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RESEARCH

DEPRESSIVE SYMPTOMS IN PATIENTS WITH STROKE AND THEIR CAREGIVERS

Abstract

Introduction: In this study, it was aimed to assess the prevalence of depressive symptoms among patients with stroke and their caregivers and to determine factors associated with depression.

Materials and Method: This study included 97 patients with subacute and chronic stroke and 88 caregivers. Patients were evaluated using the Brunnstrom motor recovery scale for motor functions, Mini-Mental State Examination for cognitive status, Rivermead Mobility Index for mobility and Barthel Index for functional status. The patients and their caregivers were evaluated for mood disorders using the Beck Depression Inventory, and quality of life was evaluated using the Nottingham Health Profile.

Results: Among the participants, 61.9% of the patients and 52.6% of the caregivers were found to have depressive symptoms. Althought comparison of the quality of life scores of the patients and their caregivers revealed no significant difference, only the physical aspect of quality of life was significantly higher in the patients. Depression scores were higher in the patients than in their caregivers. Motor functional outcomes of the hand along with mobility, cognitive functions and functional status scores were significantly negatively correlated with depression scores of the patients. Functional status scores of the patients were significantly positively correlated with motor functional outcomes (hand and upper/lower extremity), mobility and cognitive function scores.

Conclusion: Functional independence and mobility are the best predictors of depressive symptoms in patients with stroke. Assessment and treatment of depression in not only in patients but also their caregivers should be a part of the general rehabilitation plan since the early stages of stroke.

Keywords: Caregivers; Depression; Stroke

ARAŞTIRMA

İNME HASTALARI VE ONLARA BAKIM VERENLERDE DEPRESİF SEMPTOMLAR

Öz

Giriş: Bu araştırmada inmeli hastalar ve bakım verenleri arasında depresif belirtilerin sıklığını ve depresyon ile ilişkili faktörlerin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Çalışmaya subakut ve kronik inme geçiren 97 hasta ve 88 bakım veren dahil edildi. Hastalar motor fonksiyonlar için Brunnstrom Motor Geri Kazanım Ölçeği, bilişsel durum için Mini-Mental Durum İncelemesi, hareketlilik için Rivermead Hareketlilik İndeksi ve fonksiyonel durum için Barthel İndeksi kullanılarak değerlendirilmiştir. Hastalar ve bakım verenler Beck Depresyon Envanteri kullanılarak duygudurum bozuklukları açısından ve yaşam kalitesi Nottingham Sağlık Profili kullanılarak değerlendirilmiştir.

Bulgular: Çalışmaya katılanların, hastaların %61.9'unun ve bakım verenlerin %52.6'sının depresif belirtileri saptanmıştır. Hastaların ve bakım verenlerin yaşam kalitesi skorlarının karşılaştırılmasının anlamlı bir fark göstermediği, hastaların Nottingham Sağlık Profili›ndeki sadece fiziksel yönün hastalarda anlamlı derecede yüksek olduğunu ortaya koymuştur. Depresyon skorları, hastalarda bakıcılarına göre daha yüksekti. Mobilite, kognitif fonksiyonlar ve fonksiyonel durum skorları ile birlikte elin motor fonksiyonel sonuçları, hastaların depresyon skorları ile anlamlı derecede negatif yönde koreleydi. Hastaların fonksiyonel durum skorları, motor fonksiyonel sonuçlar (el ve üst/alt ekstremite), mobilite ve bilişsel işlev skorları anlamlı derecede pozitif korelasyon göstermiştir.

Sonuç: Fonksiyonel bağımsızlık ve mobilite, inmeli hastalarda depresif belirtilerin en iyi belirliyicileridir. Depresyonun sadece hastalarda değil aynı zamanda bakım verenlerde de değerlendirilmesi ve tedavi edilmesi, inmenin erken evrelerinden itibaren genel rehabilitasyon planının bir parçası olmalıdır.

