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Perceived Hospitalized Elder Abuse in Iran: A Cross-Sectional Study of Subscale Patterns and Associated Factors

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Abstract

Background: The growing elderly population in Iran, coupled with the high prevalence of chronic diseases, has increased hospital admissions, thereby

heightening the risk of institutional abuse by caregivers. This study aimed to examine the perceived hospitalized elder abuse among hospitalized older adults and its associated factors.

Methods: A descriptive cross-sectional study was conducted from 2023 to 2024 in hospitals affiliated with Shahid Beheshti University of Medical Sciences, Tehran, Iran. In total, 422 patients aged ≥60 years were recruited through stratified random sampling. Data were collected via face-to-face interviews using a demographic and clinical characteristics form and the Hospitalized Elder Abuse Questionnaire (HEAQ). Factors associated with elder abuse were analyzed using multivariate linear regression in SPSS version 25, with statistical significance set at $P < 0.05$.

Results: The mean age of participants was 70.65 (SD= 6.42) years; 48.1% were female, and 22.3% lived alone. The highest mean score for perceived hospitalized elder abuse was observed in the subscale of environmental and managerial inhibitors, at 2.29 (SD=0.4), and the lowest level of hospitalized elder abuse was found in the subscale of physical and psychological abuse, at 1.16 (SD=0.27). Multivariate linear regression analysis identified older age ($\beta = 0.119$; $P = 0.003$), being female sex ($\beta = 0.154$; $P < 0.001$), living alone ($\beta = 0.119$; $P = 0.002$), and a higher number of medications ($\beta = 0.617$; $P < 0.001$) as significant associated factors of perceived hospitalized elder abuse. The multiple regression model explains 42% of the total variation in perceived hospitalized elder abuse (Adjusted R-squared = 0.419).

Conclusions: These findings suggest potential areas for attention in clinical practice, including enhanced awareness among staff regarding the vulnerability of specific subgroups .Future research should employ longitudinal designs and

interventional studies to evaluate whether targeted strategies can effectively reduce abuse perceptions.

Keywords: Elder Abuse, Hospitalized Abuse, Neglect, Hospitalized Older Adults

Introduction

The global elderly population has been increasing at an unprecedented rate over recent decades, primarily due to declining fertility rates, improvements in health indicators, and increased life expectancy (1). It is projected that by 2050, the population of individuals aged 60 years and older will reach approximately 2.1 billion, with 80% residing in developing countries (2). This demographic shift has multiple social, economic, and healthcare implications, requiring particular attention to the needs of this age group (3). Iran has similarly experienced a growing elderly population in recent years; in 2022, individuals aged 60 and above accounted for more than 10% of the country's population (4), and this proportion is expected to reach approximately one-third by 2050 (5). Such changes are likely to substantially increase the demand for healthcare services, long-term care, and social support (3).

Alongside the growth of the elderly population, elder abuse has emerged as a significant public health challenge(6). At the outset, it is important to distinguish between two related but conceptually distinct phenomena: "elder abuse" and "hospitalized elder abuse" . Elder abuse is a broad term encompassing psychological, physical, financial, and sexual abuse, as well as neglect, typically occurring within a trust-based relationship such as family or caregiving dyads (7, 8). Despite its importance, reporting of elder abuse

remains substantially low in many countries, with barriers such as lack of awareness, fear of consequences, and social stigma limiting disclosure (9, 10).

Global reports indicate that the reported rates of elder abuse are alarming, and in some countries, abuse increased during the COVID-19 pandemic due to social isolation, mobility restrictions, and economic pressures (11, 12). Regional and national studies have also shown that the rate of elder abuse in Iran is considerably higher than the global average (10, 13). According to a meta-analysis, the overall rate of elder abuse in Iran was estimated at 55%, with the most common subtype being emotional neglect (39%) and the least common being social exclusion (15%)(10). Additionally, a cross-sectional study conducted in Qazvin (2025) reported that among 540 community-dwelling older adults, 71.1% had experienced at least one type of abuse in the past year (14).

