PREVALENCE OF MAJOR DEPRESSION AMONG ELDERLY PATIENTS HOSPITALIZED FOR PHYSICAL ILLNESS AT HUSM AND THE ASSOCIATED PSYCHOSOCIAL FACTORS

EWE EOW TEH

PSYCHIATRIST, PSYCHIATRIC DEPT.

PENANG HOSPITAL

RESIDENSI ROAD

10990 PENANG

MALAYSIA

E-MAIL:eeteh2000@yahoo.com

CHE ISMAIL HASANAH

ASSOC. PROFESSOR AND CONSULTANT PSYCHIATRIST

SCHOOL OF MEDICAL SCIENCES

UNIVERSITI SAINS MALAYSIA

16150, KELANTAN, MALAYSIA

Corresponding Author:

EWE EOW TEH
PSYCHIATRIC DEPT.
PENANG HOSPITAL
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MALAYSIA

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E. E. TEH & C. I. HASANAH

ABSTRACT

Background:

Depression is prevalent among the elderly physically ill inpatients and has important clinical implications, but often under recognized and under treated. But, the prevalence in Malaysia was unknown. This study aimed to determine the prevalence rate of major depression among elderly patients hospitalized for physical illness, and to examine its association with psychosocial factors and quality of life.

Methods:

This is a cross sectional study, participated by 271 subjects inpatients aged 60 years and above, from medical, surgical or orthopaedic ward of Hospital Universiti Sains Malaysia. Data collected by self-administration of questionnaire, 14 items Malay version Geriatric Depression Scale (M-GDS-14) and WHOQOL-BREF. Major depression was defined as score 8 or above on M-GDS-14.

Results:

The overall prevalence for major depression was 37.3%; 25.9% for male and 45.8% for female. Under multivariable analysis, the female to male odds ratio for major depression was 2.2 ($p = 0.03$); self-rating of having enough money to meet needs, satisfaction with personal relationship, accessibility to information needed and opportunity for leisure activities were all significant protective factors against major depression. All 4 domains – physical health, psychological, social relationship and environmental domain of WHOQOL-BREF were significantly inversely correlated with M-GDS-14 scores.

Conclusion:

The prevalence yielded in this study was relatively high. Clinician should be aware of this highly comorbid condition along with patients' physical illness. Good social resources play important role in preventing major depression in the elderly inpatients.

Key Words:

Prevalence, elderly, geriatric, major depression, hospitalized patient, inpatient, physically ill.

Background

Depression is one of the most prevalent psychiatric conditions among the elderly (Copeland et al 1987), and it is associated with a decline in both well being and functioning (Ormel et al 1994), as well as higher risks of mortality and health service utilization (Koenig et al 1989, Covinsky et al 1999, Penninx et al 1999).

The studies elsewhere have shown a wide variation of prevalence rate of major depression in elderly medical inpatients, ranged from 5.9 – 45% (Kok et al 1995, Kitchell et al 1982); when only studies with a structured and validated diagnostic interview are included, the range narrows down to 5.9 – 25% (Kok et al 1995, Jackson & Baldwin 1993). Nevertheless, major depression among the geriatric inpatients mostly goes on unrecognized and untreated. In one study, there were only 8.7% of depressed patients identified by the house staff (Rapp et al 1988). The local data on the prevalence of major depression among the elderly inpatients in Malaysia is lacking at the time of the study.

Studies on geriatric population consistently reported being female has higher risk for major depression (Sonnenberg et al 2000), while age factor is controversial (Beekman 1999). The lower socioeconomic level, as well as poorer social support is also well-recognized risks for depression in the elderly (Murphy 1982; Woo et al 1994). The association of physical health with depression as concerned, Beekman et al (1997b) found that physical health was related to only minor depression, but not major depression

among the aged population. The general aspects of physical health were shown to have stronger associations with depression than specific disease categories.

This study aimed to determine the prevalence rate of major depression among elderly inpatient at Hospital Universiti Sains Malaysia (HUSM) and to find its association with psychosocial factors, including of sociodemographic features, socioeconomic level, social support and involvement, as well as the relationship between depression and quality of life.

