

Factors Related to Depression Among Elderly Patients with Pressure Ulcers in Wenzhou, China

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Abstract

This study aimed to describe post-PU depression and to investigate the factors related to post-PU depression among elderly patients with pressure ulcers in Wenzhou, China. A simple random sampling method was used to recruit the sample of 128 elderly patients with PU in the Second Affiliated Hospital of Wenzhou Medical University. Research instruments included Demographic questionnaire, the Appraisal of Self-care Agency Scale-Revised (ASAS-R), the Beck Depression Inventory-II (BDI-II), the mental health literacy scale (MHLS) and the Multidimensional Scale of Perceived Social Support (MSPSS). Data collected from July to December, 2023. Descriptive statistics and Pearson's product moment correlation were used to analyze the data.

The results revealed that the sample had mild depression (18.75%) and severe depression (5.47%). For correlation analysis, depression after pressure ulcer was significantly correlated with social support ($r = -.439, p < .001$) and self-care ability ($r = -.465, p < .001$). While mental health literacy was not significantly correlated with depression after pressure ulcer.

These findings suggest that Nurses and other health care providers should apply these study results to develop interventions or programs aimed at reducing the incidence of depression in patients with pressure ulcers by focusing on social support and self-care ability.

Key words: Factors, Depression, Elderly atients with pressure ulcers

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Introduction

Pressure ulcers (PU), a serious nursing problem worldwide, refer to localized damage to the skin and subcutaneous soft tissues owing to intense or prolonged pressure, usually at bony prominences (Artico, Piredda, D'Angelo, Lusignani, & Marinis, 2020). It is a common occurrence in various healthcare settings and most commonly develops in elderly and critically ill patients with multiple comorbidities. Notably, PU can lead to a physiological burden on patients, along with a heavy social and economic burden. Li et al. conducted a meta-analysis and revealed a 12.8% global PU prevalence, with an incidence rate of hospital-acquired PU being 8.4%. Reportedly, approximately 3 million patients in the United States are treated for PU annually at a cost of nearly 17.8 billion USD (Babak Hajhosseini, Longaker, & Gurtner, 2019). In China, the incidence of chronic ulcers among surgical inpatients is 1.5% - 3.0% (Fu, 2005), with that of PU being notably higher in nursing homes. Furthermore, its prevalence is expected to further increase with the increasing aging population.

PU can lead to serious complications, such as prolonged hospital stays and severe infections, which underscores the crucial need for its treatment. Depression is a commonly reported mental health condition among patients with PU, which may be attributed to PU-induced frustration, stigma, and social isolation. Persistent PU, combined with their conspicuous appearance and accompanying physical discomfort and pain, can cause great psychological distress. Furthermore, negative emotions, including depression, have been shown to significantly impair PU wound healing (Artico, Piredda, D'Angelo, Lusignani, & Marinis, 2020), possibly owing to the interplay of multiple physiological and psychological factors. In addition to the contribution of depression in delaying PU healing, the increase in the risk of depression in patients due to PU needs to be noted. Consequently, approaches, such as self-care ability, mental health literacy (MHL), and social support (SS), presenting notable advantages in managing depression, need to be explored to alleviate PU-induced depression.

Self-care ability has been associated with individual health behavior, well-being, and disease management ability, and it refers to the ability of individuals to maintain health and happiness through health promotion and chronic disease management (Sousa et al., 2010). Reportedly, self-care ability negatively correlates to the prevalence of depression in the elderly (Sousa et al., 2010). Hence, empowering patients with the skills and confidence to manage their health is considered a notable strategy to improve outcomes for chronic conditions such as PU, particularly when combined with depression. However, studies are lacking on the effects of self-management education in improving health outcomes for elderly patients with PU, especially for their mental health.

Similarly, MHL refers to the mental health knowledge and attitude to identify, manage, and prevent mental health problems (O'Connor & Casey, 2015). Reportedly, MHL has been correlated with depression, anxiety, and poor sleep quality in an elderly Chinese population (Ding et al., 2022). Similarly, studies on different populations have shown that patients with higher MHL are generally less likely to experience negative emotions, such as depression. However, the effects of MHL on patients with PU regarding depression remain elusive and need further research.

