

DEPRESSION AMONG THE POST STROKE PATIENTS IN THE TERTIARY HOSPITAL AND REHABILITATION CENTRE OF BANGLADESH

Salahuddin Mohammad¹, Shabnam Mostari², Nandeeta Samad³, Russell Kabir⁴

¹Medical Officer, Coordination and Support Centre, Directorate General of Health Services, Dhaka, Bangladesh

²Consultant, A2i Innovation Lab, Access to Information (A2i) Programme, Dhaka, Bangladesh

³Lecturer, Department of Public Health, North South University, Dhaka, Bangladesh

⁴Senior Lecturer, School of Allied Health, Anglia Ruskin University, Essex, UK

Abstract

A cross sectional study was carried out to see the magnitude of depression as public health problem among purposively selected 291 stroke patients attending for physiotherapy at outpatient department of Physical Medicine Department of Dhaka Medical College Hospital and Center for the Rehabilitation of the Paralyzed, Dhaka. Data were collected through face to face interview using a pretested questionnaire and document review. Depressive symptoms were measured using the Hamilton Depression Rating scale at cut-off value 10 for mild, 14 for moderate and 18 for severe depression. The proportion of depression among the study population was 65% which included 30% with severe depression and rest 17% mild, 18% moderate depression and 35% had no depression. People with ischaemic stroke were more depressed (75.9%) than other types of stroke ($p<0.001$). With the duration of stroke both the proportion and level of depression had been increased ($p<0.001$). Most of the respondents from low income group were suffering from some level of depression ($p<0.05$). Both diabetes mellitus ($p<0.001$) and hypertension ($p<0.005$) had significant role in depressive state. This study identified depression among stroke patients as a significant public health problem. Therefore, while planning therapeutic approaches for stroke patients, depression always should be taken into consideration for effective management and improvement of the compliance.

Keywords: Depression; Stroke; Rehabilitation; Tertiary hospital; Bangladesh.

Introduction

For decades while infectious diseases have had the attention of the global health agenda, non-communicable diseases have received very little attention. This is particularly true for developing countries. According to World Health Organization (WHO), the global burden of non-communicable diseases continues to grow. Tackling the burden constitutes one of the major challenges for development in 21st century. Proven cost-effective strategies exist to prevent and control this growing burden. However, high-level commitment and concrete actions are often missing at the national level. Prevention of non-communicable diseases and control programmes remain dramatically under-funded at the national level and have been neglected from the global health agenda [1].

Two important members of non-communicable diseases are cerebrovascular disease (stroke) and mental health. These two often coexist and pose a major burden of non-communicable diseases. Notably depression, which is among the most common psychiatric disorders, is also one of the most common co morbid psychiatric disorders associated with stroke and impacts upon treatment course and prognosis [2]. Stroke is a major health problem in the whole world both in developed and developing countries. In addition to be the third most common cause of deaths, stroke is the most important cause of

physical disability of people over 60 years old. It is projected that by 2030 stroke will be the 4th leading cause of burden of disease accounting 4.3% of total DALYs [3]. The majority of stroke survivors continue to live at home [4], but, based on population studies. 20-50 per cent of stroke survivors need help in at least one aspect of daily living activities [5]. It is understandable that stroke might have effects on survivors' and their carers' quality of life and mood.

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, feeling of guilt or low self-worth, disturbed sleep or appetite, low energy and poor concentration. These problems can become chronic or recurrent and lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities [6]. It is a significant contributor to the global burden of disease and affects people in all communities across the world. Today, depression is estimated to affect 350 million people. Depressive disorders are a significant public health issue. They are prevalent, disabling, often chronic illnesses, which cause a high economic burden for society, related to both direct and indirect costs [7].

Nearly 30% of persons suffering from various illnesses simultaneously suffer from depression [8]. In Bangladesh, 49% of total cases of depressive symptoms were found in orthopaedic patients and among them 16% had major depressive episodes [9]. Again 38% of major depressive episodes were found in deliberate self-harm patients [10]. Stroke patients suffer more from major



eISSN: 2522-7165
pISSN: 2520-7342

Correspondence: Dr. Russell Kabir, Senior Lecturer, School of Allied Health, Anglia Ruskin University, Essex, UK. Email: russell.kabir@anglia.ac.uk



depressive symptoms. The prevalence of clinical depression and elevated depressive symptoms are higher among persons with stroke compared with the general population [11]. These associations may be related to increased risk of depressive symptoms in individuals with stroke, increased risk of stroke in individuals with depressive symptoms or both [12]. Depression interferes with rehabilitation by causing physical and cognitive function impairment [13].