Anahtar sözcükler: Bakıcı; Depresyon; İnme

INTRODUCTION

Stroke is a major cause of death and disability in both developed and developing countries. It causes devastating consequences not only on physical and social requirements but also on psychological needs and significantly reduces the quality of life. A wide range of emotional and behavioural disorders affect patients during the post-stroke period and the most common is depression. Various studies have reported the prevalence of post-stroke depression as 20%-60%. Depression levels of patients with stroke vary according to different features of the patients. Many factors are known to influence the level of depression, including lesion location, stroke severity, cognitive and functional impairments, sex, educational status and socioeconomic status. Several studies have reported the negative effects of depression on recovery in terms of performing daily activities. Many studies have shown that depression negatively affects function and that treatment of depression increases functional recovery (1-4).

Patients with disabilityresulting from stroke need emotional and physical support from their caregivers, who are usually family members. Caregivers play an important role in stroke rehabilitation. Depression is very common in not only the patients with stroke but also their caregivers. Remarkably, various studies have shown that the prevalence of depression in patients with stroke and their caregivers is similar. Depression in and quality of life of caregivers are adversely influenced by their age, sex, and physical health. Therefore, to adapt to stroke, psychosocial support to patients and their caregivers is necessary (1,5,6).

The factors influencing depression and quality of life among patients with stroke and their caregivers have been investigated only in a few studies. Therefore, the aim of this study was to assess the prevalence of depressive symptoms among patients with stroke and their caregivers and to determine the factors associated with these symptoms.

MATERIALS AND METHOD

This cross-sectional study was conducted at a single centre (Eskisehir Osmangazi University, Physical Medicine and Rehabilitation Department, Eskisehir, Turkey) between 2013 and 2014.

Patients with stroke (n=118) who were referred to a polyclinic and those who are concerned about their caregivers (n=101) were included. Overall, 97 patients with chronic and subacute stroke and 88 caregivers were included in the study. All the patients and their caregivers were able to understand the questionnaires in Turkish and could read and write in Turkish. Stroke patients and caregivers with psychiatric illnesses and aphasia which caused co-operative problems were excluded.

A detailed anamnesis of the patients (age, sex, duration of stroke, educational status, socioeconomic status, family status, marital status, affected extremity, antidepressant usage and aphasia rehabilitation history) and their caregivers (proximity of relationship, age, sex, educational status, socioeconomic status and marital status) were conducted.

The motor functional outcome of the patients was evaluated using the Brunnstrom motor recovery scale. Movements of the fingers, arms and legs were classified into six grades: 1 point for no voluntary movement to 6 points for normal movement. Specific cognitive functions were evaluated using the Mini-Mental State Examination (MMSE), and MMSE scores range from 0 to 30 (7). Mobility was assessed using the Rivermead Mobility Index (RMI), and RMI scores range from 0 to 15 (8). Further, functional status was assessed using the Barthel Index (BI), BI contains 10 items that measure performance of self-care and mobility (0-100) (9). Depressive symptoms of the patients and their caregivers were evaluated using the 21-item Beck Depression Inventory (BDI). Responses were given on a scale of 0-3 in reference to the past fortnight [total score range 0–63: mild (10–18), moderate (19–29) and severe (30–63); patients with a score of >9 were considered to have depression] (10, 11).

Quality of life was assessed using the Nottingham Health Profile (NHP), Part 1 which reflects patients' and their caregivers' degree of discomfort or distress in six dimensions (emotional relations, sleep, lack of energy, pain, physical mobility and social isolation) in a total of 38 questions with yes/no responses. The ratings of each item were weighted to obtain a score of 0-100; a higher score indicates more problems (12). BDI and NHP questionnaires, which are self-instructive instruments, were administered to the patients and their caregivers and collected by the interviewer on completion. In a few cases, when the patients and their caregivers needed assistance in filling the questionnaire because of visual deficit or writing problems, the interviewer read the BDI and NHP questions aloud and, if necessary, wrote down their answers.