Social support (SS) refers to the assistance individuals receive from others in the form of emotional, instrumental, and informational help, provided by sources such as spouses, relatives, and friends. Studies have shown that SS offers independent protective effects against depression in both adults and the elderly (Gariépy, Honkaniemi, & Quesnel-Vallee, 2016). A cross-sectional study has found that higher levels of SS in adults with spinal cord injury are associated with fewer symptoms of depression (Chen et al., 2015). Similar to individuals with spinal cord injuries, patients with PU often lose some physical mobility and therefore require caregiving and support from others. However, the effect of SS on the occurrence of depression in patients with PU remains unclear.

Owing to the multifaceted nature of these risk factors, certain variables are typically prioritized based on the specific interests of the study. From a broader perspective, developing comprehensive guidelines to address both the physical and psychological aspects of PU care can facilitate its better management by healthcare policymakers. Such guidelines, supported by the departments of health or national governments, may help reduce the strain on social healthcare systems and potential medical disputes. Hence, this study aimed to explore the factors associated with the occurrence of post-PU depression in elderly patients. Furthermore, based on the understanding of the influencing factors, this study may contribute to more comprehensive patient care and provide targeted interventions to enhance the physical and mental health outcomes of elderly patients with PU.

Research objectives

1. To describe post-PU depression in hospitalized patients.
2. To examine factors associated with post-PU depression in hospitalized patients, specifically self-care ability, mental health literacy, and social support.

Conceptual framework

The conceptual framework model used in this study developed from the review literature. Some of the variables in the model components (i.e., self-care ability, mental health literacy and social support) were selected for investigation based on supporting evidence. Self-care ability was negatively correlated with post-PU depression (Ledger et al., 2020). Mental health literacy and social support were negatively associated with post-PU depression (Gariépy et al., 2016). A diagram of the study conceptual framework is shown in Figure 1.

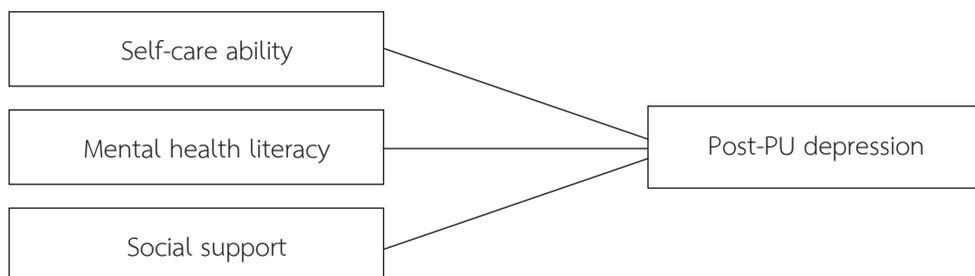


Figure 1 Conceptual framework

Methodology

Research design

A cross-sectional research design was employed in this study.

Population/Samples

Population

The Target population in this study is PU inpatients at the Second Affiliated Hospital of Wenzhou Medical University (WMU) in Wenzhou, China. The average daily flow of patients in the Second Affiliated Hospital is about 3000 person per day.

Sample was PU inpatients at the Second Affiliated Hospital of Wenzhou Medical University (WMU) in Wenzhou, China and selected based on the inclusion criteria:

1. All patients diagnosed by physician as PU
2. Be able to read, write and understand Chinese
3. Patients with undiagnosed depression prior to pressure ulcer diagnosis
4. No other mental illnesses
5. No cognitive disturbance until could not provide information
6. Aged ≥ 50 years

Sample size

The sample size in this study will be calculated by using Tabachnick and Fidell's formula (2007) as follows:

$N \geq 104 + m$ (where m is a number of independent variables). Based on this formula, the sample size for this study should be least 107. In this study, 20% of the attrition rate will be used 21 subjects therefore 128 participants will be recruited.