Data on depression in the general population in South Asia are inadequate, particularly for stroke patients. Bangladesh is not an exception. Though different study was done separately on stroke and on depression related to other disease conditions, post stroke depression has always been neglected. Therefore, this study has been designed with the expectation to find out information regarding depression among the stroke patients in Dhaka city and factors associated with depression among them.

Materials and Methods

The study was a cross sectional study. Diagnosed stroke patients attending for physiotherapy in the Outpatient Department of DMCH and CRP, Mirpur, Dhaka are the study population. The study was undertaken in outpatient departments (OPD) of Physical Medicine Department of Dhaka Medical College Hospital (DMCH) and Center for the Rehabilitation of the Paralyzed (CRP).

The Sample size was determined by using following formula:

$$n = \frac{Z_{\alpha}^2 pq}{d^2}$$

Here,

n= Number of Desired Sample size

Z = Standard normal deviation (Usually set as 1.96 corresponding to 95%CI)

p= Proportion in the target population with particular characteristics

q= Proportion in the target population without particular characteristics,

that is 1-p;

d= Degree of accuracy desired usually set as 5% = 0.05

α = Level of significance

Here, $p = 75\% = 75/100 = 0.75$ ³⁶

Then, $q = 1 - p = 1 - 0.75 = 0.25$

So, $n = (1.96)^2 \times 0.75 \times 0.25 / (0.05)^2$

= 288

Therefore, sample size (n) is 288. The participants were selected using purposive sampling technique from both sites considering the inclusion criteria- i) Patients who has history of Stroke (diagnosed by physician before) and ii) patients over 70 years of age and the exclusion

criteria applied – i) patients with history of psychiatric problems (diagnosed by physician before) ii) family history of depression iii) patients who are taking anti-depressant drugs and iv) patients who were seriously ill during the period of data collection

Data was collected using a self prepared semi-structured questionnaire developed in English and it was translated into Bangla. Data collection period was from July 2014 to October 2014. Each potential subject was adequately informed of the objectives, methods, anticipated benefits and potential hazard of the study and the discomfort it may entail. They were informed that they are free to abstain from participation in the study and free to withdraw their consent any time. It was assured that personal information would not be disclose to anyone and anonymity is maintained. Ethical approval was obtained from the Research ethics committee before the data collection process started. The interview questions were checked and verified for its completeness, correctness and internal consistency to exclude missing or inconsistent data. Age, sex, income, religion, educational status, area of residence, occupation, marital status, family income, family size, type of stroke, side of hemiparesis, dysphasia, ability of perform activity of daily life and other diseases status were noted. An HDRS cut-off score of 10 was used to define the level of depression. Depression score 10 to 13 was regarded as having mild depression and 14 to 17 as moderate depression. A depression score ≥ 18 was taken as severe form of depression. After checking & rechecking, SPSS version 20 was used for data analysis.

Results

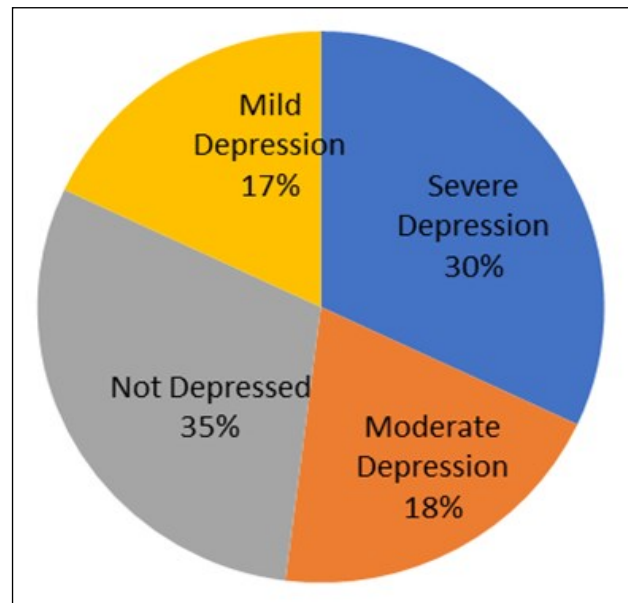
In this study, the age limit of the respondents was selected up to 70 years. The youngest of the respondents was 38 years and oldest was 70 years. The age group (51-60) constituted the highest portion (40.6%) of the respondents, which was followed by the age group of '61 to 70 years' (37.5%). The mean age of the respondents was 55.91 years and $SD \pm 6.09$ years. Most of the respondents resided in the urban area (90.4%). A considerable number of the respondents completed their graduation degree or above (30.9%). SSC (28.5%) and HSC (23.7%) completed respondents were about same. Majority of the respondents were retired (31.9%), followed by service holder (30.6%) and housewife (21.9%). Most of the respondents were living in nuclear family (64.3%). Family having 4 to 6 members was the highest group (81.8%) followed by 7 and above members group (14.4%). The average monthly family income for more than half of the respondents (55.7) was between Tk.20000 to less than Tk.30000.

