

Do Psychosocial Factors Predict Readmission among Diabetic Elderly Patients?

Abstract

Background: Despite advances in diabetes treatment, the rate of readmission is still relatively high among these patients, especially in older population. Various factors may predict readmission in these patients; hence, the aim of this study was to assess the role of psychosocial factors in predicting readmission among diabetic elderly hospitalized in selected hospitals of Isfahan. **Materials and Methods:** In this cross-sectional study conducted from January to September 2016, 150 diabetic elderly hospitalized in selected hospitals affiliated with Isfahan University of medical sciences were chosen using a convenient sampling method. The initial information was collected by a three-part questionnaire consisting of (a) demographic characteristics, (b) 21-item depression, anxiety, and stress scale (DASS-21), and (c) multidimensional scale of perceived social support (MSPSS). Further information about readmission was gathered 3 months after completing the questionnaires through a phone call follow-up. Descriptive and inferential statistics (discriminant function analysis test) were used to analyze the data. **Results:** During 3 months after discharge, 44% of hospitalized diabetic elderly were readmitted. Analytical model predicted the readmission status of 109 individuals (of total 150 persons) in the studied units (success rate of 72.2%). Among predicting factors, depression and social support had the most and the least important roles in predicting readmission rate, respectively. **Conclusions:** Interventions to improve mental status (i.e., decreasing levels of depression, anxiety, and stress) and develop social support are suggested to reduce the risk of readmission among diabetic elderly patients. Nevertheless, future studies are needed to verify the value of such interventions.

Keywords: Aged, patient readmission, psychosocial factors

Introduction

At present, growing aging phenomenon is considered to be a major concern in all societies.^[1] Ageing trend has also begun in Iran and is expanding rapidly. With this trend, 25–30% of the population will be over 50 years of age by approximately 2030.^[2] Elderly people are exposed to variety of health problems and disabilities for many reasons.^[3] A literature review shows that currently diabetes is among the leading health problems of elderly worldwide.^[4] Based on some reports, the prevalence of diabetes among Iranian elderly population is 14% and is expected to increase in the near future.^[5]

Diabetes particularly in the elderly is associated with poor health outcomes, which leads to considerable increase in health care expenditures, unplanned recurrent hospitalizations, and finally premature death.^[6] Hospitalization itself puts

the elderly at excessive health risks such as irreversible decrease in functional and cognitive status and overall quality of life.^[7] Therefore, increased risk of hospitalization in diabetic patients^[7] is known as a major concern for health systems.^[6]

Reducing the rate of readmission among elderly is identified as a priority.^[8] Some evidences suggest that approximately 25–45% of readmissions can be prevented through proper detection and management of related predicting factors.^[9] Therefore, many investigators have attempted to examine the factors associated with readmission in elderly patients; however, no general agreement is available regarding these factors. Studies on the elderly show that patient characteristics, disease characteristics, and factors related to health system are among predictors of readmission in hospitals.^[10] Some studies have discussed personal information including old age, sex and education, low income, and previous

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history of admission in hospital as the main factors related to readmission.^[8,10] Despite several studies conducted in this context, few studies have been conducted regarding readmission among diabetic elderly. In Unites States, ethnic and racial differences, comorbidities, length of hospital stay, diabetes macro- and micro-vascular complications, and lack of outpatient follow-up after discharge have been indicated as the risk factors for readmission in diabetic elderly.^[11] However, no evidence considering this topic is available in Iran.

Although studies have often emphasized the role of physical and environmental factors in readmission among diabetic elderly, the possible effect of psychosocial elements have not received major consideration. According to the available data, elderly are subjected to many types of mental problems such as depression, stress, and anxiety,^[2,3] as well as to social problems such as lack of social support,^[12] due to various reasons including reduced social participation and physical activities, gradual increase in dependence to others and lower quality of life. Because these psychosocial determinants have impacts on health status among elderly, it is expected that they could be helpful in predicting readmission in diabetic patients also; nevertheless, their role in readmission among diabetic elderly have not been examined. Thus, the present study aimed to investigate the association between psychosocial factors and readmission among diabetic elderly in selected hospitals of Isfahan University of Medical Sciences.

