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Prevalence of pressure ulcer and its related factors in elderly patients hospitalized to teaching hospitals in East Guilan

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Abstract

Introduction: Pressure ulcer is a pressure-induced tissue injury that can affect the skin, muscle, connective tissue, cartilage, and bone. Pressure ulcer is a painful, debilitating condition that endangers a person's health by increasing mortality and morbidity in terms of length of hospital stay, increasing the rate of infection, and the need for surgical procedures. Pressure ulcers are the third most expensive disease after cancer and cardiovascular diseases. About two-thirds of hospital beds are occupied by people over 65 years old. This study aimed to determine the prevalence of pressure ulcer and its related factors in elderly patients hospitalized at teaching hospitals in Guilan, Iran.

Materials and Methods: This was a descriptive cross-sectional study in which elderly patients who had been hospitalized for 24 hours or more in the intensive care units, internal and surgical wards of East Guilan educational hospitals were eligible for the study. Using the available stratified sampling method, 250 patients aged 60 years and older were included in our study. Data collection tools included socio-demographic and medical profile questionnaires and the Braden pressure ulcer risk assessment scale. Data were analyzed using SPSS version 22 statistical software. Descriptive statistics, Pearson correlation, Chi-square, and Fisher's exact tests were used to analyze data at a significant level of $P < 0.05$.

Results: The prevalence of pressure ulcer in elderly patients hospitalized in teaching hospitals in was 26.4%. There was a significant relationship between the presence of pressure ulcer with age, length of hospital stay, type of ward, urinary and fecal incontinence, edema, level of consciousness, type of mattress used, connection to mechanical ventilation, position change, sensory perception areas, humidity, activity, and mobility. There was no significant relationship between the presence of pressure ulcer with gender, marital status, and surgical history.

Conclusion: Pressure ulcer has a high prevalence in hospitalized elderly and it is always accompanied by serious complications. It is better for nurses to check patients regularly and prevent its occurrence by controlling significant risk factors.

Keywords: Prevalence, Pressure ulcers, Elderly patients, Risk factors

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Received: 2023.1.25, Accepted: 2023.3.13



Introduction

The increase in the elderly population of the world, especially in Iran, has led to attention to the health of this age group. Research shows that about two-thirds of hospital beds are occupied by the elderly (people over 65) (1). According to studies and statistical indicators, it is predicted that the elderly population of Iran will reach 10.5% by 2025 and 21.7% by 2050 (2). One of the most important and common problems of hospitalized elderly patients, especially in intensive care units, is pressure ulcer, which causes many costs and complications for patients and the health system (3). Pressure ulcers (also known as pressure sores, bed sores, or decubitus ulcers) are defined as localized skin lesions that result from the prolonged compression of the soft tissue between the inner bony part and the outer surface. Pressure ulcers occur in the elderly who are hospitalized for a long time. Aging is one of the risk factors for pressure ulcers (4). Decreased subcutaneous fat, skin elasticity and moisture, and dryness of the skin are some of the reasons for the increased risk of pressure ulcers in the elderly (5). Despite increasing awareness of the clinical consequences, and economic burden, the prevalence of pressure ulcers in the elderly hospitalized is high (6). According to epidemiological studies, the prevalence of pressure ulcers in European hospitals was between 8.2 to 23%, and 12.3% in US hospitals (7). In Iran, the prevalence of pressure ulcers is between 10.1 to 21% in special wards, and 5% in general wards (8). In 2012, Theisen et al. reported a pressure ulcer prevalence of 7.1% in elderly patients of a German University Hospital (9). In addition to physical and mental problems in elderly patients, pressure ulcers cause loss of function and increase the incidence of infection, and the length of hospital stay and as a result increase economic cost. Therefore, prevention of pressure ulcers is the most effective measure. The incidence of pressure ulcers is a major and important indicator of good nursing care. The nurse is the first health care person who can prevent the occurrence of many pressure ulcers among elderly with her (his) good intervention (10). In an overview, no comprehensive study has been conducted in Guilan province, as the oldest province in Iran, regarding the estimation of the prevalence of pressure ulcers in elderly patients. Considering the disability and mortality caused by pressure ulcers, as well as the high

cost of treatment, knowing the prevalence of pressure ulcers and its' risk factors can be useful especially in nursing. Therefore, this study aimed to determine the prevalence of pressure ulcers and related factors in the elderly hospitalized in East Guilan hospitals.