The study estimated that among the stroke patients 16.4% (n=34) had mild and 17.8% (n=37) had moderate depression. Out of all respondents 29.9% (n=62) had severe depressive symptoms (depression score > 18) [Figure 1].

Large portion of both sexes were sufferer of depression. But females were more sufferers of depressive symptoms than males. Females were also more sufferers of severe depressive symptoms than males. The respondents of '61 and above' age groups were the sufferer of depressive symptoms (37.5%). Chi-square test found significant relationship of depression level with age group ($\chi^2 = 37.2$, $p < 0.001$). Most of the widow/widower

Table 1. Background characteristics of the respondents

Characteristics		No of respondents (%)
Sex	Male	207 (71.1)
	Female	84 (28.9)
Age group (in years)	Up to 50	64 (21.9)
	51-60	118 (40.6)
	61-70	109 (37.5)
	Mean $\pm$ SD=55.91 $\pm$ 6.09	
Residence	Urban	263 (90.4)
	Rural	28 (9.6)
Religion	Islam	256 (87.98)
	Hindu	35 (12.02)
Marital status	Married	277 (95.2)
	Widow/widower	14 (4.8)
Educational status	Illiterate	49 (16.8)
	Up to SSC	83 (28.5)
	HSC	69 (23.7)
	Graduate and above	90 (30.9)
Main occupation	Service holder	89 (30.6)
	Businessman	11 (3.8)
	Agricultural work	34 (11.7)
	House wife	64 (21.9)
	Retired	93 (31.9)
Type of family	Nuclear	187 (64.3)
	Joint	104 (35.7)
Family size	1-3	11 (3.8)
	4-6	238 (81.8)
	7 and above	42 (14.4)
Monthly family income (in Taka)	<20000	33 (11.3)
	20000 to 30000	168 (55.7)
	30000 to 40000	66 (22.7)
	$\geq$ 40000	24 (8.3)

**Fig 1. Distribution of respondents by level of Depression**

had severe depressive symptoms (71.4%). The difference of depression level due to marital status was statistically significant ($\chi^2=26.46$, $p<0.001$). Education level having graduate or above group were relatively less sufferer of depression. Chi-square test showed significant association between depression level and educational status ($\chi^2=42.73$, $p<0.001$). Though the agricultural workers were very small part of the respondents (3.8%) all of them were sufferer of some level of depression. Most of the house-wives and retired persons were also suffering from different level of depression and in specific from severe depressive symptoms. Statistically the association between occupational status and level of depression was significant ($\chi^2=43.17$, $p<0.001$). Respondents living in families having 7 or more members were more sufferers of depressive symptoms mainly severe (57.1%) form than other group and the finding was statistically significant. Respondents having family income less than 20 thousand were relatively more sufferer (48.4%) of severe depressive symptoms though the difference was not statistically significant ($\chi^2=12.26$, $p>0.05$).