Sampling technique

The simple random sampling method was used in this study. The researcher will search for eligible patients who meet the inclusion criteria. The researcher assigned each client a number on a small piece of paper and mix it in a box. The researcher will randomly pick up a number until reach the target number of sampling.

Research instruments

1. Demographic Questionnaire: The questionnaire was designed to collect the general information of the participants, including sex, age, body-mass index (BMI), place of residence, marital status, years of education, average annual household income, primary caregiver, smoking and drinking status, and history of diabetes, hypertension, and heart diseases.

2. BDI-II: BDI-II, a 21-item scale, with each item scored from 0 to 3 (total score: 0-63), was employed for assessing depressive symptoms (Cheng, 2011), with higher scores indicating a greater risk of depression. Based on scores, depression is divided into four levels: 0-13, healthy; 14-19, mild depressive symptoms; 20-28, moderate depressive symptoms; and > 28 , severe depressive symptoms. Reportedly, BDI-II presents a high internal consistency (coefficient $\alpha = 0.90$), with its total score not showing an obvious correlation with gender, age, or race (Steer, Rissmiller, & Beck, 2000).

The Chinese version of BDI-II has been reported to show good reliability and validity as a depression self-management scale (Cronbach's coefficient: 0.94). Additionally, the correlation coefficient of 21 items ranges from 0.18 to 0, with the total item correlation coefficient ranging from 0.71 to 0.82 and the test-retest coefficient being 0. ($p < 0.05$) (Guo, 2015)

3. ASAS-R: ASAS-R, employed to evaluate self-care agency, is a short, reliable, and valid instrument to measure self-care agency among individuals from the general population. It includes 15 items that capture enabling characteristics (power components) of self-care institutions. The items are rated using a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree), with the overall scores ranging from 15 to 75, and higher scores suggesting greater self-care skills. Notably, four items of the scale (such as Factor 3: lacking power for self-care) are negatively worded and scored inversely. The content validity of the original scale was identified via Orem's self-care theory expert panel (Fok & Wong, 2003), and its internal consistency with Cronbach's alpha coefficient (0.80-0.85), as previously reported (Peyrot, Peebles, Tomky, Charron-Prochownik, & Weaver, 2007). This was consistent with the strong Cronbach's alpha coefficient of 0.90 of the original 24-term ASAS-R reported by Sousa et al. Notably, the best factor structure model to fit the data in their study was the 15-term ASAS-R three-factor model with a Cronbach's alpha coefficient of 0.89 (Sousa et al., 2010).

4. MHLS: MHLS was developed by Jung et al. based on Jorm's Mental Health Literacy Scale (2000) ("Mental Health Literacy in Healthcare Students: An Expansion of the Mental Health Literacy Scale," 2020) and is suitable for assessing the MHL level in adults. The Chinese version of the tool was translated by Ming et al. (MING, CHEN, & WANG, 2021) MHLS consists of 22 items across 3 dimensions, as follows: mental health knowledge (items 1-10), beliefs (items 11-18), and resources (items 19-22). Additionally, it employs the dichotomous scoring method, as follows: for positive questions, "strongly agree" and "agree" are selected, counting for 1 point; for reverse questions, "strongly disagree" and "disagree" are selected, counting for 1 point; and other questions count for 0 points. For the resource dimension, "Yes" equals 1 point, and "No" equals 0 points. The total score is the cumulative score of each item (range: 0-26), with the higher the score, the higher the MHL level. MHLS has been reported to show good reliability and validity (Wang et al., 2024). The Cronbach's alpha coefficients of internal consistency of the scale are 0.83, and those of mental health knowledge, belief, and resources are 0.76, 0.77, and 0.84, respectively.

5. MSPSS: MSPSS was employed for measuring the level of SS, which can be classified into the following three subscales: support from family (items 3, 4, 8, and 11), support from friends (items 6, 7, 9, and 12), and support from significant others (items 1, 2, 5, and 10), including neighbors and professional medical staff. Each subscale is scored when all related four items are answered. Chou (2000) introduced MSPSS to China and performed the back translation process. Patients are requested to rate each item on a 7-point Likert scale (1 = very strongly disagree to 7 = very strongly agree), with the total score of the perceived SS ranging from 12 to 84 points and a higher score indicating a higher SS (Dallam et al., 1995). Reportedly, the evaluation of the psychological properties

of MSPSS has revealed that the Cronbach's alpha coefficient for the total scale is 0.91 and that of subscales ranges from 0.81 to 0.98.