Materials and Methods

This descriptive cross-sectional study, from April until July 2021, 250 elderly people were selected from 6 hospitals affiliated to Guilan University of Medical Sciences in northern Iran using the available stratified sampling method. Criteria for inclusion in this study are the elderly aged at least 60 years and older hospitalized in the intensive care units and internal and surgery wards of selected hospitals that have been admitted for at least 24 hours. The presence or absence of pressure ulcers and the degree of ulcers were evaluated and the possibility of pressure ulcers was assessed based on the Braden scale. The data collection tool had three parts. The first part was related to personal-social and medical characteristics includes: hospital name, gender, age, marital status, length of hospital stays, and type of ward. Medical characteristics, including diagnosis, presence of underlying diseases (heart failure, respiratory failure, renal failure, multiple organ failure, hypertension, diabetes), urinary and fecal incontinence, edema, patient level of consciousness, type of mattress used, connection to the mechanical ventilator and the duration of connection, recent surgery, change of position, limb casting and having traction. The level of consciousness was assessed by Glaco Coma scale, this scale evaluate three domain, eye opening, best verbal response, and the best motor function. The score of this scale is at least 3 to maximum 15. The second part was the observational checklist to examine the common sites for pressure ulcers such as the back, shoulders, Iliac crest, trochanter, sacrum, buttocks, the side edge of the foot, heel, neck, and other sites. The third section was Braden Predictive Scale, which is used to diagnose patients at risk for pressure ulcers. This scale includes 6 subsets of sensory perception, moisture, activity, mobility, nutrition, and Stretch or wear. The range of scoring is from 6 to a maximum of 23. Therefore, a score of ≥ 15 indicates low risk, 13 to 14 moderate risk, 10 to 12 high risk, and ≤ 9 very high risk for pressure ulcer. Finally, the data were analyzed by using SPSS

version 22 statistical software. A Kolmogorov - Smirnov test indicated that the data was sampled from a population with a normal distribution. Descriptive statistics (mean and standard deviation), Pearson correlation, Chi-square, and Fisher's exact tests were used to measure the relationship between demographic variables and Braden tool score according to abnormal or normal variable distribution, at a significance level of $P < 0.05$.

Ethical Consideration

In this study, the principles of research ethics were considered based on the latest version of the Helsinki Declaration. Informed consent was obtained from all patients. For those patients who were unable to communicate, had a reduced level of consciousness or were connected to the Ventilator, informed consent was obtained from their families. In addition, this is the nursing thesis at the MSN level and was approved by Guilan University of Medical Sciences Ethical Committee with the ethical code IR.GUMS.REC.1398.461.

Results

Our findings revealed that the prevalence of pressure ulcers in elderly patients was 26.4%. Most of the elderly had first (46.1%) and second (44.15%) degree pressure ulcers (Table 1) and the most common sites of pressure ulcers were sacrum (29.22%), hip (26.62%), and heel (14.28%) (Table 2). The mean age of the patients was calculated to be 69.54 ± 9.33 years, and 59.6% of the cases were male. Findings revealed that 99% of the patients had less than 10 days of hospitalization. The results of this study showed that there is a significant relationship between age and the prevalence of pressure ulcers in hospitalized elderly (P -value ≤ 0.05), and the prevalence of pressure ulcer increased with age. However, there was no significant relationship between gender and the prevalence of pressure ulcers.

Table 1. Frequency distribution and percentage of pressure ulcers based on demographic variables and Braden Scale.

| Variable | Category | Frequency | Percent |
|-----------------------------|-------------------------------|-----------|---------|
| Duration of Hospitalization | 10 days and less than 10 days | 248 | 99.2 |

| | | | |
|---------------------------------|--------------------------|-----|-------|
| | More than 10 days | 2 | 0.8 |
| Inpatient department | CCU | 27 | 10.8 |
| | ICU | 65 | 26 |
| | Internal | 72 | 28.8 |
| Existence of underlying disease | Surgery | 86 | 34.4 |
| | Yes | 201 | 80.4 |
| Urinary incontinence | No | 49 | 19.6 |
| | Yes | 63 | 25.4 |
| Stool incontinence | No | 187 | 74.8 |
| | yes | 61 | 24.4 |
| Edema | No | 189 | 75.6 |
| | Yes | 39 | 15.6 |
| Level of consciousness | No | 211 | 84.4 |
| | Less than 10 | 30 | 12 |
| | 10 to 14 | 56 | 22.4 |
| Type of mattress | 15 | 164 | 65.6 |
| | Wave | 100 | 40 |
| Connect to ventilator | Normal | 150 | 60 |
| | Yes | 23 | 9.2 |
| Surgery | No | 227 | 90.8 |
| | Yes | 81 | 32.4 |
| Braden scale score | No | 169 | 67.6 |
| | Very high risk ≤ 9 | 29 | 11.6 |
| | High risk (10 - 12) | 49 | 19.6 |
| | Moderate risk (13 - 14) | 80 | 32 |
| | Low risk (15 - 18) | 46 | 18.4 |
| Existence of pressure sores | Normal control ≥ 19 | 46 | 18.4 |
| | Yes | 66 | 26.4 |
| Degree of pressure ulcer | No | 184 | 73.6 |
| | Degree 1 | 71 | 46.1 |
| | Degree 2 | 68 | 44.15 |
| | Degree 3 | 11 | 7.14 |
| | Degree 4 | 4 | 2.59 |