Most of the patients (75.9%) of ischaemic stroke had depressive symptoms and larger part of them were sufferer of severe depression (38.0%). Sub-arachnoid haemorrhage and haemorrhagic stroke patients had relatively less depression. Most of the patients having stroke 3 months back had severe depressive symptoms (75%). Patients having stroke within 1 month were relatively less depressed. This difference due to duration of stroke was statistically significant ($p<0.001$). Very little difference was found in the level of depression among patients on basis of weakness of the side of the body and the difference was not statistically significant by doing chi-square test ($p>0.05$). Out of the respondents who could not perform their activity of daily life 91.4% were suffering from different level of depression and most of them had severe depressive symptoms (44.7). Of the patients who could perform their activity alone, 71.1% had no depression. The difference was statistically significant ($\chi^2=74.81$, $p<0.001$). More than 33% of hypertensive patients had severe depressive symptoms,

Table 2. Association between background characteristics of respondents and level of depression

Characteristics	Level of depression				Total n (%)	Test statistics
	No n (%)	Mild n (%)	Moderate n (%)	Severe n (%)		
Gender						
Male	74 (35.7)	34(16.4)	37(17.8)	62 (29.9)	207(71.1)	x ² =3.34, p>0.05
Female	17(20.23)	17(20.23)	18(21.4)	32(38.1)	84(28.9)	
Age						
≤50	45(58.11)	5(7.8)	12(18.7)	2 (3.1)	64(21.9)	x ² =37.2, p<0.001
51 to 60	46 (38.9)	20 (16.9)	25(21.1)	27 (22.8)	118 (40.6)	
>61	12(11.0)	22(20.1)	18(15.5)	57 (52.3)	109 (37.5)	
Education						
Illiterate	0	13 (26.5)	3 (6.1)	33(67.3)	49(16.8)	x ² = 42.73 p<0.001
Up to SSC	15(18.07)	10(12.04)	11 (13.2)	47 (56.6)	83(28.5)	
Up to HSC	17 (24.6)	14 (20.2)	24 (34.7)	14 (20.2)	69(23.7)	
Graduate or above	42(46.6)	17(18.8)	16(17.7)	15(16.6)	90(30.9)	
Marital Status						
Married	101 (36.5)	47 (16.9)	60(21.6)	69 (24.9)	277(95.2)	x ² =26.46 p<0.001
Widow/ Widower	0	3 (21.4)	1 (7.1)	10(71.4)	14 (4.8)	
Main occupation						
Service holder	57(64.0)	12(13.4)	14(15.7)	6 (6.7)	89 (30.6)	x ² =43.17 p<0.001
Agricultural	0	3 (27.2)	1(9.0)	7 (63.6)	11 (3.8)	
Business-man	11 (32.3)	6 (17.6)	5 (14.7)	12 (35.2)	34 (11.7)	
Retired	10(15.6)	15(23.4)	13 (20.3)	26(40.6)	64 (21.9)	
House wife	17 (18.6)	16(17.5)	20 (21.9)	38 (41.7)	91 (31.9)	
Type of family						
Nuclear	87 (46.5)	31(16.5)	39(20.8)	10 (16.04)	187 (64.3)	x ² =39.18 p<0.001
Joint	13 (12.5)	17(16.3)	18(17.3)	56 (53.8)	104(35.7)	
Family size						
1 to 3	6 (54.5)	1 (9.0)	3(27.2)	1 (9.0)	11 (3.8)	x ² =25.17 p<0.001
4 to 6	81 (34.03)	47 (19.7)	40 (16.8)	70 (29.4)	238 (81.8)	
7 and above	3 (7.1)	7 (16.6)	8 (19.04)	24 (57.1)	42 (14.4)	
Monthly family income						
<20000	7 (21.2)	4(12.1)	6 (18.2)	16 (48.4)	33 (11.3)	x ² =12.26 p>0.05
20000 to <30000	65 (38.6)	32 (19.0)	28 (16.6)	43 (25.5)	168 (55.7)	
30000 to <40000	15 (22.7)	15 (22.7)	17 (25.7)	19 (28.7)	66 (22.7)	
>40000	6 (25)	5 (20.8)	4 (16.6)	9 (35.7)	24 (8.3)	

whereas more than 60% of normotensive respondents were not depressed. This difference of depression due to hypertension was revealed significant by chi-square test ($\chi^2=14.99$, $p<0.005$).