Statistical analysis

Data for each continuous variable were examined using the Shapiro–Wilk test to determine whether the assumptions of normality were valid. The independent samples Mann-Whitney U test and Spearman's correlation analysis were used when the data were not normally distributed. Descriptive statistics are the median values (quartiles). A p-value of <0.05 was considered statistically significant. Data were analysed using IBM SPSS Statistics 21.0 (SPSS Inc., Chicago, Illinois, US).

Ethics statement

The study was conducted in full compliance with the amended Declaration of Helsinki, after obtaining approval from the institutional review board of Eskisehir Osmangazi University (date/no: 14.05.2013/08-09). Informed consent was obtained from all patients and their caregivers before inclusion.

RESULTS

In total, 97 patients (34 women [mean age 62.26±14.91 years] and 63 men [mean age 63.30±10.51 years]) with an average post-stroke period of 18.3±28.8 months) and 88 caregivers (72 women [mean age 51.2±14.2 years] and 16 men [mean age 50±19.8 years], comprising spouses, children and others) were enrolled. Moreover, among the caregivers 46 (52.27%) were the patient's spouses, 39 (44.32%) were the patient's children and 3 (3.41%) were other individuals.

The demographic characteristics (age, sex, marital status, educational status, socioeconomic status and antidepressant usage) of the patients and their caregivers are summarised in Table 1.

In terms of the BDI scores (mild, moderate and severe), no significant differences were observed among working, non-working and retired patients, and no significant differences were found in terms of educational and marital status. Furthermore, 61.9% of the patients and 52.6% of the caregivers were found to be depressed. The rates for all patients and their caregivers are separately presented in Tables 2 and 3. Among the patients, 55 had a right-hemispheric lesions and 42 had left-hemispheric lesions. No significant difference was found in terms of the BDI scores of the patients with right-hemispheric lesion and those with left-hemispheric lesion. The majority of patients had ischaemic stroke; 80 patients had ischaemic stroke and 17 had haemorrhagic stroke. Notably, no significant difference was observed in terms of the BDI scores of the patients with ischaemic and haemorrhagic strokes. In addition, 80 patients had an elementary family and 17 had an extended family. No significant difference was noted in terms of the BDI scores of the patients with elementary and extended families (Table 4). There were also no significant differences in the BDI scores of the caregivers in terms of working, educational and marital statuses and antidepressant usage (Table 5).

Comparison results of the NHP scores of the patients and their caregivers revealed no significant difference ($p>0.05$), with one exception the physical scores of NHP were significantly higher in the patients ($p=0.003$, Table 6).

In the patients, there was no correlation between the Brunnstrom grades of upper/lower extremity

and the BDI scores. Not only Brunnstrom grades of the hand (p=0.043) but also RMI (p<0.001), MMSE (p=0.003) and BI (p<0.001) scores were significantly negatively correlated with the BDI scores of the patients. However, the BI scores of the patients were significantly positively correlated with the Brunnstrom grades (hand and upper/lower extremity) and RMI and MMSE scores (p<0.001, Table 7).

Table 1. Demographic characteristics of patients and their caregivers.

Variable	Patients		Caregivers		p
	n	%	n	%	
Age (mean±sd)		62.94±12.17		51.22±15.35	<0.001
Sex					<0.001
Female	34	35.1	72	81.8	
Male	63	64.9	16	18.2	
Marital status					<0.001
Married	78	80.4	69	78.4	
Unmarried	19	19.6	19	21.6	
Socioeconomic status					<0.001
Working	1	1.0	16	18.2	
Not working	52	53.6	50	56.8	
Retired	44	45.4	22	25	
Educational status					0.144
Illiterate	8	8.2	2	2.3	
Primary school	67	69.1	56	63.6	
High school	12	12.4	17	19.3	
University	10	10.3	13	14.8	
Antidepressant usage					0.133
Yes	34	35.1	21	23.9	
No	63	64.9	67	76.1	

Table 2. The frequency and severity of depression scores of patients.

Severity of depression (BDI points)	Patients	
	n	%
0-9	37	38.1
10-18	17	17.5
19-29	35	36.1
30-63	8	8.2
Total	97	100.0

Table 3. The frequency and severity of depression scores of caregivers.