Materials and Methods

This cross-sectional study was conducted among diabetic elderly patients aged 60 and older hospitalized in Alzahra, Kashani, Noor, and Aliasghar hospitals affiliated with the Isfahan University of Medical Sciences in 2016. The power and sample size software (PASS) was used as an appropriate method to power analysis and calculate sample size in discriminant analysis study;^[13] in which significance level (α), statistical power ($1-\beta$), number of independent variables, and number of levels in dependent variable were considered as 0.05, 0.84, 4, and 2 respectively. Moreover, the appropriate effect size was considered as 0.2 that was derived from a study by Low *et al.*^[14]

One hundred and fifty diabetic elderly eligible for the study (hospitalized in internal and endocrinology wards due to type 2 diabetes or its complications including hyperglycemia, hypoglycemia, frequent infections, and diabetic foot ulcers/no cognitive or mental disorder/volunteers for participation in the study) were selected using convenient sampling method. Then, a questionnaire consisting of 3 parts including (1) demographics, (2) 21-item Depression, Anxiety and Stress Scale (DASS-21), and (3) Multidimensional Scale of Perceived Social Support (MSPSS) were provided to the participants. The DASS scale consists of 21 statements which evaluates mental constructs including depression,

stress, and anxiety using 7 distinct statements for each subscale. The range of Likert type responses are scored from 0 (never) to 3 (always). Samani and Jokar^[15] have reported the test-retest reliability coefficients for depression, anxiety, and stress and the overall scale as 0.81, 0.78, 0.8, and 0.82 ($p < 0.001$), respectively. They also reported the Cronbach's alpha reliability coefficient for depression, anxiety and stress as 0.85, 0.75, and 0.87, respectively. MSPSS, by Zimet *et al.*, is a 12-item self-report scale evaluating perceived social support. A 7-point Likert scale consisting of responses from totally agree (7 points) to totally disagree (1 point) is used. The range of scores varies from 12 to 84. Validity and reliability of this scale have been confirmed by Chenary *et al.* (Cronbach's $\alpha = 0.89$).^[16] After obtaining ethical and official permission, the research aims and process were described for the participants. Moreover, they were ensured about the confidentiality of the information. After that, the questionnaires were filled by the researcher on their discharge day.

Three months after completion of the questionnaires, studied participants were evaluated regarding readmission by means of a phone call follow-up, and related data were documented. After data collection, analysis was performed using SPSS 18.0 software (statistical package for social sciences, SPSS Inc, Chicago, IL). Statistical indices were used for data description, and discriminant function analysis test was performed for data analysis.

Ethical considerations

The study was approved by the Isfahan University of Medical Sciences research Committee (394412). Participants signed an informed consent and were given written information, and were ensured that their participation would be voluntary. Moreover, they were ensured about the confidentiality of their information.

Results

Of the 150 diabetic elderly, 66 (44%) had at least one readmission in 3 months after discharge due to diabetes or its complications. Table 1 shows the descriptive statistics of demographic variables in studied participants.

Examining the relationship between demographic variables and grouping criterion variable, readmission showed no significant result. Table 2 presents the descriptive statistics (means and standard deviations) of predicting variables of depression, anxiety, stress, and perceived social support based on the levels of the grouping variable. We see that the mean score of depression, anxiety, and stress among patients without readmission is lower and the mean score of perceived social support among them is higher than that of the group with readmission. These statistics implicitly suggested that the entered predicting variables can predict group membership (i.e., readmission rate) among the diabetic elderly patients.

Table 1: Demographic data and personal characteristics

Variable	Terms	Frequency (%)
Gender	Female	78 (52.00)
	Male	72 (48.00)
Marriage status	Married	114 (76.00)
	Single	6 (4.00)
	Divorced	2 (1.30)
	Widow	28 (18.70)
Education level	Analphabetic	77 (51.30)
	Primary education and middle school	63 (42.00)
	Diploma	4 (2.70)
	Post diploma	4 (2.70)
	Bachelor	2 (1.30)
Income	Income less expense	62 (41.30)
	Came at the expense and more	88 (58.70)
Variable		Mean (SD)
Age (year)		67.99 (6.93)
Depression		17.48 (9.79)
Anxiety		13.27 (9.19)
Stress		19.27 (13.07)
Perceived social support		58.83 (14.30)

Table 2: Means and standard deviations of predicting variables based on levels of the grouping variable (readmission)

Readmission	Mean (SD)
No	
Depression	13.93 (8.20)
Anxiety	10.02 (7.69)
Stress	15.64 (9.86)
Perceived social support	61.51 (12.62)
Yes	
Depression	22.00 (9.85)
Anxiety	17.40 (9.35)
Stress	23.88 (15.13)
Perceived social support	55.41 (15.58)
Total	
Depression	17.48 (9.79)
Anxiety	13.27 (9.19)
Stress	19.27 (13.07)
Perceived social support	58.83 (14.30)

Table 3: Classification results of predicted group membership

Readmission rate	Predicted group membership		Total (%)
	No (%)	Yes (%)	
Original Group Membership			
No (%)	68 (81)	16 (19)	84 (100)
Yes (%)	25 (37.90)	41 (62.10)	66 (100)

Table 3 summarizes the success rate of predicting readmission based on the predicting variables. As shown

in Table 3, 68 cases without readmission and 41 cases of readmission were successfully predicted. In the other words, the readmission status of 109 patients (out of 150) was predicted successfully (success rate of 72.70%).