Discussion

This study findings show that most of the patients were above 60 years and more than 90% of the respondents were from urban area. The patients of ischaemic stroke were 76% and another research shows that approximately 80% of all strokes are ischaemic, 10%-15% intracerebral haemorrhage (ICH), 5 % subarachnoid hemorrhage (SAH), and the rest is due to other causes of stroke. Studies from Asian countries indicate that the proportion of ICH is higher than in Caucasians with approximately 20 % to 30% being hemorrhagic.⁴ In this study, among the 291 post-stroke patients 65.3% had been suffering from some level of depression (HDRS score >10). Among the depressive persons, most had severe depressive symptoms (29.9%) and only 34.7% patients had no depression. About 16.4% had mild and 17.8% had moderate depression. Various studies report the prevalence of post-stroke depression as ranging from 9 percent to 53 percent¹³. This variation is may be since all those studies were performed in the developed countries. The level of depression indicating high prevalence of severe depressive symptoms necessarily do not indicate presence of Major Depressive Disorder (MDD), as HDRS as a screening tool only indicates the likelihood

of presence severe depression. But it is not a clinical diagnosis.

In this study proportion of mild, moderate and severe depression were higher among female than male. This finding was supported by most of the previous studies¹⁴. But the analysis in this study showed no significance association between sex and depression level ($p>0.05$). Most patients among the older (above 60 years) age group were sufferer of severe depressive symptoms (52.3%). On the other hand very, few of younger age group (≤ 50 years) had severe depression (3.1%). This age difference found statistically significant for depressive symptoms ($\chi^2=37.62$, $p<0.001$). But a research found older age group as more sufferer of severe depression.¹¹ Around two-third (71.4%) of these single persons were suffering from severe depressive symptoms and among married 24.9% were severely depressed. This difference in depression level due to marital status was significant ($p<0.001$). Astrom et al. also found more depression among the single persons.¹⁵

The respondents who had ischaemic stroke were more sufferer of all level of depression. Patients of haemorrhagic stroke and SAH were least depressed. This difference was significant ($p<0.001$). Previous study also supports this finding.¹³ Most (75%) of patients having stroke of more than 3 months were sufferer of severe depressive symptoms and depression was relatively less among the patient with history of stroke 1 month back.

Table 3. Association between level of depression with duration and types of stroke, and Disease conditions

	Level of depression				Total	Test statistics
	No n (%)	Mild n (%)	Moderate n (%)	Severe n (%)		
Type of stroke						
Ischaemic	40 (18.09)	44(19.9)	53(23.9)	84 (38.0)	221 (75.9)	x ² =41.29 p<0.001
Haemorrhagic	35 (74.4)	7(14.8)	1(2.1)	4(8.5)	47(16.1)	
Sub-arachnoid	18 (78.2.7)	1 (4.3%)	1 (4.3%)	3 (13.04)	23 (7.9)	
Duration since attack of stroke (in completed month)						
Up to 1	46(48.9)	18(19.1)	19 (20.2%)	11 (11.7)	94 (32.3)	x ² =69.16 p<0.001
>1to3	40(26.8)	29(19.4%)	34(22.8%)	46(30.8)	149 (51.2)	
>3	5(10.4)	5(10.4)	2(4.1)	36 (75.0)	48(16.5)	
Side of hemiparesis						
Left side	35 (27.1)	27(20.9)	27(20.9)	40(31.0)	129 (44.3)	x ² =0.73 p>0.05
Right side	50 (30.8)	28 (17.2)	30 (18.5)	54 (33.3)	162 (55.7)	
Dysphasia						
No	84(43.7)	40(20.8)	29(15.1)	39(20.3)	192(65.9)	x ² =36.18 p<0.001
Yes	8 (8.08)	12 (12.1)	25(25.5)	54 (54.5)	99 (34.1)	
Ability to perform activity of daily life (without others help)						
Can perform	64(71.1)	12(13.3)	6 (6.6)	8 (8.8)	90 (30.9)	x ² =74.81 p<0.001
Cannot perform	19(9.4)	40 (19.9)	52 (25.8)	90 (44.7)	201(69.1)	
Diabetes mellitus						
No	72 (46.4)	22(16.1)	22(16.1)	20(14.7)	136 (46.7)	x ² =42.04 p<0.001
Yes	18 (11.6)	29 (18.7)	32(20.6)	76 (49.04)	155 (53.3)	
Hypertension						
No	37 (61.7)	8(13.3)	3 (5.0)	12 (20.0)	60 (20.6)	x ² =14.99 p<0.005
Yes	56 (24.2)	47(20.3)	50 (20.3)	78 (33.7)	231 (79.4)	