Traditional family structures in Iran, while often providing support, can become a risk factor for elder abuse under conditions of economic dependency or caregiving stress (13). Other contributing factors include limited social support networks, low awareness of older adults' rights, and the taboo surrounding discussions of abuse, which further exacerbate the risk of abuse in the country (10).

In addition to social consequences, elder abuse has significant negative impacts on the physical and mental health of older adults. These outcomes include physical injuries, anxiety, depression, cognitive decline, disability,

reduced quality of life, and increased hospitalization (15). A study conducted in Iran demonstrated an inverse relationship between elder abuse and quality of life, showing declines in self-care, psychological components (anxiety and depression), physical, cognitive, and social functioning, life satisfaction, and overall health (16). Furthermore, a qualitative study involving in-depth interviews with abused older adults reported multiple physical and psychological consequences, including psychological distress, feelings of worthlessness, physical disability, reduced self-esteem, and compromised overall health (9).

While these community-based findings are important, elder abuse in the hospital setting—more precisely termed hospitalized abuse—presents distinct challenges that differ from abuse occurring at home or in the community. Hospitalized older adults are often highly dependent on caregivers for daily activities such as feeding, mobility, and personal hygiene and may also experience physical or cognitive limitations and fragile clinical conditions, placing them in a particularly vulnerable position (13). Organizational and structural factors, including staff shortages, high workload, lack of specialized training in geriatric care, neglect of emotional and psychological needs, delays in medical or nursing care, and inadequate hospital environments (e.g., poor hygiene, insufficient space, limited equipment), can further increase the likelihood of harmful behaviors (13, 17). A qualitative study conducted across several teaching hospitals in Shiraz reported that older adults and their caregivers experienced a range of

abuses, including care neglect, inadequate emotional support, breaches of professional ethics, lack of clear communication, poor hygiene and facilities, delays in care, and unintentional medical neglect—forms of abuse rooted in structural weaknesses and team performance deficits (13). Additionally, research indicates that hospital staff, including nurses and healthcare personnel, often have insufficient knowledge and awareness regarding elder abuse. Even in the absence of malicious intent, deficiencies in knowledge, attitudes, and caregiving skills may lead to neglect or inappropriate behavior toward older patients (15, 18). A study involving 400 nurses employed in teaching hospitals in Iran in 2022 found that their legal knowledge regarding elder abuse was low, and there was a significant association between knowledge and performance (19).

However, a substantial portion of the literature in Iran focuses on community-dwelling older adults, and large-scale studies specifically examining abuse in hospital settings—using standardized measurement tools and analyzing associated factors—remain very limited. Hospital-based research is often restricted to qualitative studies or case reports. For example, the qualitative study conducted in Shiraz, although in-depth, involved a small sample (16 older adults and their caregivers) and therefore has limited generalizability (13). Considering the importance of identifying underlying factors and mechanisms contributing to elder abuse, as well as understanding risk and protective factors, particularly in hospital environments where older adults are more vulnerable due to greater dependence on caregivers, functional

limitations, and complex clinical conditions, conducting rigorous research is essential. This study was therefore designed to examine patterns of hospitalized abuse among hospitalized older adults in Iran and to identify associated factors at the individual, psychosocial, and organizational levels. The specific research question guiding this study was:

Research Question: What is the level and pattern of perceived hospitalized abuse among hospitalized older adults in Tehran, Iran, and what demographic and clinical factors are associated with it?

Based on the existing literature, we hypothesized that:

- Hypothesis 1: The highest levels of perceived abuse would be observed in the subscales reflecting systemic and organizational factors (e.g., environmental and managerial inhibitors), while direct physical and psychological abuse would be less frequently reported.
- **Hypothesis 2:** female sex, advanced age, living alone, polypharmacy, and previous hospitalization history would be significantly associated with higher perceptions of elder abuse.
- **Hypothesis 3:** The combination of these individual-level factors would explain a substantial proportion of the variance in abuse perceptions.

These hypotheses were derived from previous studies identifying similar correlates of elder abuse in community and hospital settings (17, 20, 21), as well as from the conceptual understanding that systemic vulnerabilities may disproportionately affect certain patient subgroups.