Severity of depression (BDI points)	Caregivers	
	n	%
0-9	46	47.4
10-18	23	23.7
19-29	17	17.5
30-63	2	2.1
Total	88	100.0

Table 4. Beck Depression Inventory scores of the patients by demographic characteristics.

Variable	Score				p
	0-9	10-18	19-29	30-63	
Working status					
Working	1 (100.0%)	- (-)	- (-)	- (-)	0.245
Not working	15(28.8%)	12 (23.1%)	22 (42.3%)	3 (5.8%)	
Retired	21 (47.7%)	5 (11.4%)	13 (29.5%)	5 (11.4%)	
Educational status					
Illiterate	2 (25.0%)	3 (37.5%)	3 (37.5%)	- (-)	0.215
Primary school	24 (35.8%)	9 (13.4%)	26 (38.8%)	8 (11.9%)	
High school	4 (33.3%)	3 (25.0%)	5 (41.7%)	- (-)	
University	7 (70.0%)	2 (20.0%)	1 (10.0%)	- (-)	
Marial status					
Married	30 (38.5%)	15 (19.2%)	27 (34.6%)	6 (7.7%)	0.619
Single	1 (50.0%)	1 (50.0%)	- (-)	- (-)	
Widow	6 (35.3%)	1 (5.9%)	8 (47.1%)	2 (11.8%)	
Affected extremity					
Right	18 (42.9%)	10 (23.8%)	10 (23.8%)	4 (9.5%)	0.148
Left	19 (34.5%)	7 (12.7%)	25 (45.5%)	4 (7.3%)	
Anti-depressant usage					
Yes	- (-)	9 (26.5%)	5 (14.7%)	17 (50.0%)	0.085
No	- (-)	28 (44.4%)	12 (19.0%)	18 (28.6%)	
Family type					
Extended	8 (47.1%)	3 (17.6%)	4 (23.5%)	2 (11.8%)	0.693
Elementary	29 (36.2%)	14 (17.5%)	31 (38.8%)	6 (7.5%)	
Stroke type					
Ischaemic	29 (36.2%)	13 (16.2%)	31 (38.8%)	7 (8.8%)	0.660
Haemorrhagic	8 (47.1%)	4 (23.5%)	4 (23.5%)	1 (5.9%)	

Table 5. Beck Depression Inventory scores of the caregivers by their demographic characteristics.

Variable	Score				p
	0-9	10-18	19-29	30-63	
Working status					
Working	9 (56.2%)	5 (31.2%)	1 (6.2%)	1 (6.2%)	0.161
Not working	21 (42.0%)	15 (30.0%)	13 (26.0%)	1 (2.0%)	
Retired	16 (72.7%)	3 (13.6%)	3 (13.6%)	- (-)	
Educational status					
Illiterate	2 (100.0%)	- (-)	- (-)	- (-)	0.966
Primary school	28 (50.0%)	14 (25.0%)	12 (21.4%)	2 (3.6%)	
High school	9 (52.9%)	5 (29.4%)	3 (17.6%)	- (-)	
University	7 (53.8%)	4 (30.8%)	2 (15.4%)	- (-)	
Marial status					
Married	39 (56.5%)	17 (24.6%)	11 (15.9%)	2 (2.9%)	0.086
Single	7 (53.8%)	4 (30.8%)	2 (15.4%)	- (-)	
Widow	- (-)	2 (33.3%)	4 (66.7%)	- (-)	
Anti-depressant usage					
Yes	- (-)	7 (33.3%)	6 (28.6%)	6 (28.6%)	0.202
No	- (-)	39 (58.2%)	17 (25.4%)	11 (16.4%)	

Table 6. Comparison of quality of life scores of patients and their caregivers.