Kotila et al. also found that depression is related with the duration since the attack of stroke.¹¹ Dysphasic respondents were mostly sufferer of severe depressive symptoms (54.5%). Depression was less among them who had no speech difficulty and 43.7% of them had no depression. Statistically this difference was significant ($p<0.001$). Astrom et al. also described dysphasia as a strong predictor of PSD.¹⁵

The study was conducted in a selected hospital and rehabilitation centre especially on those stroke patients who came for physiotherapy. So, the study population might not represent the whole community. Therefore, the study findings might lack external validity. Probability sampling technique could not be employed to recruit the study unit; they were selected purposively due to time constraints. As a result, there might have some selection bias. Information given by the respondents especially concerning depressive symptoms was subjective though data were collected after careful judgment by the investigator.

Conclusion

The study concluded that proportion of stroke patients suffering from depressive symptoms and factors associated with depression among them. A high proportion of depressive symptoms were found among two-third of the study population. Considering illness characteristics depression was more among the patients with ischaemic stroke, increased with the duration since attack of stroke and most prevailing among them who had a long history of stroke.

Recommendations: When planning therapeutic approaches for stroke patients, depression should always be taken into consideration. Identification and treatment of post stroke depression should be an integral part of stroke management protocol. Physicians should get proper training to identify patients with co morbid depression and ensure improved access to effective integrated treatment for the patients. Further in-depth research may be conducted to clarify the association between depressive symptoms and stroke, especially considering mode of drug treatment.

Funding: None

Conflict of interest: None

References:

- [1] World Diabetes foundation. WHO Launches Action Plane for NCDs, 2008. Denmark: World Diabetes Foundation; 2009
- [2] World Health Organization. The global burden of cerebrovascular disease. Geneva, World Health Organization; 2000.
- [3] World Health Organization. The global burden of disease: 2004 update.
- [4] Hackett ML, Duncan JR, Anderson CS, Broad JB, Bonita R. Health-related quality of life among long-term survivors of stroke. Results from the Auckland Stroke Study, 1991-1992 Stroke 2000;31:440-7
- [5] Bonita R, Solomon N, Broad JB. Prevalence of stroke and stroke-related disability. Estimates from the Auckland stroke studies. Stroke 1997;28:1898-902
- [6] Rahman M, Rahman MA, Flora MS, Rakibuz-Zaman M. Depression and associated factors in diabetic patients attending an urban hospital of Bangladesh. International Journal of Collaborative Research on Internal Medicine & Public Health . 2011; 3:65-76
- [7] Cassano P, Fava M. Depression and public health: an overview. J Psychosom Res. 2002 Oct;53(4):849-57.
- [8] Ashan Gunarathne, Jeetesh VP, Brian G, Paramjit SG, Elizabeth AH, Gregory YHL; Ischemic Stroke in South Asians: A Review of the Epidemiology, Pathophysiology, and Ethnicity-Related Clinical Features; Stroke 2009;40:415-23
- [9] Mullic MSI, Karim E, Khanm M, Haque R. Assessment of Depression in Orthopedic Patients. Journal of Bangladesh Orthopaedic Society 1992; 7:59
- [10] Karim E, Khanam M, Mullic MSI. Depression in Deliberate self-harm patients. Journal of Bangladesh College Physicians & Surgeons, 1995; 13:12-8.
- [11] Kotila M, Numminen H, Walimo O, Kaste M. Depression After Stroke; Results of the Finnstroke Study. Stroke-Journal of the American Heart Association 1998; 29:368-72
- [12] Paradise S, Ohkubo T, Robinson R.G. Vegetative and psychological symptoms associated with depressed mood over the first two years after stroke. International Journal of Psychiatry in Medicine 1997;27:137-57.
- [13] Berg A, Palomaki H, Lehtihalmes M, Lonnqvist J, & Kaste M. Poststroke depression. An 18-month follow-up. Stroke 2003; 34:138-40
- [14] Poynter B, Shuman M, Granados ND, Kapral M, Grace SL, Stewart DE. Sex Differences in the Prevalence of Post-Stroke Depression: A Systematic Review, Psychosomatics.2009;50:6
- [15] Astrom M, Adolfsson R, Asplund K, Major Depression in Stroke Patients A 3-Year Longitudinal Study. Stroke 1993; 24:976-82