

Risk factors for depressive disorders among patients attending outpatient clinics of Assiut University Hospitals

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Received 1 July 2012

Accepted 15 August 2012

Egyptian Journal of Psychiatry 2013, 34:10–18

Background

Depression is a common mental health problem observed frequently in general medical setting.

Aim

The aim of this study was to identify possible demographic and clinical risk factors for depressive disorders among patients attending outpatient clinics of Assiut University Hospitals.

Methods

A cross-sectional study was conducted during a 1-year period from 1 June 2006 to 31 May 2007; 2304 patients aged 15 years and above were screened for depression using the Beck Depression Inventory. Patients who scored 4 or more were further evaluated through a psychiatric sheet especially prepared for the present work. Psychiatric diagnosis of patients was based on the *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.-text revision criteria. Medical/surgical diagnoses were confirmed by appropriate investigations, and information about the possible risk factors were obtained. Patients were also screened using the suicidality sheet and scored using the Sheehan Disability Scale.

Results

Depression was found in 202 patients, representing 8.8% of the entire sample. Depression was significantly higher among female patients, highly educated and literate individuals, nonworking male patients and among divorced/widowed/separated individuals. Patients with malignancy, disfiguring conditions, autoimmune conditions, renal diseases, and hepatic diseases were at a higher risk of developing depressive disorders. Patients with two or more medical/surgical conditions were at a high risk of developing depressive disorders (25.9 and 17.1%, respectively). Depressive disorders were significantly high among patients on dialysis (42.9%), radiotherapy (40%), chemotherapy (38.5%), steroids (28.9%), interferon (25%), and digoxin (21.9%). Depressive disorders were more prevalent among patients with a duration of medical illness of 24 months or more. The degree of impairment is significantly higher among patients with moderate and severe depression, particularly in patients having severe depression with psychotic features. Suicidality is significantly higher among patients with severe depression, particularly among patients having severe depression with psychotic features.

Conclusion

Patients attending outpatient clinics might be at a high risk for depressive disorders, especially those with certain medical conditions, with more than two medical diseases, and receiving specific treatment modalities. These patients need close psychiatric attention for early detection of depressive disorders and proper management.

Keywords:

depression, prevalence, risk factors

Egypt J Psychiatr 34:10–18
© 2013 Egyptian Journal of Psychiatry
1110-1105

Introduction

Depression is a common mental health problem observed frequently in general medical settings. Major depressive disorder, diagnosed by structured psychiatric interviews and specific diagnostic criteria, is present in 5–13% of patients examined by primary care physicians (Katon and Schulberg, 1992). Depression is more common in young

individuals, female patients, and patients who are single, divorced, separated, seriously ill, or have a previous history or family history of depression (Weissman *et al.*, 1996).

It has been found that women with coronary artery disease are at an increased risk for developing depression. Several studies report that women develop depression at roughly twice the rate at which men develop depression,

regardless of racial, ethnic, or economic backgrounds (National Institute of Mental Health, 2000). Smoking and being overweight were also related to having depression. Women who did not exercise regularly had high blood pressure or diabetes, and those who reported fair or poor health were more likely to be depressed. Moreover, women with a history of angina had a 57% greater chance being depressed compared with women without any history of heart disease (Wassertheil-Smoller *et al.*, 2004).

The rates of major depression and adjustment disorder in adult cancer patients range from 23–60%. The risk factors for developing depression may be cancer related or non-cancer-related. Accordingly, cancer-related risk factors include an advanced stage of cancer, pancreatic cancer, poorly controlled pain, increased physical impairment, being unmarried, having head and neck cancer, and treatment with some anticancer drugs. Non-cancer-related risk factors include history of depression, lack of family support, other life events that cause stress, family history of depression or suicide, previous suicide attempts, history of alcoholism or drug abuse, and having many illnesses at the same time, which manifest as symptoms of depression (such as stroke or heart attack) (Newport and Nemeroff, 1998).

In patients who have vascular depression, chronic cerebrovascular risk factors such as hypertension, diabetes, carotid stenosis, atrial fibrillation, and hyperlipidemia represent risk factors for development of this type of depression. Its symptoms appear after the age of 65 and consist of mood abnormalities, neuropsychological disturbances with impairment of executive functions, and retardation (Alexopoulos *et al.*, 1997).

In multiple sclerosis, women younger than 35 years, having a family history of major depression, and under high levels of stress were found to be at a high risk of developing depression.

The success rate of antiviral treatment in chronic hepatitis C (HCV) has considerably increased during recent years (Zeuzem *et al.*, 2004). Depression and other neuropsychiatric symptoms are among the most important side effects induced by standard antiviral therapy combining interferon (IFN) and ribavirin. Further, the possible risk factors for manifestation of depression in cancer patients who undergo chemotherapy are many, such as the duration of treatment, readmission to the hospital, the fear of death and social isolation, etc. Moreover, the financial difficulties arising from the disease, including investigations and treatment, represent an additional cause of depression, especially when the patient is the one who maintains the family (Mishra *et al.*, 2006; Pasquini and Biondi, 2007).