Methods

Setting and Participants

This multicenter descriptive cross-sectional study was conducted from 2023 to 2024 in hospitals and medical centers affiliated with Shahid Beheshti University of Medical Sciences, Tehran, Iran: Imam Hossein Hospital, Loghman Hakim Hospital, Shohada-e Tajrish Hospital, Ayatollah Taleghani Hospital, and Masih Daneshvari Hospital. Within these hospitals, data were collected from 12 medical and surgical wards, including internal medicine, cardiology, neurology, general surgery, orthopedics, and urology. The study population included all elderly patients aged 60 years and above who were hospitalized during the study period. The inclusion criteria were age 60 years or older, hospitalized in one of the educational and healthcare centers affiliated with Shahid Beheshti University of Medical Sciences, willingness to participate in the study, full consciousness during the study, ability to communicate verbally, and having intact hearing. Individuals with moderate-to-severe cognitive impairment, as determined by clinical assessment by the first author (a master's student in geriatric nursing) and review of medical records for documented diagnoses of dementia or cognitive disorders, or those with physical or mental conditions that substantially hindered their ability to understand or respond to the questions, were excluded. The first author was responsible for assessing and confirming the eligibility of all participants before enrollment.

Sampling and Sample Size Calculation

Due to the lack of complete information on the total population of hospitalized older adults, the sample size was calculated using Cochran's formula for an unknown population:

$n = (z^2 \times p \times (1-p)) / d^2$

Where:

z = 1.96 (corresponding to a 95% confidence level)

p = 0.50 (maximum variability, as the proportion of elder abuse in hospitalized Iranian older adults was unknown; 50% provides the most conservative sample size estimate)

d = 0.05 (desired margin of error of 5%)
Based on these parameters, the calculated sample size was: $n = (1.96^2 \times 0.5 \times 0.5) / 0.05^2 = 384.16$, rounded to 385 participants. Accounting for a 10% potential attrition rate, the final sample size was adjusted to 422 participants.

A stratified random sampling method was employed to ensure representation across different hospital types and wards. The strata were defined at two levels: first, the five teaching hospitals were considered the primary strata to ensure representation from each facility. Second, within each hospital, medical and surgical wards were treated as substrata. The sample size for each stratum was allocated proportionally based on the bed capacity and average monthly admission rates of each ward.

The randomization process was operationalized as follows: Each day, the first author obtained the admission list for each participating ward from the nursing station. All patients aged ≥60 years who met the inclusion criteria

were identified from the admission list. Using simple random sampling method, patients were selected by assigning a sequential number to each eligible patient and using a random number generator (www.random.org) to select the required number of participants for that day. This process was repeated daily until the proportional sample size for each stratum was achieved. No sampling frame was used beyond the daily admission lists, as patient turnover and length of stay varied considerably.

Data Collection

Data were collected through face-to-face interviews conducted between May 2023 and April 2024 at educational and healthcare centers affiliated with Shahid Beheshti University of Medical Sciences. Initially, potential participants were approached in the hospital wards, and the study objectives were explained. Written informed consent was obtained from all participants before inclusion. Private interviews were conducted with eligible elderly patients on the day of discharge by the first author. Interviews were conducted on the day of discharge to ensure that patients had completed their full hospital experience while minimizing disruption to their care and avoiding interviews during acute illness when patients might be too unwell to participate. To ensure standardization, illiterate participants completed the questionnaires via interviewer administration. The time required to complete the questionnaire ranged from 15 to 25 minutes, depending on whether the participant completed it independently or via interview. Of 450 patients approached for participation, 422 (93.8%) agreed to participate and

completed the study. The 28 non-participants (6.2%) included 15 who refused (reasons: too tired [n=8], not interested [n=5], no reason given [n=2]) and 13 who were excluded due to inability to complete the questionnaire (cognitive impairment identified during approach [n=7], acute illness [n=4], hearing impairment [n=2]). No missing data were present in the final sample of 422 participants, as all questionnaire items were completed via interview.

