Psychosocial factors predicting length of hospitalization in elderly individuals with diabetes in selected hospitals of Isfahan University of Medical Sciences, Isfahan, Iran, in 2015

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Original Article

Abstract

BACKGROUND: Currently, researchers seek to identify factors related to length of hospital stay in elderly in order to reduce burden on the health system. The importance of either physiological or psychological factors in determining health outcomes has been well stablished; however, the possible contribution of psychosocial factors particularly in elderly patients with diabetes is also of special importance. This study aimed to know what psychosocial variables predicts length of hospital stay in elderly patients with diabetes.

METHODS: This was a cross-sectional, correlational study conducted on 150 elderly patients from July-October 2015. Convenient sampling method was used to recruit the subjects. The data was collected by a three-part questionnaire consisted of demographic and health related characteristics, 21-item depression anxiety stress scale (DASS-21) and multidimensional scale of perceived social support (MSPSS).

RESULTS: The mean ± standard deviation of length of hospital stay was 15.6 ± 7.7 days. Findings from multiple regression analysis showed that the models of predicting length of hospital stay in subgroups of both women (P = 0.001, $F_{6,77}$ = 4.45) and men (P = 0.030, $F_{6,71}$ = 2.43) were significant. The entered variables in subgroups of women and men accounted for 27% and 18% of total variance (R^2) of the length of hospital stay, respectively. None of the psychosocial variables in women significantly predicted the lengths of hospital stay. However, one out of three predicting psychosocial variables (i.e. stress) in men significantly predicted the length of hospital stay (β = 0.39, t = 2.1, P = 0.040).

CONCLUSION: The results emphasized the importance of promoting social support of elderly patients with diabetes, particularly in patients who are women, have higher levels of stress, have higher period of disease and a history of hospitalization in the past 6 months in order to lower length of hospital stay and finally promote health status in elderly patients with diabetes. Further studies regarding the effect of each of these factors on health condition of elderly with diabetes are recommended.

Keywords: Psychosocial Factors, Length of Stay, Elderly, Diabetes, Iran

Introduction

Health care systems have already faced great challenges due to rapid growth in elderly population.[1] Elderly people as one of the most vulnerable sectors of the society[2] are subject to variety of health risks.[3,4] Evidences show that diabetes is amongst chronic and disabling diseases that have seriously challenged the health of elderly population worldwide[5] and Iran is not an exception.[6]

Patients with diabetes are exposed to the variety of co-morbid conditions such as deterioration of physical health[7] and adverse changes in psychosocial status.[8] Similarly, elderly people are subject to the risk of psychological (i.e. depression, anxiety and stress)[4,9] and social problems (i.e. less social support)[10] due to variety of factors such as changes in function of body systems, decline in social nvolvement, gradual increase in dependence on others and decline in the quality of life.

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Such great changes in physical and psychosocial status of either elderly people or patients with diabetes may expose them to poor health outcomes.[3] It is revealed that the elderly with diabetes have even worse health status, which further puts them at serious health risks like irreversible decline of physical and mental function[11] and therefore frequent and longer hospitalization.[12] Moreover, physical or psychosocial comorbidities may result in poor treatment adherence and therefore poor treatment outcomes.[8]

Prolonged hospitalizations lead to increasing hospital costs, decreasing efficacy of clinical care and other adverse consequences.[13] Therefore, reduction of hospital stay is an important policy for many health care systems.[14] Currently, researchers seek to identify factors related to length of hospital stay in patients with diabetes. For example, in different studies on patients with diabetes, complications and co-morbidities including nosocomial infections and thromboembolic disease,[7] lack of inpatient diabetes services and poor glycemic control,[15] diabetic foot[16] and, malnutrition[17] have been identified as important factors predicting length of hospital stay.

Most studies on patients with diabetes were conducted regardless of age and have emphasized the role of various physiological factors; however, the possible contribution of psychosocial factors such as depression, anxiety, stress and social support, particularly during elderly hospitalization, has been less investigated. Therefore, there is a need to assess psychosocial factors predicting length of hospitalization among hospitalized elderly patients with diabetes.

Materials and Methods

This cross-sectional study was conducted on 150 patients aged 60 years and older who were admitted in the selected hospitals (Alzahra, Kashani and Noor and Aliasghar) affiliated with Isfahan University of Medical Sciences, Isfahan, Iran, from July-October 2015. Inclusion criteria consisted of being hospitalized in internal and endocrinology wards due to type 2 diabetes or its complications (i.e. hyperglycemia, hypoglycemia, frequent infections and diabetic foot ulcers) which was ensured using the patients' records. None of the subjects were diagnosed with cognitive or mental disorder. Convenient sampling was used to recruit the subjects, such that according to the total number of elderly with diabetes hospitalized in each center during study period, the share of each center was identified and then subjects were sampled conveniently.