Table 2. Frequency of pressure ulcer site in the elderly under study.

| Site of pressure ulcer | Percent | Frequency |
|------------------------|-------------|------------|
| Behind | 0.65 | 1 |
| Shoulder | 5.19 | 8 |
| Iliac crest | 5.84 | 9 |
| Trochanter | 11.03 | 17 |
| Sacrum | 29.22 | 45 |
| Side edge of the foot | 3.24 | 5 |
| Heel | 14.28 | 22 |
| Buttocks | 26.62 | 41 |
| Neck | 0.65 | 1 |
| Other | 3.24 | 5 |
| Total | 100% | 154 |

In addition, it was shown that there was a significant relationship between the prevalence of pressure ulcers in elderly patients with the duration of hospitalization, decreased level of consciousness, type of hospitalized ward, connection to a ventilator, limb edema, urinary and fecal incontinence, and sensory perception impairment ($p \leq 0.05$). The highest prevalence of pressure ulcers was observed in intensive care units (60%). The findings related to determining the causes of pressure ulcers based on Braden criteria are as follows:

Using Chi-square and Fisher's exact test, there was a significant relationship between the prevalence of pressure ulcers with sensory perception impairment, skin moisture, the need for moderate to high assistance in shaking, and limited physical activity of the elderly patient ($P < 0/05$). The prevalence of pressure ulcers was higher in the elderly who were completely immobile or had very limited mobility. In general, examination of samples based on the Braden tools showed that about 31.2% of the hospitalized elderly are at high risk of developing pressure ulcers (Table 3).

Table 3. Frequency and determining the relationship between the prevalence of pressure ulcers and Braden scale in the elderly under study.

| Braden scale | Pressure ulcer | | P-Value |
|----------------|-------------------------------|----------------------------------|-------------------|
| | With pressure ulcer (Percent) | Without pressure ulcer (Percent) | |
| Very high risk | 28 (96.6%) | 1 (3.4%) | P<0.001 |
| High risk | 36 (73.5%) | 13 (26.5%) | |
| Moderate risk | 2 (2.5%) | 78 (97.5%) | |
| Low risk | 0 (0%) | 46 (100%) | |
| Normal control | 0 (0%) | 46 (100%) | |
| Total | 66 | 184 | |

Discussion

In the present study, the prevalence of pressure ulcers in the elderly was 26.4%. Out of 250 hospitalized elderly, 66 had pressure ulcers. The findings of the study are consistent with the results of the meta-analysis conducted by Karimian et al., in which the prevalence of pressure ulcers was reported to be 19% in Iran (11). In the study of Bereded et al., the prevalence of pressure ulcers was 14.9% (12). The overall prevalence of bed sore in the study of Assefa et al. was 9.6% (13). Discrepancies in the results of studies may be due to factors such as nursing services and sample size, study duration, sampling method, and type of study.

In this study, most of the elderly had first- and second-degree pressure ulcers. In the study of Mobayen et al., most patients had grade 2 or grade 3 ulcers (4). Shokati Ahmadabad et al. showed that 41.4% and 4.3% of the patients in their study had grade 1 and grade 2 ulcers, respectively (14). In the present study, the most common site with pressure ulcers was the sacrum (29.22%). The findings of the study are consistent with the results of the study of Ayyıldız et al., where the prevalence of pressure ulcers in the sacrum was higher (78.8%) (15). As we know, the sacrum of elderly patients bears the most weight, and as a result, is reported as the most common place for pressure ulcers.

Based on the research findings, a significant relationship has been established between age and the prevalence of pressure ulcers. The findings of the study are consistent with the results of the study of Ayyıldız

et al. in which the most important risk factor for the development of pressure ulcers was found to be advanced age (15). In the study of Mobayen et al. and Walther et al., increasing age had a significant effect on the development of pressure ulcers, so most cases of pressure ulcers were observed in patients over 60 years (4,16). Karimian et al. reported that the highest and lowest prevalence of pressure ulcers in Iran belonged to the age groups of 60-70 and 40-50 years with prevalence rates of 22% and 14%, respectively, suggesting that the incidence of pressure ulcer increases with age (11). The results of a study performed by Arba et al. indicated that increasing age was significantly associated with the prevalence of pressure ulcers. (3). Elderly people seem to have wrinkled skin due to subcutaneous fat loss and are prone to pressure ulcers.