Nottingham Health Profile	Patients (25%-75%) median	Caregivers (25%-75%) median	p
Energy	66.6(16.65-100)	66.6(33.3-100)	0.901
Pain	25 (0-100)	37.5 (3.13-87.5)	0.883
Emotional	55.5 (22.22-77.77)	55.53 (22.2-86.04)	0.740
Sleep	40 (10-100)	40 (20-80)	0.997
Social	40 (20-80)	40 (0-80)	0.152
Physical	62.5 (37.5-75)	31.25 (0-75)	**0.003**

Table 7. Correlation of Beck Depression Inventory and Barthel Index scores of patients with related variables.

Variable	Beck Depression Inventory	Barthel Index
Brunnstrom stage of upper extremity	ns	**r=0.449 p<0.001**
Brunnstrom stage of lower extremity	ns	**r=0.517 p<0.001**
Brunnstrom stage of hand	**r=-0.206 p=0.043**	**r=0.356 p<0.001**
Rivermead Mobility Index	**r=-0.380 p<0.001**	**r=0.885 p<0.001**
Mini-Mental Test	**r=-0.301 p=0.003**	**r=0.524 p<0.001**
Barthel Index	**r=-0.428 p<0.001**	-
Beck Depression Inventory	-	**r=-0.428 p<0.001**

ns indicates nonsignificant.

DISCUSSION

The present study was conducted to investigate various patient- and caregiver- related factors that influence depressive symptoms and quality of life among them. Untreated depression prevents successful recovery and rehabilitation in these patients. Our results showed that >50% of the patients (61.9%) and their caregivers (52.6%) had depressive symptoms. Various studies found differences in the prevalence of depression in patients with stroke and their caregivers (1,13,14). A previous study reported prevalence of depression of 40.1% (13). Kotila et al. reported that 41% of 321 patients participated in active rehabilitation programmes and that 42% of 195 caregivers were depressed at three months after experiencing stroke (1). In another study, the prevalence of depression in 21-45 year-old caregivers, was 40% (14). In the present study, the prevalence of depressive symptoms was higher than that reported in the above-mentioned studies. This may be associated with disease duration of stroke and the age of caregivers, which were higher in our study than those in the above-mentioned studies. Similarly, another study reported that the prevalence of depression was 52% in older patients with stroke and 53% in their geriatric caregivers (5).

The important question is which factors affect depression and quality of life of patients and their caregivers. Berg et al. Reported that age was the most significant determinant of depression and that older patients were more depressed after suffering acute strokes (15). Nakipoğlu et al. demonstrated that depression exists in 52.6% of geriatric patients with hemiplegia (5). In our study, the mean age of patients was 62.94±12.17 years, and depressive symptoms were found in 61.9% of the patients, similar to that reported in the study by Kotila et al. wherein which study older age was as an independent contributor to depression. This result may be associated with the patients' acceptance of their disabilities, adaptation to physical and psychosocial sequelae and learning how to live with them.

In some reports patients with left-hemispheric lesions were more depressed than those with right-hemispheric lesions, although no difference was found in some studies in the literature (1,5,16,17). In our study, no association was found between the hemispheric side and depressive symptoms of patients. In addition, no correlation was found among stroke subtype (infarct/haemorrhage), patients' family type (elementary/extended) and depressive symptoms.

Hand and lower/upper extremity motor functions, cognitive functions and mobility were significantly correlated with functional independence of patients. Hand motor functions, cognitive functions, mobility and functional independence were also significantly negatively correlated with depressive symptoms of patients. However, depressive symptoms are more likely to be influenced by functional independence and mobility. Our results were similar to those of earlier studies; Wade et al. (18) and Sharpe et al. (19) reported that physical disability is associated with depression. Schmid et al. investigated 174 patients with post-stroke depression for over 12 weeks and found that the severity of depression was negatively associated with functional independence (20). The primary objectives of stroke rehabilitation are to reduce functional dependency and allow patients to return to their communities. However, functional independence is mostly influenced by post-stroke depression, and this finding reinforces the importance of treating depression during stroke rehabilitation. Depression can often be overlooked or ignored, which delays the functional recovery of patient. Therefore, depression should be considered, and necessary support and treatment should be given (21).