Methods

Study design and subjects

This is a cross sectional study. Subjects were recruited from elderly patients (aged 60 years and above, follow the definition of The National Policy For The Elderly, Malaysia) who were admitted into medical, surgical or orthopaedic ward at HUSM during the study period i.e. from February 2003 till June 2003. Subjects with severe cognitive impairment that they could not answer the questionnaires given, and who were unable to understand Malay language, too ill or refused to participate were excluded. The data was collocated only once from those had repeated admissions during the study period.

During the study period, there were total of 735 admission (433 males, 302 female) aged 60 years and above into medical, surgical or orthopaedic ward at HUSM. Among these 98 were repeated admission, 305 had been discharged before collection of data, 37 were too ill, 19 were excluded because of severe cognitive impairment and 5 refused to participate. This left with 271 subjects participated in the study. The mean age of subjects was 69.15 (SD 7.01) years, ranged form 60 to 94 years. There was no significant different in age between male (Mean: 68.91years; SD 7.30years) and female (Mean: 69.34years; SD 6.81years) subjects (Mann Whitney test, $p = 0.377$).

Procedure

Written informed consent was obtained from eligible subjects, before the collection of data. The subjects were given a designed questionnaire, Malay version of GDS-14items (M-GDS-14) and WHOQOL-BREF for self-administration within a week of admission. For those who cannot read but able to understand Malay language, research assistant would read out the questions and elicit response from them.

Measures

Depression

Depression was measured using Malay version of Geriatric Depression Scale (GDS), which had been validated earlier. During the validation of the scale, it was found that the item-9 from GDS-15 (*Do you prefer to stay at home, rather than going out and*

doing new things?) had no discriminatory value against clinical depression and was poorly correlated with all other items; thus it was dropped from the scale. The rest form the M-GDS-14, with good internal consistency (Cronhbach's alpha 0.8431) and test-retest reliability (Spearman's Correlation Coefficient 0.843) and yielded 100% sensitivity, 92% specificity in detecting Major Depression at the cut off point of 7/8. Subjects were categorized into Major Depression group if they scored 8 or above on M-GDS-14, and Non Major Depression group if they scored less than 8.

Quality of Life

Quality of life was measured by Malay version of WHOQOL-BREF. This self-administered scale had been validated in the previous study (Hasanah et al 2003). It gives scores on 4 domains of quality of life, namely physical health, psychological, social relationship and environmental. The greater score indicate a better quality of life.

Psychosocial variables

A questionnaire was designed to obtain data on psychosocial variables, which included basic demographic data, as well as questions on socioeconomic level, social support, social role-played and accessibility to other social needs. 5-point Likert scale (1 indicate not at all; 5 indicate very much) was used in certain questions whereby the subjects were asked to rate their satisfactory level on specific social needs met or extent of their social involvement.

Statistical analysis

The collected data were analyzed using SPSS 10.0. Chi-square and Mann Whitney U test were used in testing null hypotheses. Spearmann's correlation was used to compare the WHOQOL-BREF scores on each domain of quality of life and total scores on M-GDS-14. Significant level was set at 0.05. Multiple logistic regression analysis was used to determine the odds ratio of individual psychosocial factor in relation to major depression, while controlling for the effects of other confounding factors.

Results

Prevalence of Major Depression

The scores on M-GDS-14 ranged from 0 to 14, the full range of the scale, with the mean of 6.72 (SD 2.78). One hundred and one out of 271 subjects scored 8 or above on M-GDS-14, gave an overall prevalence for major depression of 37.3% among elderly patients hospitalized for physical illness. When considering different gender separately, the prevalence was 25.9% and 45.8% for male and female respectively.