Measures

Data were collected using a demographic and clinical characteristics form and the Hospitalized Elder Abuse Questionnaire (HEAQ). The HEAQ measures the perception of abuse on a continuous scale, with higher scores indicating more perceived abuse.

Demographic and Clinical Characteristics Form

This form included participants' age, sex, marital status, education, employment, living condition, living area, economic status, number of children, number of chronic diseases, number of medications, history of hospitalization, duration of hospitalization, and number of hospitalizations in the past year.

Hospitalized elder abuse questionnaire (HEAQ)

This 27-item questionnaire assesses elder abuse across five dimensions: management-environmental deterrents (8 items), neglect of professional obligations (9 items), physical-psychological abuse (4 items), long waiting times in treatment processes (3 items), and violation of patient privacy (3 items). Items are rated on a five-point Likert scale (1 = never to 5 = always),

with higher scores indicating greater levels of abuse. Subscale scores were calculated separately. The minimum score is 27 and the maximum score is 135. It is important to note that this study does not establish a clinical threshold or case definition for 'abuse'; rather, it measures the perception of abuse on a continuous scale, with higher scores indicating more perceived abuse. The psychometric properties of the questionnaire were validated in the Original study by Naderi et al. (2023), with Cronbach's alpha of 0.89 and intra-class correlation of 0.92 (13). Principal component analysis confirmed five distinct subscales explaining 50.09% of the total variance. Convergent validity was significant ($P < 0.001$, $r = 0.44$). In the current study, Cronbach's alpha was 0.87, confirming internal consistency.

Data Analysis

Means and standard deviations were used for continuous variables, and frequency (percentage) was used to describe categorical variables. The Shapiro-Wilk test and histogram plot confirmed the normal distribution of the main variable. Linear regression was selected as the primary analytic approach because the outcome variable (total perceived hospitalized elder abuse score) was continuous and normally distributed (Shapiro-Wilk $P < 0.05$) and was treated as a continuous scale score (range 27-135). First, univariate linear regression was run to determine the factors affecting perceived hospitalized elder abuse. Then, variables with a P value less than 0.1 in the univariate analysis were entered into the multivariate linear regression model using the Enter method (22). Categorical variables were

entered as dummy codes. Critical assumptions of linear regression, including normality, homoscedasticity, and absence of multicollinearity, were evaluated and confirmed as follow: (1) Normality of residuals was assessed using the Shapiro-Wilk test and visual inspection of Q-Q plots; (2) Homoscedasticity was confirmed by plotting standardized residuals against predicted values, revealing no funnel patterns; (3) Absence of multicollinearity was verified using variance inflation factors (all VIF values < 1.5, tolerance > 0.67); (4) Independence of residuals was confirmed via the Durbin-Watson statistic; (5) No influential outliers were detected based on Cook's distance values.

Potential confounders were selected a priori based on the existing literature on elder abuse in hospital and community settings (17, 20, 21). Variables considered for multivariable adjustment included age, gender, marital status, education, living condition, number of chronic diseases, number of medications, hospitalization history, and hospitalization duration.

Effect sizes were determined as the coefficient of determination (adjusted R-squared) for the model. $P < 0.05$ was considered significant for all analyses. Data were analyzed using SPSS version 25.

Results

Participants' characteristics

A total of 422 older adults were recruited. The mean age of the participants was 70.65 (SD = 6.42), ranging from 61 to 87 years. Of these, 51.9% were male, 68.2% were married, and 38.6% were housewives. Most of the

participants (45%) had elementary education, and 77.7% lived with family. Participant characteristics are presented in Table 1.

Mean (SD) scores of the perceived hospitalized elder abuse questionnaire and its subscales.

Table 2 shows the mean (SD) of the total score of the elder abuse questionnaire for hospitalized elderly patients and its subscales. The mean score was 47.5 (SD = 7.06), which was lower than the scale's mean score. The highest score was related to the environmental and managerial inhibitors subscale at 2.29 (SD = 0.4), and the lowest score was related to the physical and psychological abuse subscale at 1.16 (SD = 0.27).