The data was collected by a three-part questionnaire that consisted of a) demographic and health related characteristics (i.e. age, gender, marital status, education level, income, living with family, duration of illness, history of hospitalization in the past 6 months), b) 21-item depression anxiety stress scale (DASS-21)[18] and c) Multidimensional Scale of Perceived Social Support (MSPSS).[19] DASS-21 questionnaire, which is a standard scale, contains 21 items or phrase to measure individuals' depression, anxiety and stress on a four-point Likert scale (never, few, sometimes and always) with scores of 0 to 3 and total range of 0-21. Reliability and validity of DASS-21 questionnaire have been confirmed. Samani and Joukar[20] supported its internal consistency (alpha = 0.85, 0.75 and 0.87) in their study. MSPSS contains 12 items on a seven-point Likert scale (from 1 indicating completely disagree to 7 indicating completely agree) with total score of 12 to 84, which higher scores indicate better social support. Reliability and validity of MSPSS questionnaire has also been established by Chenary et al.[21] (Cronbach's alpha = 0.89).

The study was approved by the Isfahan University of Medical Sciences Research Committee (394412). After getting ethical and official permission, the research aims and process were described for the subjects. 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 the information. After that the questionnaires were filled by the researcher in their discharge day.

Data from continuous variables (i.e. age, duration of illness, duration of hospital stay, depression, anxiety, stress, and perceived social support) and categorical variables (i.e. gender, marital status, education level, income, and living with family) were presented as means ± standard deviations and frequency (relative frequency), respectively.

Pearson correlation coefficient was used to examine the relationship between length of hospital stay and other continuous variables. Moreover, Student's t-test and one-way analysis of variance were used to examine the association between length of hospital stay and categorical variables.

Those variables of demographic and personal characteristics which had a significant relationship with length of hospital stay were then included in the regression model to adjust their effects.

The key method of analysis was multiple linear regression analysis.

Table 1. Descriptive statistics of demographic data and personal characteristics of the subjects (n = 150)

Variable	Terms	n (%)
Gender	Women	78 (52.0)
	Men	72 (48.0)
Marital status	Married	114 (76.0)
	Single	6 (4.0)
	Divorced	2 (1.3)
	Widow	28 (18.7)
Education level	Analphabetic	77 (51.3)
	Primary education and middle school	63 (42.0)
	Diploma	4 (2.7)
	Post diploma	4 (2.7)
	Bachelor	2 (1.3)
Income	Sufficient	62 (41.3)
	Insufficient	88 (58.7)
Living with family	Yes	127 (84.7)
	No	23 (15.3)
Variable		**Mean ± SD**
Age (year)		67.99 ± 6.93
Duration of illness (year)		13.39 ± 6.45
Duration of hospital stay (day)		15.61 ± 7.73
History of hospitalization (in the past 6 months)		1.08 ± 1.04
Depression		17.48 ± 9.27
Anxiety		13.27 ± 9.19
Stress		19.27 ± 13.07
Perceived social support		58.83 ± 14.30

SD: Standard deviation

This was used in order to examine the model of predicting length of hospital stay based on four psychosocial variables (i.e. perceived social support, depression, anxiety and stress).

Results of this statistical analysis included non-standardized coefficients (B), standardized beta coefficient (β) and R square (R^2) values. SPSS for Windows (version 19.0, SPSS Inc., Chicago, IL, USA) was used for all analyses, and all analyses were two-tailed.

Results

Demographic characteristics of the subjects are represented in table 1.

The results of Pearson correlation test showed significant association between some of the included variables and length of hospital stay. It has to be noted that the perceived social support, duration of illness, and history of hospitalization in the past 6 months showed a significant relationship with length of hospital stay (Table 2). Moreover, there was a significant association between gender and length of hospital stay; so that, women had longer hospital stay [t = -4.210, degrees of freedom (df) = 148, P < 0.001]. Therefore, multiple linear regression analysis was performed separately in each of the levels of this variable. Moreover, there were no significant association between the patients' education level ($F_{4,145}$ = 0.644, P = 0.632), marital status ($F_{3,146}$ = 1.168, P = 0.324) and living with family (t = 1.474, df = 148, P = 0.142).

Before performing multiple linear regression analysis, the data were checked to ensure they met the key assumptions of performing such analysis. For each of the four psychosocial predicting variables, the tolerance statistic was found > 0.20 and the variance inflation factor (VIF) was < 10, indicating absence of multi-collinearity. Moreover, the Durbin-Watson statistic was between 1 and 3, indicating independence of error.