Univariate Analysis

As shown in Table 1, being male was a protective factor from having major depression among the elderly hospitalized patients (OR= 0.413, 95% C.I. 0.245 – 0.696;

p = 0.001). Educational level was also significantly associated with major depression (p < 0.0005) with those had no formal education had the higher risk. The admission ward, age group, ethnic group and marital status were not found to be significantly associated with major depression. Although lower proportion of those who still working (26.3%) were in the major depression group compared to the not working group (39.1%), the difference did not reach the significance level (p=0.132).

[Table 1]

[Table 2]

The personal income in amount as well as self reported financial adequacy was significantly related to the lower risk of major depression. Those receive pensions as the main income had lower risk for major depression (Table 1 & 2).

The satisfaction with living condition (p = 0.006), with personal relationship (p = 0.001) and with friends' support (p = 0.003) was significantly associated to the lower risk of having major depression. For those who remained in married, the satisfaction with the spouse support was also inversely related to the risk for major depression (p = 0.016)(Table 2). However, whether living alone or with someone, had someone to confide in and the relation of the main caregiver when subjects fell sick were all found not significantly related to major depression in this study (Table 1).

The satisfaction with transport ($p = 0.009$), the accessibility to information needed ($p < 0.0005$) as well as the opportunity for leisure activities ($p < 0.0005$) were all protective against having major depression (Table 2).

The greater involvement of the subjects in making family decision, the less likely they were in major depression group ($p<0.0005$) (Table 2); whereas the extent of involvement in caring for grandchildren was not significantly associated with major depression.

The inverse correlations between the scores of M-GDS-14 and WHOQOL-BREF in all domains (physical health: $r = -0.395$, $p < 0.0005$, psychological: $r = -0.543$, $p < 0.0005$, social relationship: $r = -0.186$, $p = 0.002$ and environmental domain: $r = -0.505$, $p < 0.0005$) were found, indicate the better quality of life was associated with less depressive symptoms.

Multivariable analysis

The psychosocial variables found significantly associated with major depression among the elderly hospitalized patient for physical illness were entered into the multiple logistic regression analysis. Age group, marital status, working status and the score on physical health domain of WHOQOL-BREF were also entered into the analysis. The scores on the other 3 domains of WHOQOL-BREF were not included because there was some overlapping between the components of these domains and the psychosocial

variables studied or items asked in M-GDS-14. Self reported satisfaction with the spouse support was not included in the analysis because this variable did not apply for those who no longer in married (n = 98, 36.2% of the sample). The independent variables were entered into the regression model with backward stepwise method.

As shown in table 3, in the multivariate analyses the odds ratio of major depression for female was only slightly reduced from OR = 2.4 to OR = 2.2, and remained significant.

[Table 3]

When controlling for other psychosocial social variables studied, the amount of personal income became not, but the self-rating of having enough money (OR = 0.420, 95% C.I.: 0.242 – 0.727; p = 0.002) remained significantly associated with major depression. Those depended on working for their main income remained significantly more likely than the pension group to have major depression (OR = 7.819, 95% C.I.: 1.390 – 4.558; p = 0.020).

Among the social support factors, the satisfaction with personal relationship in general was the only factor that remained significantly associated with major depression (OR = 0.265, 95% C.I.: 0.094 – 0.745; p = 0.012). Both the accessibility to information needed (OR = 0.361, 95% C.I.: 0.194 – 0.670; p = 0.001) and opportunity for leisure

activities (OR = 0.506, 95% C.I.: 0.276 – 0.926; p = 0.027) remained as significant protective factors against major depression under multivariable analysis.

Discussion

The overall prevalence of major depression among the elderly inpatients hospitalized for physically illness from this study was relatively high compared to most of the previous studies (Rapp et al 1988, Koenig et all 1991, Ramsay et al 1991, Jackson & Baldwin 1993, Kok et al 1995, Booth et al 1998) although prevalence as high as 45% had been reported before (Kitchell et al 1982). There were several probable contributing factors to this relatively high prevalence. First, there was greater proportion of subjects were female, who has higher risk for major depression, than male in this study. Second, after reduction of those with repeated admission, nearly half of the eligible subjects were not recruited because they were discharged from hospital before being invited to participate in the study. These short stay inpatients were more likely to be less disable, thus expected to have lower risk for major depression. Third, major depression was defined in this study by M-GDS-14 scores (8 or above). As a screening scale, M-GDS-14 has relatively high sensitivity but lower specificity (The validation study reported 100% sensitivity versus 92% specificity at cutoff point of 7/8). Thus, the prevalence yielded tends to be higher than the real prevalence.

