. More complications and prolonged hospital stays are more common in individuals with malnutrition who receive appropriate intervention from a dietitian 82-83. Studies show that 58-59% of undernourished people had a BMI risk of < 5%, while a ≥1-point increase in BMI was recorded for those whose nutritional status improved during hospitalization. Patients with improved nutrition during hospitalization are likely to have safer and timelier discharges 84-85. Early detection and intervention for undernourished people or those at risk of undernutrition need to be assessed as early as possible so that treatment can be done immediately and correspondingly 86-87.

A recent study found that 55-70% of malnourished elderly patients experienced an increase in BMI worth ≥ 1 point during hospitalization. This increase was also recorded during malnutrition. Measurement of BMI/weight in poor nutrition is only possible in chronically malnourished patients, which have lasted for weeks or months 88-89. Serum albumin is commonly used as a plasma nutritional marker due to its long half-life and its association with surgical wound disruption, subcutaneous tissue unraveling, increased hospital and surgical complications, and infections 90-91.

Serum albumin levels are used to predict intestinal wound healing, physical and mental rehabilitation in elderly patients. However, serum albumin is not very sensitive, so an increase in total protein and activity of the measured plasma albumin is highly recommended for improved blood viscosity 92-93. Immediate dietary intervention can avoid worsening malnutrition, inpatient relations with protein, energy, strength, general health, and well-being. High protein/calories reduce the severity of the disease, are more energy efficient, and are added to monitor body composition, metabolism, and drug handling 94-95.

The Nutrition Care system should be continuously and consistently completed if necessary to the time of hospital discharge. Once the determination of current and ideal nutritional status is done, an intervention for good nutrition care and further preparation for discharge should be done accordingly 96-97.

A study aimed to determine the characteristics of patients who should be referred to hospital discharge planning while processing for discharge eligibility and investigate the partial views of clinicians regarding the impact of patients' characteristics on discharge eligibility performance 98-99. Recommendations include patients being discharged from the hospital when there is a clear decision, patients who cannot care for themselves being admitted to a rehabilitation center or discharged to a nursing home, and patients being allowed to make decisions regarding tracheostomy and physical therapy when needed 100-101.

A conducted study aimed to provide insights for discharge planning in hospitals, focusing on health disparities due to economic factors such as low basic income. Low readiness for discharge is believed to be affected by patients' inability to make a personal schedule or choose an alternative care facility according to their needs and abilities 102-103. The study found that age is a key factor influencing the completeness of the discharge criteria, with older patients over 65 years showing a lack of adherence to the discharge criteria. Nutritional status is a focus of the multidimensional approach in the biopsychosocial approach, which must consider the dependence of patients on external caregivers for daily activities 104-106.

Results of a study have implications for clinical practice, suggesting the need for integration of a patient's socioeconomic and age-related background, as well as nutritional status, into policy setting for primary and community care, the right place, and time for discharge 107-110. Strategies can be developed to optimize the time of discharge by using the patient's family ability to pay for care and nutritional status. Discharge recommendations from the hospital need to consider socioeconomic, age-related, and nutritional status, and a discharge care flowchart should be developed with a quantitative approach using a larger sample 111-114.

A conducted study demonstrated that factors related to one's socioeconomic status, age, income, and physical condition at the time of hospitalization positively led to the discharge eligibility of the patient 115-116. Doctors need to address two main issues: high social welfare recipients can quickly return home and do not need to extend hospitalizations, while malnourished patients may delay hospital discharge 117-118. Discharge planning procedures should be supported by an integrated interdisciplinary approach, including social and nutritional preparation, to ensure clinical and financial support and prevent discharge problems 119-121.

Future research directions include investigating the complicated relationships between age, socioeconomic status, nutritional status, and factors associated with discharge eligibility, developing discharge enhancement interventions, and addressing the rich and diverse dimensions of patient readiness for discharge.

5. Conclusion

Our statistical analyses revealed a significant regression association regarding patients ageing against the propensity for extended HLOS (0.983 ± 0.192 , p -value=0.000) but insignificant for socioeconomic and nutritional statuses at admission (0.129 ± 0.201 , p -value=0.521) and (-0.143 ± 0.201 , p -value=0.478), respectively, with an estimate propensity ratios of 2.672 (95% CI; 1.834-3.892), 1.138 (95% CI; 0.767-1.688), and 0.867 (95% CI; 0.584-1.286), respectively.

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest in this manuscript

Statement of ethical approval

There is no animal subject involvement in this manuscript. The Jordanian Royal Medical Services (JRMS) Institutional Review Board (IRB) initially approved this study at 5 November 2024 with the registration number 33_16/2024. This approved study was formally cleared for publishing after being reviewed by our institution's directorate of professional training and planning at 18 Dec 2024.

Statement of informed consent

Owing to the retrospective design of this study, the informed consent form was waived.

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