Table 2. Correlation between demographic and predicting variables and length of hospital stay

Variables	Correlation coefficients						
	Age	Duration of illness	History of hospitalization	Depression	Anxiety	Stress	Perceived social support
Length of hospital stay	0.074	0.271[*]	0.360[*]	0.018	0.057	0.099	0.283[*]

[*] P < 0.010

Table 3. Results of multiple regression analysis to predict length of hospital stay from included variables

Variable entered	Gender	Statistical indices				
		B	SE	β	t	P
Duration of illness	Women	0.19	0.12	0.18	1.60	0.120
	Men	0.16	0.13	0.14	1.22	0.220
History of hospitalization	Women	1.81	0.78	0.28	2.30	0.020
	Men	1.90	0.90	0.25	2.10	0.040
Depression	Women	0.08	0.09	0.12	0.97	0.330
	Men	0.16	0.14	0.20	1.15	0.250
Anxiety	Women	0.12	0.10	0.18	1.18	0.240
	Men	0.13	0.15	0.12	0.85	0.400
Stress	Women	0.19	0.11	0.28	1.68	0.090
	Men	0.30	0.14	0.39	2.10	0.040
Perceived social support	Women	0.08	0.05	0.18	1.66	1.000
	Men	0.11	0.07	0.19	1.63	0.120

B: Non-standardized coefficients; SE: Standard error; β: standardized beta coefficient

Findings from multiple regression analysis showed that the models of predicting length of hospital stay in subgroups of both women (P = 0.001, $F_{6,77}$ = 4.45) and men (P = 0.030, $F_{6,71}$ = 2.43) was significant. The entered variables in subgroups of women and men accounted for 27% and 18% of total variance (R^2) of the length of hospital stay, respectively.

Among demographic variables, history of hospitalization in the past 6 months was significantly associated with the length of hospital stay in both subgroups. None of the predicting psychosocial variables in women was significantly associated with the length of hospital stay. However, one out of three predicting psychosocial variables (i.e. stress) in men significantly predicted the length of hospital stay (Table 3).

Discussion

The study results revealed that among psychosocial variables, stress significantly predicted the length of hospital stay in the elderly men with diabetes; such that greater stress score was associated with longer hospitalizations. Evidences in either patients with diabetes or other illnesses have supported the association between psychological problems and length of hospital stay; however, none of them have examined elderly patients with diabetes. For example, Prieto et al.'s[22] study on cancer patients and Thompson et al.'s[23] work on patients with psychological disorders have shown significant associations between psychological problems and length of hospital stay. Bhoraskar[24] also found significant association between stress and duration of hospitalization among patients with diabetes.

Gender differences in predicting the role of psychosocial factors in health outcomes of chronic illnesses has already been identified in the literature. It is evident that gender interacts with a variety of social, economic and biological factors and consequences of diseases to create different health outcomes and health related events for men and women.[25]

Another finding from the present study suggested that perceived social support has no significant predicting role in length of hospital stay in elderly patients with diabetes. Some other studies have reported similar result. For example, in a study by Contrada et al.[26] on 142 patients who underwent cardiac surgery, there was no association between the extent of social support and length of hospitalization in these patients.

However, we found no similar study on elderly patients with diabetes and inconsistent results have been emerged from other studies such as the study by Misto[27] who found that family support and participation in caring for elderly patients with diabetes is worthwhile to reduce their length of hospital stay. Pointed out that providing social support for patients with diabetes strengthen and inspire them to engage in self-care activities. It is also associated with treatment compliance and therefore proper glycemic control.[10] Moreover, higher social support particularly in elderly patients with diabetes is associated with less depression, anxiety and stress as well as proper coping with stressful life events.[2]

Another finding from the present study was that depression and anxiety were not associated with length of hospital stay in elderly patients with diabetes. Such finding is in line with a previous work on geriatric medical-surgical inpatients by Fulop et al.[28] who found no significant association between some psychological problems (depression

and anxiety) and length of hospital stay. Moreover, the results from a cross-sectional study by Loren and Gascon Catalan[29] on 81 elderly patients admitted to a tertiary acute care hospital did not show such association.

Based on the findings, history of hospitalization in the past 6 months had also significant association with length of hospital stay which was supported in Mohammadebrahimi et al.'s study.[30] It seems that hospitalization increases vulnerability of the elderly patients with diabetes. Future studies are needed to examine the adverse effects of hospitalization on health outcome in the elderly patients with diabetes.

We also found no significant relationship between duration of illness and length of hospital stay. This finding was inconsistent with the results reported by Comino et al.[12] on patients with diabetes.

Such inconsistencies between findings may be attributable to contextual factors.[31] Lubkin and Larsen[32] pointed out that a chronic illness interplays with variety of social, cultural, economic and even demographic (e.g. marital status) factors, which determine further health outcomes and health related events (i.e. hospitalization).

The present study has some limitations. Firstly, a limited numbers of predicting variables have been examined; and secondly, the data were collected from a limited population who had their own specific psychosocial and cultural context that may limit the generalizability of the results. Therefore, further studies are recommended to examine the role of broader spectrum of psychosocial factors in different populations.

Conclusion

In conclusion, the present study identified some of the most important psychosocial and demographic factors predicting length of hospital stay in elderly patients with diabetes. These factors represent key points which need to be taken into account and well managed by health care managers and professionals in order to lower length of hospital stay and finally promote health status in elderly patients with diabetes. Further studies are recommended regarding the effect of each of these factors on the health condition of elderly patients with diabetes.

Acknowledgments

Conflict of Interests

Authors have no conflict of interests.

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