Being female is a well-recognized risk for depression (Jorm 1987). The female:male odds ratio for major depression among elderly inpatients in this study in fact

did not differ from those in the community population, which ranged from 1.74 to 2.91 across different age groups from 60 to 85 years in Sonnenberg et al (2000). The relation of age factor and geriatric depression has been controversial (Beekman 1999). In this study, age factor was not found to be significantly associated with major depression.

Although some studies recognized being divorced or widowed as risk for depression (Kennedy et al 1989, Beekman et al 1995), most studies did not (Cole & Dendukuri 2003). This study also did not find marital status as significant associated factor for major depression. The satisfaction with spouse support was however found to be protective against major depression.

Nearly half of the subjects in this study never received formal education and only small minority (7%) studied up to secondary school or above. The elderly today, during their young days, schooling was a luxury rather than norm. Only those from better socioeconomic background were accessible to opportunity for education. The lower educational level was significantly associated with major depression under univariate analysis, but the significance was lost after controlling for other confounding factors. Koenig et al (1988c) reported the similar associations for educational level with depressive symptoms, as measured by the corrected HAM-D.

Poverty is a recognized risk for depression (McHorney & Mor 1988, Woo et al 1994). This study also found the lower income groups, are more susceptible to major depression. This association became not significant, however, when other psychosocial

factors were controlled for. Nevertheless, the self-rating of financial adequacy remained a significant predictor for major depression under the logistic regression analysis. That means the self-rating of financial adequacy has more weight than the amount of personal income in association with major depression.

There was significant higher risk (O.R.= 7.8) in the group whose main income were from working as compared to the group receiving pension as main source of income even after controlling for confounding factors. This finding could not be explained by the stress of working alone. In fact, the working status by itself was associated with lower prevalence of major depression, although the difference did not reach significant level in this study. The higher risk in those depend on working as main income, probably reflected the effect of financial constraint – the need to continue working to get enough money even at the old age. Alternatively, this may be explained by the fact that those who previously had a stable job with pensions scheme, in general had better socioeconomic status than those who did not.

The protective effect of social support and companionship against depression was consistently described in previous studies (Murphy 1982, Kennedy et al 1989, Woo et al 1994, Beekman et al 1995). In contrast to others findings, this study did not find absence of confiding relationship (Kennedy et al 1989, Woo et al 1994) as significant risk factor for major depression. However, the satisfaction with friends support was a significant protective factor for major depression before controlled for other psychosocial variables.

Chen et al (1986) reported 55% of the Malaysian elderly community population help to make family decisions. This study has a comparable finding that 55% of subjects are involved in making family decision at least at a moderate amount. The participation in the family decision-making was significantly related to major depression. This finding, however, did not explain the causal relationship. Asian societies, in general, do hold elderly people, particularly members of their own families, in higher esteem and treating them at all time with the utmost respect and consideration, including their opinion (Feldman 2000). On the other hand, the depressed patient tends to become withdrawn socially and have more difficulty or decline in making decision. Also, for those are unwell, their opinions are generally less taken weight of by other family members. This in turn makes them even more reluctant to contribute their view in family matters.

There was only 23% of studied subjects participated in caring for grandchildren at least at a moderate level. In Chen et al (1986), 54% of community elderly help to care for the grandchildren. The lesser involvement in caring for grandchildren by the subjects in this study is probably the result of their physical illness, presumably at moderate to severe level that necessitated for hospitalization.