Univariate and Multivariate Linear Regression Analysis

The results of the univariate linear regression are presented in Table 3. In the multivariate regression analysis, there was a significant association between age, number of medications, and the hospitalized older adults' abuse score. With increasing age (β = 0.119; P = 0.003) and number of medications (β = 0.617; P < 0.001), older adults experienced more perceived abuse. Additionally, female sex (β = 0.154; P < 0.001) and living alone (β = 0.119; P = 0.002) were positively related to more abuse among older adults. Overall, the independent variables entered in the multivariate regression model explained 42% of the variance of the hospitalized abuse score among the older adults (adjusted R-square = 0.419; F = 34.68) (Table 4).

Discussion

The findings of this study indicate that the total mean score of perceived hospitalized abuse among hospitalized older adults was lower than the scale's mean score. Among the various dimensions assessed, managerial–environmental deterrents recorded the highest mean scores, whereas physical–psychological abuse exhibited the lowest. Moreover, the analysis revealed that female sex, advanced age, polypharmacy, and living alone were significantly associated with higher levels of perceived hospitalized abuse.

It is important to emphasize that, because of the cross-sectional design, the associations identified between participant characteristics and perceptions of abuse should not be interpreted as causal relationships. The findings represent correlates that warrant further investigation in longitudinal studies designed to establish temporal sequence and causal pathways. When interpreting these findings, it is also essential to consider the unique context of acute hospital settings, which differ fundamentally from community and long-term care environments in terms of patient-staff relationships, duration of exposure, and the nature of potential abuse.

This study found that hospitalized older adults reported relatively low levels of perceived abuse. Although lower than the rates reported for family-based abuse, this finding aligns with hospital-based studies, such as Wiklund et al. (2022) and Chang & Levy (2021), which reported perception rates of 17.8% and 21.3%, respectively (20, 23). Globally, approximately 10% of adults aged 65 and older experience abuse in care settings, particularly in long-term care facilities (24). However, direct comparison with our findings requires

caution, as long-term care settings involve different caregiver-patient relationships, longer duration of exposure, and distinct regulatory environments compared to acute hospital settings. The lower perception scores in our study may reflect these contextual differences rather than true differences in abuse frequency. The lower scores in the present study compared to prior Iranian research on community-dwelling older adults (25, 26) likely reflect fundamental differences like abuse assessed. Community-based studies typically measure family-perpetrated abuse, which may be more frequent or more readily disclosed, whereas our study assessed hospitalized elder abuse arising from systemic hospital factors such as workload and staff shortages (9).

The apparent conceptual tension between reporting overall low perception scores while identifying significant associations with participant characteristics warrants explicit reconciliation. These findings are not inconsistent but rather reflect different levels of analysis. The overall mean score of 47.5 (SD=7.06) represents 35.2% of the maximum possible score of 135, indicating that, on average, participants perceived abuse as occurring 'rarely' to 'sometimes.' However, within this relatively low range, there was sufficient variability to detect statistically significant differences between subgroups. This pattern suggests that while hospitalized abuse may not be pervasive across all hospitalized older adults, specific subgroups-particularly women, those living alone, and those with polypharmacy—experience systematically higher perceptions of abuse. These findings align with a health

inequalities framework, where overall population rates may be low while significant disparities exist between population subgroups.

The findings of this study indicate that managerial–environmental deterrents contribute most to perceived hospitalized elder abuse among hospitalized older adults, including factors such as ward overcrowding, long waiting times, staff shortages, and infrastructural deficiencies. This pattern aligns with Wiklund et al. (2022), who reported that perceived abuse in hospitalized older adults primarily stems from systemic inefficiencies rather than direct staff behavior, with structural hospital issues driving feelings of neglect (20). Similarly, Lachs & Pillemer (2015) noted that “passive” forms of abuse, such as delayed care, inadequate attention, and organizational problems, are far more common than active abuse (e.g., verbal or physical violence) and are often linked to staff shortages and healthcare system strain (21). In contrast, physical–psychological abuse had the lowest mean score. This finding is consistent with Johannesen & LoGiudice (2013), who reported that direct abuse by healthcare staff is less common, likely due to closer supervision in hospital settings, enforcement of professional and ethical standards, and serious legal consequences (27).