In our study, the depression scores of patients and their caregivers were high. This result is not surprising because chronic diseases are consistently associated with an increased prevalence of depression and lower level of energy (22,23). Moreover, the severity of depression of the patients was positively associated with the severity of depression of their caregivers (1). Considering that >50% of the caregivers were depressed in our study, care for depression not only in patients but also in their caregivers is very crucial. Depression in caregiers may reduce the rehabilitation success of patients. Emational support and encouragement to the caregivers may reduce depression in patients with stroke. Evans et al. have reported that depression is reduced in patients after counselling of their caregivers (24). A significant relationship was found between quality of life dimensions of the patients and their caregivers in our study, and their results were similar. Only the physical dimension of quality of life was worse in the caregivers. This is an expected result because caregivers should already have the capacity to care for patients and meet their needs. These results showed that stroke adversely affects not only the quality of life of patients with stroke but also the quality of life of their caregivers owing to their workload and responsibilities.

High-level family support is associated with improvement in depression and functional outcomes in patients with acute-stage stroke (25). Moreover, 94.59% of the caregivers of such patients were first-degree relatives. To attain better rehabilitation outcomes, caregivers should have complete motivation and good attitude. In conclusion, caregivers as well as patients with stroke must obtain necessary support since the initiation of rehabilitation programme. In our study, the duration for which the caregivers cared for these patients was not considered. This is the main limitation of our study. In addition, the duration of the antidepressant usage was not considered, which is another limitation. However, our study is one of the few studies that investigated quality of life and depressive symptoms of patients with stroke and their caregivers.

In conclusion, our results showed that the best predictor of post-stroke depressive symptoms is functional independence and mobility of patient and that stroke affects patients and their caregivers. Post-stroke depressive symptoms have negative effects on functional independence. Assessment and treatment of depression not only in patients but also in their caregivers should be a part of the general rehabilitation plan since the early stages of stroke.

Conflict of interest

The authors have no conflicts of interest to declare. All authors have read the journal's policy on disclosure of potential conflicts of interest. All authors have read the journal's authorship agreement. The manuscript has been reviewed and approved by all named authors.