Aim of the work

The aim of the study was to identify possible demographic and clinical risk factors for depressive disorders among patients attending outpatient clinics of Assiut University Hospitals.

Population and methods

The present work is a cross-sectional study among patients attending outpatient clinics of Assiut University Hospitals during a 1-year period (from 1 June 2006 to 31 May 2007). The studied sample included 2304 patients aged 15 years and over, and the sample size was calculated according to the following equation.

$$N=(Z_{1-\alpha/2})^2 p(1-p)/D^2,$$

where N is the sample size, $Z_{1-\alpha/2}$ is the number of SEM, P is the proportion of the best guess about the value of the proportion of interest and D is the absolute precision required on either side of the proportion, or distance; how close to the proportion interest.

The estimate is desired to be, when confidence interval is equal to 95%. Accordingly, every 10th patient attending the clinic was selected for screening.

Inclusion criteria

- (1) Age 15 years or above for both sexes.
- (2) Willing to participate in the study.

Exclusion criteria

Patients with disturbed levels of consciousness, aphasia, or mental retardation were excluded.

The study was approved by the ethical committee of the Faculty of Medicine, Assiut University. In addition, confidentiality was maintained during all steps of the study.

Methods

An initial sheet was applied to all individuals to collect data on name, age, sex, residence, educational level, marital status, family size, and special habits. This sheet also included data on the clinical diagnoses (as made by specialists in the outpatient clinic), often confirmed by appropriate investigation, that were also picked up in the initial sheet. Information on duration of the current illness, treatment (if any) and its duration, and patient's response to treatment was also obtained. The initial sheet was concluded by enquiring about history of any psychiatric illness and its duration.

All selected patients were then screened for the presence of depressive symptoms using the Beck Depression Inventory (BDI; Beck, 1988). The BDI is a 13-question multiple-choice self-report inventory, one of the most widely used instruments for measuring the presence and severity of depression. Although the severity of depression could be assessed using BDI, it was not used for this purpose in the present work; *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed.-text revision (DSM-IV-TR) criteria was used.

Once detected as having depression (scoring 4 or more on BDI scale), the diagnosed depressed individuals were further subjected to a detailed psychiatric interview using a psychiatric sheet prepared for the study. This psychiatric

sheet ended with psychiatric diagnosis based on DSM-IV-TR (APA, 2000) criteria. Data on medical/surgical disease and neurological examination were included in this sheet. Clinical and other possible risk factors were recorded, for example, duration and number of medical illnesses, family history of mood disorder, and details of therapeutic interventions.

Suicidality was measured using the suicidality sheet of the MINI plus English version 5.0.0 (Sheehan *et al.*, 1998), which addresses the risk of suicide among depressed patients. It contains six questions answered by yes or no with a maximum score of 33 and classifies patients into categories of low risk when they score 1–5 points, moderate risk at 6–8 points, and high risk of suicide when they score at least 10 points.

Functional impairment was assessed using the Sheehan Disability Scale (SDS; Sheehan, 1983). This scale assesses three inter-related domains: work/school, social, and family life. The scoring system of this scale ranged from 0–10 points according to disturbances caused by symptoms of depression. These degrees were scored according to the response of the patient as either no affection (scored 0), mild affection (1–3), moderate affection (4–6), marked affection (7–9), or extreme affection (10).

Statistical analysis

Numerical data were represented as mean \pm SD. Nominal data were represented as frequencies and percentages. The *t*-test was used to compare any two groups or categories. One way analysis of variance has been used to compare more than two groups or categories. The χ^2 -test was used to illustrate the relationship or comparison with nominal data. *P*-value less than 0.05 was considered significant.

Results

Among patients attending the outpatients clinics of Assiut University Hospitals, 2304 patients were eligible to participate in the study. Among 2304 examined patients, the total prevalence of depressive disorders within the whole sample was 8.2%. Malignant conditions were associated with the highest prevalence of depressive disorders (50%). In order of frequency, depressive disorders were found in 45.8% of patients with disfiguring conditions, 36.3% of patients with autoimmune disease, 36% of those with loss of vision, 33.3% of patients with liver disease and renal disease, and 27.3% of individuals presenting with infertility. The frequency of depressive disorders among other patients is presented in Table 1.

It was found that frequency of depressive disorders significantly increased with the increase in concurrent medical disease. Table 2 shows that 25.9% of patients with more than two medical conditions, 17.14% of those with two medical conditions, and 6.8% of patients with a single medical condition have depressive disorders. The differences in frequency of depressive disorder were

significantly higher when comparing the first two groups ($P < 0.001$) with the last group.