The association between female gender and higher perceptions of abuse observed in this study aligns with previous research in hospital settings (20, 21). Some studies have suggested this may reflect gendered patterns in healthcare interactions, where women receive less empathic communication or have their concerns taken less seriously by providers (28, 29). However,

evidence regarding gender differences in elder abuse remains mixed (14), and our findings should be interpreted cautiously. The observed association may also reflect differences in reporting behavior or help-seeking patterns, as suggested by Lytle et al. (2018), rather than differential treatment per se.

Our findings indicate that a higher perception of hospitalized abuse among older adults is associated with advanced age, which may reflect the greater vulnerability of older patients. With advancing age, physical frailty and dependence on caregivers typically increase—factors recognized in the literature as key correlates of elder abuse (30, 31). Evidence regarding the direct relationship between age and elder abuse is mixed; for instance, a 2021 study in India found no significant differences across age groups (32). This suggests that age alone is not necessarily a predictor of abuse; rather, the association may be stronger when combined with caregiving dependence, physical or cognitive impairments, or reliance on healthcare services. Our results are also consistent with findings from Sweden in 2022 (20), indicating that hospitalized older adults remain vulnerable to abuse. These findings underscore the need for special attention to older patients in hospital settings, including staff training, awareness of ageism, and targeted protective and supervisory policies, particularly for those who are highly dependent on care.

The study revealed that polypharmacy was associated with higher perception scores for perceived elder abuse in hospitalized older patients. Polypharmacy often reflects multiple chronic conditions, greater care dependence,

increased treatment complexity, and higher clinical monitoring needs (33), which naturally heighten patient vulnerability. Such conditions increase the likelihood of neglect, medication errors, and delays in care, and communication lapses, forms of abuse classified as elder abuse or unintentional neglect (34, 35). A meta-analysis also showed that frail older adults on multiple medications face higher risks of adverse hospital outcomes and require more assistance compared to those not on polypharmacy regimens (36). These findings suggest that treatment complexity, including polypharmacy, is a key factor increasing care demands and the perceived hospitalized elder abuse in hospitalized older adults.

The present study found that living alone was significantly associated with higher levels of perceived elder abuse among hospitalized older adults. Older adults who live alone often have limited social support networks, with fewer individuals available to advocate for their needs, which increases their vulnerability in healthcare settings and the likelihood of neglect, oversight, or lower quality care (37, 38). Evidence indicates that weak social networks and low social support are linked to adverse physical and mental health outcomes, and individuals living alone receive less representation and advocacy in hospitals (39). Studies have also shown that older adults living alone are more likely than those living with family to experience abuse, neglect, and marginalization in healthcare settings (40). Furthermore, Yon et al. (2019) reported in a global systematic review that living alone is a major correlate for elder abuse and care neglect in hospital environments (17).

These findings underscore the need for enhanced monitoring, continuous assessment of care needs, and targeted organizational support for older adults living alone to prevent potential abuse and neglect.

Limitations

This study has several limitations. First, the cross-sectional design prevents the determination of causal, and all identified associations should be interpreted as correlates requiring further investigation. Second, the exclusion of patients with cognitive impairment was based on clinical assessment and medical record review rather than a standardized screening tool such as the MMSE or MoCA. This non-standardized approach may have resulted in inconsistent application of exclusion criteria and potential selection bias. Specifically, some patients with undetected mild-to-moderate cognitive impairment may have been inadvertently included, while others with subtle deficits may have been incorrectly excluded. This threatens internal validity and reproducibility, and future studies should employ validated cognitive screening instruments. Third, the inclusion criteria requiring full consciousness and ability to communicate verbally introduced selection bias by excluding the most vulnerable older adults—those with cognitive impairment, delirium, aphasia, or other communication difficulties. These patients may be at the highest risk for abuse due to their inability to advocate for themselves or report negative experiences, and their exclusion likely resulted in an underestimation of the true burden of hospitalized abuse. Fourth, data collection on the day of discharge may have introduced social

desirability bias, as patients might have been reluctant to report negative experiences while still under the care of hospital staff or feeling grateful for their treatment. This timing may have led to an underestimation of perceived abuse. Fifth, the generalizability of findings is limited to teaching hospitals in Tehran, Iran. The study hospitals were all affiliated with a single university of medical sciences and located in an urban metropolitan area. Healthcare delivery, staffing ratios, resources, and organizational culture may differ substantially in non-teaching hospitals, rural hospitals, private hospitals, or hospitals in other provinces of Iran. Therefore, the findings may not be representative of all hospital settings in Iran or other countries with different healthcare systems.