Data Collection

Participants were required to complete the demographic questionnaire, Beck Depression Inventory-II (BDI-II), Appraisal of Self-Care Agency Scale-Revised (ASAS-R), Mental Health Literacy Scale (MHLS), and Perceived SS Multidimensional Scale (MSPSS). The surveys were supervised by two skilled researchers who orally communicated the survey questions to participants and recorded their responses. Throughout the data collection process, participants were informed both verbally and in writing about confidentiality measures, with reassurances that their choices would not affect the services provided to them. Before data analyses, signed consent forms were received from participants. The collected data were exclusively applied in this study and employed solely for research purposes. Patients were presented with the option to independently complete the questionnaire or seek assistance within a tranquil environment, with an estimated duration of 20–30 min. The study was conducted voluntarily, allowing participants the freedom to opt-out at any time.

Ethical Considerations

This research adheres to the human rights. Approval for including human subjects was acquired from the Burapha University Ethics Committee on Human Research (G-HS044/2564) and the Institution Review Board (2023-K-118-02) of the Second Affiliated Hospital of Wenzhou Medical University. Participants were provided with information regarding the protection of human subjects and were granted the right to withdraw from the study at any given time. Before their participation in this study, participants were requested to sign informed consent forms.

Data Analyses

The data were analyzed using the Statistical Package for Social Sciences software version 26. A significance level of $p < .05$ was established. Descriptive statistics encompassed frequency and percentage, along with mean and standard deviation (SD) were used to analyze the demographic characteristics and study variables. Pearson's product-moment correlation coefficients were used to analyze the relationship between depression and self-care ability, mental health literacy, and social support.

Results

1. Demographic characteristics of the sample

Demographic characteristics of the sample showed that 72.66% of the patients were male, and 75.79% of them were over 65 years old. The average BMI level was 20.30, and 7.81% exhibiting overweight status. In addition, the majority (54.68%) live in rural areas. 78.13% of the patients were married or cohabiting with their spouses, and most people (58.60%) only accepted the primary education, only a few people (3.61%) received undergraduate education. A total of 61.24% of individuals report having no religious beliefs, whereas 38.76% identify as having religious beliefs. The average annual household income of 31.25% of the patients was less than 25,000 yuan. For patients,

the primary caregiver during hospital stay was their spouse in 45.31% of cases. The majority of individuals have experienced illness for a duration of less than one month, with most of them presenting with low-grade pressure ulcers, including suspected deep tissue injury and stage 1 ulcers. In addition, 53.12% do not smoke and 64.84% do not drink alcohol. In addition, 31.25% of the patients were diagnosed with diabetes, 41.41% with hypertension and 19.53% with heart disease.

2. Descriptive information on depression after PU

The maximum score of depression after PU was 32, the minimum score was 7, and the mean score of depression after PU was 17.91 (SD = 5.347). 35.16% of patients had depressive symptoms. In addition, 64.84% had no depressive symptoms; 18.75% had mild depressive symptoms, and 5.47% had severe depression symptoms, as shown in Table 1.

Table 1 Mean, standard deviation, max, min, and level of depression after PU (n = 128)

variables	Frequency	Percentage (%)
Depression		
Yes	45	35.16
No	83	64.84
Degree of depression		
No depressive symptoms (0-13)	83	64.84
Mild depressive symptoms (14-19)	24	18.75
Moderate depressive symptoms (20-28)	14	10.94
Severe depressive symptoms (≥ 28)	7	5.47
Mean = 17.91, SD = 5.347, Max = 32, Min = 7		

3. Factors related to depression after PU

According to the correlation, social support and self-care ability were significantly negatively correlated with depression after PU ($r = -.439, p < .001$; $r = -.465, p < .001$). However, mental health literacy levels were not associated with depression after PU, as shown in Table 2.