It was found that 33.1% of patients with depressive disorder had a severe form of depression according to the classification based on DSM-IV-TR criteria (Table 3). In addition, frequency of occurrence of severe forms of depressive disorders increases significantly ($P = 0.03$) with increase in comorbidity. About 43% of depressive disorder patients with more than two medical conditions have severe forms of depressive disorder.

Regardless of the diagnosis and duration of therapies, frequency of depressive disorders was significantly higher among patients receiving specific modalities of treatment ($P < 0.001$) (Table 4). For example, 42.9% of patients on regular hemodialysis, 40% on radiotherapy, 38.5% on chemotherapy, 28.9% on steroid therapy, and 25% receiving IFN therapy have depressive disorders.

In terms of severity of depressive disorder, 73 of 202 patients (36.1%) with depressive disorders have severity degrees distributed as follows: 1.5% each for hemodialysis patients, chemotherapy patients, those undergoing treatment

Table 1 Relationship between depression and medical or psychiatric diagnoses in the studied sample (n=2289)

Diagnosis	n (%)		Total
	Depressed	Not depressed	
Malignant conditions	19 (50%)	19 (50%)	38
Disfiguring conditions	11 (45.8%)	13 (54.2%)	24
Autoimmune conditions	8 (36.4%)	14 (63.6%)	22
Loss of vision	9 (36%)	16 (64%)	25
Liver diseases	12 (33.3%)	24 (66.7%)	36
Renal diseases	9 (33.3%)	18 (66.7%)	27
Infertility	3 (27.3%)	8 (72.7%)	11
TB chest	3 (25%)	9 (75%)	12
Weakness	4 (21.1%)	15 (78.9%)	19
IBS	5 (16.7%)	25 (83.3%)	30
Cerebrovascular accidents	8 (16.3%)	41 (83.7%)	49
Diabetes and its complications	9 (15.8%)	48 (84.2%)	57
Cardiac conditions	6 (15.4%)	33 (84.6%)	39
Painful conditions	28 (14.7%)	163 (85.3%)	191
Obstructive airway diseases	7 (12.5%)	49 (87.5%)	56
Other psychiatric conditions	9 (11.7%)	86 (88.3%)	77
Epilepsy	2 (7.4%)	25 (92.6%)	27
Hypertension	3 (5.4%)	53 (94.6%)	56
Other medical conditions	32 (2.1%)	1461 (97.9%)	1493
Total	187 (8.2%)	2102 (91.8%)	2289

TB, tuberculosis.

$\chi^2 = 351.022$, $P < 0.001$.

Patients attending psychiatric clinic diagnosed primarily as depressive disorder were excluded ($n = 15$ patients).

Table 2 Relationship between depression and number of medical conditions encountered in the same patient in the studied sample (patients attending psychiatry clinic were excluded)

Number of medical conditions	n (%)		Total
	Depressed	Not depressed	
Single medical condition	132 (6.8%)	1819 (93.2%)	1951
Two medical conditions	39 (17.1%)	189 (82.9%)	228
More than two	7 (25.9%)	20 (74.1%)	27
Total	178 (8.09%)	2028 (91.9%)	2206

$\chi^2 = 41.171$, $P < 0.001$.

for digitalis, and those undergoing treatment with hypoglycemic agents, 4% for patients undergoing surgical intervention, and 2% for patients receiving steroid therapy. For each modality of therapy, the percentage of patients with severe degree of depression was very high. Of patients with depressive disorder, three of six patients on hemodialysis (50%), one of two patients on radiotherapy, three of six patients on hypoglycemic agents, and eight of

16 patients undergoing surgical intervention have severe forms (Table 5).

Frequency of depressive disorder was significantly increased with the increased duration of medical/surgical illness. Depressive disorders were significantly more common in patient groups with a duration of illness of 24 months or more (15.9%) than in those with a duration

Table 3 Relationship between severity of depression and number of concurrent medical conditions in the same patient and in the studied sample (patients attending the psychiatric clinic were excluded)

Number of current medical conditions	n (%)				Total
	Minor	Mild	Moderate	Severe	
Single medical condition	18 (13.6%)	34 (25.8%)	34 (25.8%)	46 (34.8%)	132
Two medical conditions	4 (10.3%)	20 (51.3%)	5 (12.8%)	10 (25.6%)	39
More than two	2 (28.6%)	–	2 (28.6%)	3 (42.9%)	7
Total	24 (13.5%)	54 (30.3%)	41 (23%)	59 (33.1%)	178

$\chi^2 = 13.423$, $P = 0.037$.