Conclusion

The present study found that perceived hospitalized elder abuse among hospitalized older adults was generally low. However, specific subgroups—older patients, women, individuals on multiple medications, and those living alone—reported systematically higher perceptions of abuse. These findings suggest potential areas for attention in clinical practice, including enhanced awareness among staff regarding the vulnerability of these subgroups and consideration of their needs during care planning. Future research should employ longitudinal designs to establish temporal relationships and, ultimately, interventional studies to evaluate whether targeted strategies—such as staff training, enhanced monitoring, or organizational policies—can

improve outcomes for adults Can effectively reduce abuse perceptions and improve care experiences for hospitalized older adults.

Declarations

Ethical Considerations:

The proposal for this study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (code: IR.SBMU.PHARMACY.REC.1403.006.) Prior to participation, patients were informed about the purpose and procedures of the study, and written informed consent was obtained from all participants. Participation was voluntary, and patients were free to withdraw at any time. All procedures were conducted in accordance with the Helsinki Declaration, and ethical principles, including confidentiality, anonymity, and data integrity, were strictly maintained.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Authors' contributions

All authors contributed to the study conception and design. Niloofar Rafati and Fateme Hasandoost performed material preparation, data collection, and analysis. Soolmaz Moosavi and Maryam Momeni wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Table 1. Demographic and clinical characteristics of participants (n = 422)

Variable	Category	n (%)	Mean (SD)
Age (years)			70.65 (6.42)
Sex	Male	219 (51.9)	
	Female	203 (48.1)	
Marital status	Married	288 (68.2)	
	Widow	104 (24.6)	
	Divorced	21 (5.0)	
	Single	9 (2.1)	
Education	Illiterate	168 (39.8)	
	Elementary	190 (45.0)	
	High school/Diploma	16 (3.8)	
	College	48 (11.4)	
Employment	Housewife	163 (38.6)	
	Retired	158 (37.4)	
	Employed	101 (23.9)	
Living condition	With family	328 (77.7)	

	Alone	94 (22.3)	
Living area	Urban	384 (91.0)	
	Rural	38 (9.0)	
Economic status	Poor	195 (46.2)	
	Moderate	173 (41.0)	
	Good	54 (12.8)	
Number of children			3.72 (1.87)
Number of chronic diseases			2.54 (0.97)
Number of medications			3.89 (3.88)
Department	Internal medicine	233 (55.2)	
	Surgery	189 (44.8)	
Hospitalization history	Yes	262 (62.1)	
	No	160 (37.9)	
Hospitalization duration (days)			3.47 (1.50)
Hospitalizations in past year (number)			2.39 (1.38)

Table 2. Mean (SD) scores of the perceived hospitalized elder abuse questionnaire and its subscales (n = 422)

Subscale	**Number of items**	**Sum score Mean (SD)**	**Item score Mean (SD)***

Environmental and managerial inhibitors	8	18.34 (3.25)	2.29 (0.40)
Negligence of professional duties	9	15.10 (3.44)	1.68 (0.38)
Physical and psychological abuse	4	4.65 (1.09)	1.16 (0.27)
Long waiting time in treatment processes	3	5.40 (1.52)	1.83 (0.51)
Violation of patient privacy	3	3.90 (1.00)	1.30 (0.33)
Total score	27	47.50 (7.06)	1.76 (0.26)

*Item score = sum score divided by number of items in the subscale (allows comparison across subscales with different numbers of items)

Table 3: Univariate linear regression models to determine the associated factors of the hospitalized elder abuse among hospitalized older adult's patients