Table 2 Correlation between variables and depression after PU (n = 128)

Variables	r	p-value
1. Self-care ability	-.465**	< .001
2. Mental health literacy	0.036	.341
3. Social support	-.439**	< .001

Discussion

The findings of this study shown that the mean score of depression after PU was 17.91 (SD = 5.347). From the patients' perspective, those with lower scores may possess a more optimistic

and positive disposition, coupled with effective psychological adjustment capabilities. Such individuals tend to approach their condition with an open-minded attitude and maintain confidence in their treatment and rehabilitation processes. For instance, some patients perceive PUs as a minor challenge within the rehabilitation journey and believe that, with the assistance of healthcare professionals and their own active participation, they can achieve swift recovery. Patients exhibiting elevated scores may possess sensitive personality traits, rendering them susceptible to anxiety. The pain, limited mobility, and adverse emotional states associated with PUs, coupled with apprehensions regarding future quality of life, are exacerbated. For instance, certain patients may encounter feelings of helplessness and despair stemming from the prolonged healing process of PUs and the potential necessity for extended bed rest.

Regarding the severity of the condition, it is important to note that the underlying primary diseases and the severity of PUs among the participants in our sample exhibit significant variability. Patients with lower depression scores tend to present with milder PUs, typically characterized by early-stage lesions that are small in size and shallow in depth. These conditions generally exert a lesser impact on daily functioning and are associated with relatively reduced physical pain. Conversely, patients with higher depression scores often experience more severe PUs, which may include extensive infections and chronic, non-healing wounds. Such conditions frequently result in considerable physical pain and distress, which can contribute to the development of depression.

The incidence rate of PU-associated depression has been reported to be 48.65% (Dallam et al., 1995), which is consistent with that reported in other studies (Kris-Etherton et al., 2021). Herein, 35.16% of the patients showed symptoms of depression, with most (53.33%) presenting mild depression and a few (15.56%) presenting severe depression. These incidences are comparatively lower than those reported previously. Herein, the demographic data revealed that elderly patients constituted a larger proportion of the sample. Notably, owing to their distinct physical and mental attributes, they may not prioritize quality of life to the same extent as younger individuals. These findings suggest that the psychological impact of developing PU may be less pronounced in elderly populations. Furthermore, in most of the cases included in this study, PU manifested within 1 month and exhibited an acute nature, potentially preceding the onset of depression. Simultaneously, most individuals with PU were diagnosed with either suspected deep tissue injury or stage 1 ulcers, neither of which necessitate debridement. Consequently, patients typically experienced minimal pain, resulting in a relatively minor impact on their subjective well-being. Notably, 45.31% of the patients were married, which allowed them to receive substantial psychological support, whether they were hospitalized or at home. Most patients exhibited a normal BMI, and maintaining an optimal nutritional status has been shown to contribute to the prevention and management of depression (Kris-Etherton et al., 2021). Overall, these findings elucidate the observed low incidence and mild symptomatology of post-PU depression in the included participants. Despite international awareness and education campaigns, the prevention of PU remains an essential concern of healthcare providers regarding patient safety.

The correlation model showed that two variables, namely self-care ability, and SS, significantly influenced depression prevalence in patients with PU. As indicated by ASAS-R results, individuals with a higher score are less likely to develop PU and present depression. During the survey, patients expressed that their concerns were not always considered by the caregivers. When developing strategies to prevent PU, preparing individual-specific measures and seeking their consent and opinion are crucial. As shown in this study, self-care is a crucial factor for patients during the recovery phase. Based on the risk factors previously discussed, which may affect the postoperative mental and physical quality of life of the patients, some recipients may develop anxiety and depression. Herein, patients showed more cooperation with the program when reasonable negotiations were carried out with patients for PU management. This effectively increased the efficiency of communication between patients and nurses, thus greatly reducing the incidence of PU and depression. These results underscore the importance of educating patients with PU regarding the basics of their condition, including its treatment and prevention.