REFERENCES

1. Kotila M, Numminen H, Waltime O, Kaste M. Depression after stroke: results of the FİNNSTROKE Study. Stroke 1998;29:368-72. (PMID:9472876).
2. Sandin K, Cifu D, Noll SF. 4. Psychologic and social implications. Arch Med Rehabil 1994;75:52-5. (PMID:8185464).
3. Nys GMS, Van Zardwort MJE, Van der Worp HB, De Haan EH, De Kort PL, Kappelle LJ. Early depressive symptoms after stroke: neuropsychological correlates and lesion characteristics. J Neurol Sci 2005;228:27-33. (PMID:15607207).
4. Gainotti G, Antonucci G, Marra C, Paolucci S. Relation between depression after stroke, antidepressant therapy, and functional recovery. J Neurol Neurosurg Psychiatry 2001;71:258-61. (PMID:11459907).
5. Nakipoglu G, Karamercan A, Mengulluoglu M, Dal E, Ozgirgin N. Comparison of depressive mood findings in geriatric hemiplegic patients and their caregivers. Turkish Journal of Geriatrics 2006;9(4):218-21. (in Turkish).
6. McCullagh E, Brigstocke G, Donaldson N, Kalra L. Determinants of caregiving burden and quality of life in caregivers of stroke patients. Stroke 2005;36:21-81. (PMID:16151029).
7. Küçükdeveci AA, Kutlay S, Elhan AH, Tennant A. Preliminary study to evaluate the validity of the mini-mental state examination in a normal population in Turkey. Int J Rehabil Res 2005;28:77-9. (PMID:15729101).
8. Collen FM, Wade DT, Robb GF, Bradshaw CM. The Rivermead mobility index: a further development of the Rivermead motor assessment. Disabil Rehabil 1991;13:50-4. (PMDI:1836787).
9. Küçükdeveci AA, Yavuzer G, Tennant A, Süldür N, Sonel B, Arasil, T. Adaptation of the modified Barthel Index for use in physical medicine and rehabilitation in Turkey. Scand J Rehabil Med 2000;32:87-92. (PMID:10853723).
10. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. Beck Depression Inventory (MDI). Arch Gen Psychiatry 1961;4(6):561-71. (PMID:13688369).
11. Hisli N. Beck Depresyon Envanterinin geçerliliği üzerine bir çalışma. Psikoloji Dergisi 1988;6:118-22.[Internet] Available from: http://www.turkpsikolojiyazilari.com/PDF/TPD/23/08.pdf. Accessed: 25.01.2018. (in Turkish).
12. Kücükdeveci AA, McKenna SP, Kutlay S, Gürsel Y, Whalley D, Arasil T. The Development and psychometric assessment of the Turkish version of the Nottingham Health Profile. Int J Rehabil Res 2000;23:31-8. (PMID:10826123).
13. Pohjasvaara T, Leppavuori A, Siira I, Vataja R, Kasta M. Frequency and clinical determinants of poststroke depression. Stroke 1998;29:2311-7. (PMID:9804639).
14. Khalid T, Kausar R. Depression and quality of life among caregivers of people affected by stroke. Asia Pacific Disability Rehabilitation Journal 2008;19(2):103-10. [Internet] Available from: http://english.aifo.it/disability/apdrj/apdrj208/depression_stroke.pdf. Accessed: 25.01.2018.
15. Berg A, Palomaki H, Lehtihalmes M, Lonnqvist J, Kaste M. Poststroke depression in acute phase after stroke. Cerebrovasc Dis 2001;12:14-20. (PMID:11435674).
16. Robinson RG, Price TR. Post-stroke depressive disorders: a follow-up study of 103 patients. Stroke 1982;13:635–41. (PMID:7123596).
17. Parikh RJ, Lipsey JR, Robinson RG, Price TR. Two-year longitudinal study of poststroke mood disorders: dynamic changes in correlates of depression at one and two years. Stroke 1987;18:579-84. (PMID:3590249).
18. Wade DT, Leigh-Smith J, Hewer RA. Depressed mood after stroke: a community study of its frequency. Br J Psychiatry 1987;151:200-5. (PMID:3690109).
19. Sharpe M, Hawton K, Seagroatt V, Bamford J, House A, Molyneux A. et al. Depressive disorders in long-term survivors of stroke: association with demographic and social factors, functional status and brain lesion volume. Br J Psychiatry 1994;164:380–386. [Internet] Available from: http://bjp.rcpsych.org/content/164/3/380.short. Accessed: 25.01.2018.
20. Schmid AA, Kroenke K, Hendrie HC, Bakas T, Sutherland JM, Williams LS. Poststroke depression and treatment effects on functional outcomes. Neurology 2011;76:1000-5. (PMID:21403112).
21. Yaliman A, Eskiyurt N, Vural M, Dönmez M, Cesme F, Demirci S, Bolukbas N, Ucguler HB. Cognitive function and depressive mood change after cerebrvascular attack. Turkish Journal of Geriatrics 2004;7(4):211-6. (in Turkish).
22. Wells K, Golding JM, Burnam MA. Psychiatric disorder in a sample of the general population with and without chronic medical conditions. Am J Psychiatry 1988;145:976-81. (PMID:2969199).
23. Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. The prevalence of comorbid depression in adults with diabetes: a meta-analysis. Diabetes Care 2001;24:1069-78. (PMID:11375373).
24. Evans RL, Matloc AL, Bishop DS, Stranahan S, Pederson C. Family intervention after stroke: does counseling or education help? Stroke 1988;19:1243-9. (PMID:3176084).
25. Tsouna-Hadjis E, Vemmos KN, Zakopoulos N, Stamatelopoulos S. First-stroke recovery process: the role of family social support. Arch Phys Med Rehabil 2000;81:881-7. (PMID:10895999).