Variables	B (SE)	β (95% CI)	P value
Age	0.162 (0.053)	0.148 (0.058 to 0.267)	0.002
Sex			
Female	1.467 (0.685)	0.104 (0.120 to 2.813)	0.033
Male	Ref		
Marital status			
Single	0.653 (2.395)	0.013 (-4.056 to 5.361)	0.785
Divorce	0.621 (1.599)	0.019 (-2.523 to 3.765)	0.698
Widow	0.889 (0.810)	0.054 (-0.702 to 2.480)	0.273
Married	Ref		
Education			
Illiterate	1.143 (1.152)	0.079 (-1.122 to 3.407)	0.322
Elementary	1.968 (1.137)	0.139 (-0.267 to 4.203)	0.084
High school/Diploma	4.188 (2.032)	0.113 (0.194 to 8.181)	0.040
College	Ref		
Employment			

Employed	1.150 (0.893)	0.070 (-0.606 to 2.906)	0.199
Retired	1.239 (0.788)		0.116
Housewife	Ref	0.085 (-0.309 to 2.787)	
Living condition			
Alone	1.478 (0.824)	0.087 (-0.142 to 3.098)	0.074
With family	Ref		
Living area			
Urban	0.087 (1.202)	0.004 (-2.277 to 2.450)	0.943
Rural	Ref		
Economic status			
Poor	0.597 (0.738)	0.042 (-0.854 to 2.048)	0.419
Average	1.208 (1.102)		0.273
Good	Ref	0.057 (-0.957 to 3.374)	
Department			
Internal medicine	0.129 (0.692)	0.009 (-1.231 to 1.490)	0.852
Surgery	Ref		
Hospitalization history			
Yes	1.570 (0.705)	0.108 (0.18 to 2.95)	0.026
No	Ref		
Number of children	- 0.145 (0.355)	- 0.020 (-0.842 to 0.553)	0.683
Number of chronic diseases	0.581 (0.313)	0.090 (-0.034 to 1.195)	0.064
Number of medications	3.003 (0.184)	0.623 (2.641 to 3.364)	0.001
Hospitalization duration (day)	-0.041 (0.229)	-0.009 (-0.490 to 0.408)	0.859
Hospitalization number in last year	-0.252 (0.250)	-0.049 (-0.742 to 0.239)	0.314

Ref= reference. F= F statistics (linear regression); df= degree of freedom, B= unstandardized coefficients; SE= standard error; β= standardized coefficients; CI= confidence interval

Table 4: Multivariate linear regression models to determine the associated factors of the hospitalized elder abuse among hospitalized older adult's patients

Predictors	B (SE)	β (95% CI)	P value
Age	0.131 (0.044)	0.119 (0.045 to 0.226)	0.003
Sex			

Female	2.168 (0.605)	0.154 (0.980 to 3.357)	0.000
Male	Ref		
Education			
Illiterate	-1.332 (0.926)	-0.092 (-3.152 to 0.488)	0.151
Elementary	-0.260 (0.977)	-0.018 (-2.181 to 1.661)	0.790
High school/Diploma	-3.110 (1.710)	-0.084 (-6.472 to 0.251)	0.070
College	Ref		
Living condition			
Alone	2.015 (0.662)	0.119 (0.715 to 3.316)	0.002
With family	Ref		
Hospitalization history			
Yes	1.162 (0.626)	0.080 (-0.069 to 2.392)	0.064
No	Ref		
Number of chronic diseases	- 0.124 (0.278)	- 0.019 (-0.671 to 0.423)	0.655
Number of medications	2.972 (0.184)	0.617 (2.610 to 3.335)	0.001
F= 34.68, df= 9, Adjusted R square = 0.419			

Ref= reference. F= F statistics (linear regression); df= degree of freedom, B= unstandardized coefficients; SE= standard error; β= standardized coefficients; CI= confidence interval; Variables with $p < 0.1$ in univariate analysis were entered into the multivariate model using the Enter method. Multiple linear regression model was adjusted with age, sex, living condition, number of chronic diseases, number of medications, and hospitalization history.

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