Under the multivariable analysis, the self-rated of having enough money to meet their needs, the satisfaction with personal relationship, the accessibility to information needed and the opportunity for leisure activities remained as significant protective factors against major depression for the medically ill elderly. Although it is apparent that these social needs are important in the living of the elderly, these associations do not necessary

explain the causal relationship. Conversely, the depressed subjects usually tend to give negative self-evaluation. The possible report bias by the depressed subjects may lead to the magnification of the association of these psychosocial factors with major depression.

The quality of life in elderly depressed patients is a complex outcome that is influenced only partly by depression and is determined by a variety of factors, such as age, gender, medical comorbidity, and others (Doraisamy et al 2002). As one would expect, this study supported that depressive symptoms have an inverse relationship with quality of life in all domains assessed i.e. less depression are associated with better quality of life. The strongest association with depressive symptoms was found in psychological domain of quality of life. This could be explained at least partly by the fact that some questions in psychological domain of WHOQOL-BREF are overlapped or share the same theme with certain items in the M-GDS-14.

Limitations of Study

This study recruited subjects from a single center, i.e. HUSM, a teaching hospital and tertiary center for the region. Thus, the results from this study may not be suitable to generalize to other general hospitals as well as hospitals at other regions in the Malaysia. Furthermore, a great majority of respondents were Malay, thus, the findings would not be representative of the multi-racial Malaysian population. Similar study needs to be replicated at different centers.

This study relied on a single measurement using a self-rated scale, M-GDS-14, as a measure of depression among the elderly inpatients. M-GDS-14 is good for screening purpose, but not for diagnostic use. A second stage diagnostic interview if conducted would increase the accurate recognition of caseness. A large part of the assessment of important psychosocial determinants may be superficial and relied on the subject's self rating. As mentioned earlier, the depressed subjects tend to give negative self-evaluation and thus contribute to the potential bias.

The confounding effects from physical illness in term of the type of illness, the number of disease or the severity of illness were not examined specifically in this study. The duration of hospitalization at the time data collected was also not controlled. However, attempt had been made to control for the quality of life related to physical health. Koenig et al (1988c) found a trend of association between major depression and the severity of physical illness among the elderly hospitalized patients, but did not reach statistical significant level under logistic regression model. Beekman et al (1997) reported the self-perceived health, among the aged community population, as fair or poor (compared to good or very good) in general had greater relative risk of major depression over the relative risks of any particular chronic disease or functional limitations. In their multivariate analysis, no significant association between physical health and major depression was found. Similarly, Ormel et al (1994) reported chronic medical conditions were associated with distress; the relations were however much less compared to and were mediated by disability and psychosocial resources.

Conclusion

The high prevalence rate of major depression reported in this study would enlighten the clinician awareness of this highly comorbid condition along with patients' physical illness. The identification of certain modifiable psychosocial factors that were significantly related to major depression is important not only at clinical practice in hospital setting, but also at public health and even to health policy maker in the prevention of major depression among the geriatric population.

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Reference:

Copeland JRM, Dewey ME, Wood N, et al (1987) Range of mental illness among the elderly in the community – prevalence in Liverpool using the GMS-AGECAT package. Br J Psychiatry, 150, 815-823.

Ormel J, von Korff M, Ustun TB, et al (1994) Common mental disorders and disability across cultures: results from the WHO collaborative study on psychological problems in general health care. JAMA, 272, 1741-1748.

Koenig HG, Shelp F & Goli V (1989) Survival and health care utilization in elderly medical inpatients. J. Am. Geriatr Soc, 37: 599-606.

Covinsky KE, Kahana E, Chin MH, et al (1999) Depressive symptoms and 3-year mortality in older hospitalized medical patients. Ann Intern Med. 130: 563-569.

Penninx BWJH, Geerlings SW, Deeg DJH, et al (1999) Minor and major depression and the risk of death in older persons. Arch Gen Psychiatry, 56: 889-895.

Kok RM, Heeren TJ, Hooijer C, et al (1995) The prevalence of depression in elderly medical inpatients. J Affect Disord, 33, 77-82.

Kitchell MA, Barnes RF, Veith RC, et al. (1982) Screening for depression in hospitalized geriatric medical patients. J Am Geriatric Soc, 30: 174-177.