Also in this study, the length of hospital stay is involved in the prevalence of pressure ulcers. But Assefa et al. reported that the length of hospital stay was not associated with the occurrence of pressure sore (13). In the study of Mobayen et al., the length of hospital stay was influential in the prevalence of pressure ulcers (4). Prolonged hospitalization increases the risk of pressure ulcers (17). In a study conducted by Bereded et al. on 355 hospitalized adult patients, it was reported that length of stay was significantly associated with pressure ulcer. Patients whose length of stay was 7–20 days were 8.44 times more likely to develop pressure ulcer than patients who stayed for ≤ 6 days. When the length of hospital stays increases, the risk of hospital-acquired infection increases which leads to the development of pressure ulcer (12). Staying in the hospital, especially in the intensive care unit, due to the restriction on the patient's activity, without considering other factors, has the greatest impact on the development of pressure ulcers. However, pressure ulcers themselves may also prolong the patient's stay (18).

Findings show that a significant relationship was established between the prevalence of pressure ulcers and the level of consciousness of the elderly. The prevalence of pressure ulcers was higher in the elderly with lower levels of consciousness. The findings of this study are consistent with the results of the study of Ayyıldız et al. in which decreased level of consciousness and nutritional problems in elderly

patients has been one of the effective factors in the development of pressure ulcers (15). Mobayen et al. wrote in this regard: Patients with a level of consciousness less than 8 have a higher incidence of pressure (4). According the results of Akarsu Ayazoglu et al., patients with lower level of consciousness had less sensory perception Just like the patient under anesthesia or sedation, in this condition, the patient's skin is under pressure for a longer time. They cannot perceive pain from severe stress or change their position independently or request a change of position (18). In this study, most of the elderly who suffered from pressure ulcers were hospitalized in the intensive care unit and had a lower level of consciousness and sensory perception, therefore, the prevalence of pressure ulcers was higher.

This study showed that the prevalence of pressure ulcers was higher in the elderly who were physically confined to bed. There was a significant relationship between the prevalence of pressure ulcer and the activity of the elderly patient. Assefa et al. concluded that patients whose physical activity has been reduced are more likely to suffer from pressure ulcers (13). In studies conducted by Bereded et al. and Ippolito et al., it was found that activity was significantly associated with pressure ulcer. Patients dependent on a wheelchair or bed, were 11 times more likely to develop pressure ulcer than those patients who walked frequently (12,19).

According to the Braden scale, only 17 elderly patients were completely immobile. The prevalence of pressure ulcers was higher in the elderly who were completely immobile or very limited in terms of mobility. There was a significant relationship between the prevalence of pressure ulcers and the mobility of the elderly.

Assefa et al. reported impaired mobility as one of the effective factors in causing pressure ulcers (13). Bereded et al. wrote: Patient's position change was also the other independent variable which was significantly associated with pressure ulcer. Those patients who did not have their position changed were 10.42 times more likely to develop pressure ulcer than those who had their position changed every 2–3 h (12). The prevalence of pressure ulcers in the elderly admitted to the intensive care unit was higher than in other wards, because they have more limited in movement.

Therefore, they will be more prone to pressure ulcers. It is obvious that the elderly who have been immobile for a long time, have limited movement, or change their position slowly, the muscle tissues are placed between the bony ridges and the mattress for a longer period of time, and as a result, the prevalence of bedsores is higher. Inadequate nutrition in elderly patients is one of the effective factors in causing pressure ulcers (15). Nadukkandiyil et al. and Ayyıldız et al reported that one of the most important factors in the development of pressure ulcers, especially in elderly patients, is malnutrition (10, 15).

The results of this study showed that the risk factors for pressure ulcers in the elderly admitted to hospitals are old age, decreased activity and mobility, decreased level of consciousness, inadequate nutrition, and long hospital stay.

Conclusions

As it was observed, there were many effective factors in the development of pressure ulcers in the elderly, so it is the responsibility of nurses to prevent the spread of pressure ulcers by identifying susceptible and at-risk elderly patients before the occurrence of this complication or to prevent the transformation of first-degree wounds into higher-grade wounds by implementing appropriate nursing measures. In addition, according to the priority of prevention over treatment, it is recommended that in hospital wards, especially intensive care unit, elderly should be regularly observed and assessed by nurses to prevent pressure ulcers.

Author contribution

ZRCh collected data and provided draft of manuscript, **MEB** performed the analysis and wrote the paper, **ZS** collected data and coordinated the administrative work.

Acknowledgments

I would like to thank the Vice Chancellor for Research of Guilan University of Medical Sciences for the financial support of this project and also the officials and colleagues of East Guilan Teaching Hospitals for their unwavering cooperation in collecting information.

Conflict of interest

No potential conflict of interest was reported by the authors.

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