Discussion

The aim of the present study was to examine the relation between psychosocial factors and readmission in diabetic elderly hospitalized in selected hospitals of Isfahan University of Medical Sciences. Based on the findings, the relative frequency of readmission in 3 months after discharge in studied participants was 44%. Other studies have reported 19–40% relative frequency for readmission. For example, in one study, the relative frequency of readmission among elderly was 19% during 3 months after discharge,^[8] and in another study, it was reported to be 38.7% during 6 month after discharge.^[17] Such difference in the results may be attributable to different contextual factors which are suggestable to be explored through future studies.

The results indicated that all the studied psychological factors (depression, anxiety, and stress) have significantly predicted the readmission rate among diabetic elderly patients. Predicting role of depression in readmission has been supported in some similar studies. For instance, the results of the studies by Comino *et al.*^[6] and Garrison *et al.*^[18] showed that depression was significantly associated with an increased risk of readmission. However, some other studies have shown different findings. As such, Franchi *et al.*^[8] did not support the significant predicting role for depression.

Pointed out that depression may affect treatment outcomes through altering lifestyle indices such as eating habits, physical activity, treatment adherence, and glycemic control which finally may lead to more incidences of hospital readmission.^[19]

The present study findings also supported the predicting role of anxiety in diabetic elderly patients' hospital readmission. This finding is in line with some other studies such as those by Comino *et al.*^[6] and Garrison *et al.*^[18] However, few other researches have not supported such predicting role for the anxiety.^[17] It seems that the anxiety affects readmission rate through processes similar to that of depression. Nevertheless, inconsistency among literature strengthens the potential role of contextual factors.

Regarding the predictive role of stress in readmission of the diabetic elderly patients, the present study showed a significant association, which is consistent with the results reported by Bhoraskar.^[20,21] This finding is clinically significant that we found no study reporting inconsistent findings. It is revealed that stress hormones in body may directly affect glucose levels because one of major functions of stress hormones, such as epinephrine and cortisol, is to raise blood sugar to help boost energy when

its needed most. Hence, it is desirable that people with type 2 diabetes generally experience an increase in blood glucose levels, which finally may lead to increase hospital stay and readmission rate.^[22]

It appears that, despite the undeniable predicting role of psychological status, exact role of each of such factors is different among various psychosocial contexts. This finding suggests that interventions which target the patients' psychological status should be tailored based on the specific factors that are significant in predicting readmission rate.

In another finding, perceived social support found to have significant role in predicting readmission rate of the diabetic elderly. Lower perceived social support was associated with higher readmission rate. Strunin *et al.*^[23] and Hu *et al.*^[24] have reported the same finding. However, some other studies have not confirmed such an association.^[17] This difference can be due to various reasons including cultural and social variations in societies and difference in people's expectations concerning social support.

The difference between the results of the present study and previous studies could be attributed to a variety of factors such as the cultural and social differences between societies as well as different morbidity pattern in societies. Future studies are suggestable to investigate a wide range of psychosocial and contextual factors that may affect readmission status among diabetic elderly patients.

Finally, despite useful information provided by this study regarding the role of psychosocial factors in predicting readmission rate among diabetic elderly patients, few such factors have been investigated in the present study, which have limited the generalizability of the findings. Moreover, disparities among findings from the present study and other similar studies emphasizes the role of contextual factors that may modify the impact of these predicting variables. Therefore, it may be another limitation of the study. Conducting future studies considering broader contextual factors including greater sample size may be worthwhile.

Conclusion

The results of the present study identified some of the most important psychosocial factors associated with readmission in diabetic elderly patients. Improving mental health and developing social support are suggestable interventions to reducing the risk of readmission among diabetic elderly patients. However, the former factor has a more important role. Future studies are needed to verify the value of the interventions aimed to improve mental (i.e., decreasing levels of depression, anxiety and stress) and social status to achieve fewer readmissions among diabetic elderly patients.

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Conflicts of interest

There are no conflicts of interest.

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