Jackson R, Baldwin B. (1993) Detecting depression in elderly medically ill patients: the use of the GDS compared with medical and nursing observations. Age Aging, 22: 319-353.

Rapp SR, Walsh DA, Parisi S A, et al (1988) Detecting depression in elderly medical inpatients. J Cons Clin Psychol, 56, 509-513.

Sonnenberg CM, Beekman ATF, Deeg DJH, et al (2000). Sex differences in late-life depression. Acta Psychiatr Scand, 101, 286-292.

Beekman ATF, Copeland JRM & Prince MJ (1999) Review of community prevalence of depression in later life. Br J Psychiatry, 174, 307-311.

Murphy E (1982). Social origins of depression in old age. Br J Psychiatry. 141, 135-142

Woo J, Ho SC, Lau J, et al (1994) The prevalence of depressive symptoms and predisposing factors in an elderly Chinese population. Acta Psychiatr Scand, 89, 8-13.

Beekman ATF, Penninx BWJH, Deeg DJH, et al (1997b) Depression and physical health in later life: results from the Longitidinal Aging Study Amsterdam (LASA). J Affect Disord, 46, 219-231.

Hasanah CI, Naing L, Rahman ARA (2003) World Health Organization quality of life assessment; brief version in Bahasa Malaysia. Med J Malaysia, 58, 79-88.

Koenig HG, Meador KG, Shelp F, et al (1991) Major depressive disorder in hospitalized medically ill patients: an examination of young and elderly male veterans. J. Am. Geriatr Soc, 39: 881-890.

Ramsay R, Wright P, Katz A, et al (1991) The detection of psychiatric morbidity and its effects on outcome in acute elderly medical admissions. Int J Geriatr Psychiatry, 6: 861-866.

Booth BM, Blow FC, Cook CAL (1998) Functional impairment and co-occuring psychiatric disoreders in medically hospitalized men. Arch Intern Med, 158: 1551-1559.

Jorm AF (1987). Sex and age differences in depression: a quantitative synthesis of published research. Aust NZ J Psychiatry, 21, 46-53.

Kennedy GJ, Kelman HR, Thomas C, et al. (1989) Hierarchy of characteristics associated with depressive symptoms in an urban elderly sample. Am J Psychiatry, 146: 2; 220-225.

Beekman ATF, Deeg DJH, von Tilburg T, et al (1995) Major and minor depression in later life: a study of prevalence and risk factors. J Affect Disord, 36, 65-75.

Cole MG & Dendukuri N (2003) Risk factors for depression among elderly community subjects: a systematic review and meta-analysis. American Journal of Psychiatry, 160, 1147 – 1156.

Koenig HG, Meador KG, Cohen HJ, et al (1988c) Depression in elderly hospitalized patients with medical illness. Archives of Internal Medicine, 148, 1929 – 1936.

McHorney CA, Mor V (1988) Predictors of bereavement depression and its health services consequences. Medical Care, 26, 882 – 893.

Chen PCY, Andrews GR, Josef R, et al (1986) Health and aging in Malaysia – a study sponsored by the World Health Organization. Department of Social and Preventive Medicine, Faculty of Medicine, University of Malaya.

Feldman RS (2000) How culture shape the way we treat people in late adulthood. In: Development across the life span. Prentice Hall (2nd edition): 623.

Doraisamy PM, Khan ZM, Donahue RMJ. (2002) The spectrum of quality-of-life impairments in recurrent geriatric depression. The Journal of Gerontology, 57A, 134 – 137.