Reportedly, SS, referring to the quantity of support received by an individual from others through various encounters, is an important factor affecting the occurrence of post-PU depression and among the most important defenses against stressful life (Hannan et al., 2016) events. Typically, SS enhances mental health by reducing the consequences of detrimental psychosocial outcomes such as depression, anxiety, low self-efficacy, stress, and social isolation or loneliness (Hannan et al., 2016). SS can be categorized in the following three main forms: informational, practical, or emotional (including empathy, practical help, and counsel). Spinal cord injuries are known to cause irreversible nerve damage and serious complications, such as paraplegia or paralysis of both legs, and extended bed rest may lead to PU development. Reportedly, individuals with spinal cord injuries receive considerable care and support from their family, ward physicians, or nurses, making them mentally prepared to handle challenges such as paralysis instead of abandoning medical care and recovery. Consequently, they are far less likely to experience PU onset owing to their strong SS. Moreover, even if they present PU, the chances of depression may significantly be decreased, with an increase in PU cure rate. Overall, these findings show the importance of SS in patients with PU.

Lastly, MHL is another important factor reported in this study. In recent years, mental health issues among different social groups have considerably grown, increasing public health concerns in China. Consequently, MHL, as an important factor affecting mental health, has garnered notable attention worldwide. The concept of MHL has emerged inside the health literacy (HL) domain and needs to be interpreted within that framework. In recent years, many studies have contributed to expanding the knowledge of HL to make it a more comprehensive concept, essential to enhancing individual health outcomes, lowering population health disparities, and changing the way health systems and health policy are developed. Herein, MHL scores were inversely related to the likelihood of depression and PU in most patients, with no statistically significant differences. This may be attributed to the small sample size, which may limit the statistical relevance. Moreover, when scoring young and elderly patients, the lack of cooperation by the elderly may also have contributed to

the inaccuracy. Herein, younger patients, with a high MHL, could better handle a wide range of challenges with composure. Overall, these findings suggest that patients with a high MHL are less likely to experience depression and PU owing to their positive frame of mind and interactions with doctors, nurses, and other patients. Even in the case PU has already developed, it can be treated easily to prevent the onset of depression. Consequently, we propose that MHL scores should be measured on a regular basis for individuals with PU. Additionally, family members, physicians, and nurses should be advised on improving the care and assistance of patients who have poor MHL scores. Psychologists may also be invited to provide counseling to patients, per requirements. Future studies need to focus on confirming the validity of the scoring system results of this study, including a larger patient cohort from different regional hospitals.

Implications of the Study

There is an opportunity to recommend that clinicians use these findings to improve clinical practice, particularly in preventing depression among patients with pressure ulcers. Additionally, future research could examine whether these factors predict the onset of new PU-related depression.

Conclusion

Overall, the correlation model showed that three variables, namely self-care ability, MHL, and SS, significantly influenced depression prevalence in patients with PU. These findings may be used by healthcare professionals as a reference to improve the quality of life of patients with PU presenting depression. Considering the direct influence of social and emotional factors on quality of life, prioritizing the enhancement of social and emotional well-being in patients is crucial to improving their overall well-being. One potential approach toward achieving this objective is through increasing health literacy. Furthermore, in clinical nursing, attention needs to be directed toward related factors that may affect health education, including age, gender, and marital status of the patient. Employing these measures may aid in improving self-regulation abilities among patients with PU presenting depression and facilitate better health outcomes based on a scientifically sound and rational health education system.

Limitations of the Study

The study has certain limitations. Firstly, the use of a cross-sectional design is acknowledged as one limitation since the degree of depression in patients with pressure ulcers fluctuates over time. Therefore, collecting data from multiple or longitudinal patients would be more appropriate to comprehensively describe the nature of the variables. Additionally, another limitation pertains to the settings for data collection. Although this study was conducted at a comprehensive tertiary level A provincial hospital in Wenzhou City, it is important to acknowledge that generalizing the results may be limited due to its single-hospital setting. Consequently, further development of longitudinal and qualitative research is warranted.

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