Table 1. Subjects characteristic in association with major depression

Characteristic	Major Depression n (%)	Non-Major Depression n (%)	p-value (2 tailed)
Demographic Data:			
Admission ward			0.993
Medical	71 (37.4)	119 (62.6)	
Surgical	12 (36.4)	21 (63.6)	
Orthopaedic	18 (37.5)	30 (62.5)	
Age group (years)			0.859
60 - 64	28 (34.1)	54 (65.9)	
65 – 69	36 (40.4)	53 (59.6)	
70 – 74	13 (39.4)	20 (60.6)	
75 – 79	16 (39.0)	25 (61.0)	
80 & above	8 (30.8)	18 (69.2)	
Gender			0.001[a]
Male	30 (25.9)	86 (74.1)	
Female	71 (45.8)	84 (54.2)	
Ethnic group			0.439
Malay	94 (36.7)	162 (63.3)	
Non-Malay	7 (46.7)	8 (53.3)	
Marital status			0.090
Married	58 (43.9)	115 (56.1)	
No longer married	43 (33.5)	55 (53.3)	
Education level			
Never schooling	63 (49.2)	65 (50.8)	<0.0005
Primary school	36 (29.0)	88 (71.0)	
Secondary school & above	2 (10.5)	17 (89.5)	
Working status			
Working	10 (26.3)	28 (73.7)	0.132
Not working	91 (39.1)	142 (60.9)	
Financial Status:			
Monthly Personal Income			<0.0005
RM100 or below	32 (62.7)	19 (37.3)	
RM101 – RM300	43 (42.6)	58 (57.4)	
RM301 – RM500	15 (25.4)	44 (74.6)	
RM501 – RM1000	11 (24.4)	34 (75.6)	
RM1001 & above	0 (0.0)	15 (100.0)	
Main source of personal income			0.004
Pensions	11 (35.5)	47 (64.5)	
Family	68 (41.7)	95 (58.3)	
Working	11 (19.0)	20 (81.0)	
Others	11 (57.9)	8 (42.1)	
Social Support:			
Living situation			0.476
Living alone	4 (50.0)	4 (50.0)	
Living with someone	97 (36.9)	166 (63.1)	
Who to take care of subject if ill			0.471
Spouse	24 (32.0)	51 (68.0)	
Son / daughter (in-law)	66 (38.6)	105 (61.4)	
Others	11 (44.0)	14 (56.0)	
Anyone to confide in			0.357
Yes	88 (38.4)	141 (61.6)	
No	13 (31.0)	29 (69.0)	

a: Odds ratio (male: female) = 0.413 (95% C.I. 0.245 – 0.696)

Table 2. Self-rated satisfaction on social needs and family roles in association with major depression

Social Needs / Social Roles	Major Depression (Mean rank)	Non-Major Depression (Mean rank)	Mann-Whitney U Test p-value (2 tailed)
Financial Status			
Has enough money to meet needs	96.54	159.44	<0.0005
Social Support			
Satisfaction with living condition	125.86	142.03	0.006
Satisfaction with personal relationship	125.63	142.16	0.001
Satisfaction with friends' support	124.93	142.58	0.003
Satisfaction with spouse support [a]	81.48	92.23	0.016
Other Social Needs			
Satisfaction with transport	123.07	143.68	0.009
Accessibility to information needed	105.36	154.20	<0.0005
Opportunity for leisure activities	111.68	150.45	<0.0005
Family Roles			
Involvement in family decision	114.72	148.64	<0.0005
Involvement in caring for grandchildren	135.37	136.37	0.913

a: only those remained in married give response to this item (n = 173)

Table 3. Logistic regression model of predictors of major depression among elderly hospitalized patient for physical illness

	Odds Ratio (95% C.I.)	p-value
Risk factors		
Gender of being female	2.205 (1.067 – 4.558)	0.033
Main source of income from working (relative to pensions group)	7.819 (1.390 – 43.98)	0.020
Protective factors [a]		
Has enough money to meet needs	0.420 (0.242 – 0.727)	0.002
Satisfaction with personal relationship	0.265 (0.094 – 0.745)	0.012
Accessibility to information needed	0.361 (0.194 – 0.670)	0.001
Opportunity for leisure activities	0.506 (0.276 – 0.926)	0.027

a: The odds ratios indicate the odds of major depression when the variable takes a particular value relative to the odds of major depression when the variable is increased by one score on 5-point Likert scale (1=not at all, 5=very much), while adjusting for all other studied variables in the equation.