Table 4 Relationship between depression and type of treatment in the studied sample

Type of treatment	n (%)		Total
	Depressed	Not depressed	
Dialysis	6 (42.9%)	8 (57.1%)	14
Radiotherapy	2 (40%)	3 (60%)	5
Chemotherapy	10 (38.5%)	16 (61.5%)	26
Steroids	22 (28.9%)	54 (71.1%)	76
Interferon	2 (25%)	6 (75%)	8
Digoxin	7 (21.9%)	25 (78.1%)	32
Surgery	16 (16.2%)	83 (83.8%)	99
Nootropics	7 (15.6%)	38 (84.4%)	45
Hormonal treatment	3 (15%)	17 (85%)	20
Drugs used for treatment of diabetes	6 (10%)	54 (90%)	60
Antihypertensive drugs	7 (8.6%)	74 (91.4%)	81
Antiepileptic drugs	2 (7.7%)	24 (92.3%)	26
Analgesics	12 (5.8%)	195 (94.2%)	207
Antibiotics	4 (4.6%)	83 (95.4%)	87
Other	31 (6.7%)	429 (93.3%)	460
No specific treatment for current medical condition	65 (6.1%)	993 (93.9%)	1058
Total	202 (8.8%)	2102 (91.2%)	2304

$\chi^2 = 129.431$, $P < 0.001$.

Table 5 Relationship between degree of severity of depression and type of treatment in the studied sample (percentage referred to total number of patients with depressive disorders)

Type of treatment	Degree of severity of depression [n (%)]				Total
	Minor	Mild	Moderate	Severe	
Dialysis	–	1 (0.5%)	2 (1%)	3 (1.5%)	6
Radiotherapy	–	1 (0.5%)	–	1 (0.5%)	2
Chemotherapy	2 (1%)	4 (2%)	1 (0.5%)	3 (1.5%)	10
Steroids	4 (2%)	6 (3%)	8 (4%)	4 (2%)	22
Interferon	–	1 (0.5%)	1 (0.5%)	–	2
Digoxin	1 (0.5%)	3 (1.5%)	–	3 (1.5%)	7
Surgery	1 (0.5%)	4 (2%)	3 (1.5%)	8 (4%)	16
Nootropics	1 (0.5%)	1 (0.5%)	–	5 (2.5%)	7
Hormonal treatment	2 (1%)	1 (0.5%)	–	–	3
Drugs used for treatment of diabetes.	–	1 (0.5%)	2 (1%)	3 (1.5%)	6
Antihypertensive drugs	1 (0.5%)	3 (1.5%)	1 (0.5%)	2 (1%)	7
Antiepileptic drugs	1 (0.5%)	–	1 (0.5%)	–	2
Analgesics	–	12 (5.9%)	2 (1%)	–	12
Antibiotics	1 (0.5%)	–	1 (0.5%)	2 (1%)	4
Other	5 (2.5%)	8 (4%)	7 (3.5%)	11 (5.4%)	31
No specific treatment for current medical condition	7 (3.5%)	12 (5.9%)	18 (8.9%)	28 (13.9%)	65
Total	26 (12.9%)	58 (28.7%)	45 (22.3%)	73 (36.1%)	202

$\chi^2 = 70.555$, $P = 0.009$.

of illness from 12 months to less than 24 months (9%) and in those with a duration of illness from 6 months to less than 12 months (8.3%; Table 6).

Of a total of 178 patients who have depressive disorders (patients attending psychiatry clinic were excluded), 59 (33.1%) have a severe form. The highest frequency of the severe form of depressive disorder was found among patients with a duration of illness of less than 6 months (45.9%) and among those with duration of illness of 24 months or more (30.4%; Table 7).

Only 14.4% of patients have a positive family history of depressive disorders (Table 8), which was associated with a significant increase in the frequency of the severe form of depressive disorders ($P = 0.03$; Table 9).

Assessment by SDS showed that the degree of impairment is significantly higher among patients with moderate and severe degrees of depressive disorder, particularly severe depression with psychotic features, compared with those with mild to moderate degrees of depressive disorder (Table 10).

It was found that the mean score of suicidality is significantly higher among patients with severe depression, particularly severe depression with psychotic features,

Table 6 Relationship between depression and duration of medical illness in the studied sample (patients attending psychiatric clinic were excluded)

Duration of medical illness	n (%)		Total
	Depressed	Not depressed	
<6 months	61 (5%)	1155 (95%)	1216
6-<12 months	22 (8.3%)	244 (91.7%)	266
12-<24 months	16 (9%)	161 (91%)	177
≥24 months	79 (15.9%)	417 (84.1%)	496
Total	178 (8.3%)	1977 (91.7%)	2155

$\chi^2 = 55.506, P < 0.001$.
51 patients were acute conditions for less than 2 weeks duration of illness; the least duration necessary for diagnosis of depressive disorder (e.g. acute appendicitis, renal colic...etc) were omitted.

Table 7 Relationship between duration of medical illness (months) and severity of depression (patients attending psychiatric clinic were excluded)

Duration of medical illness	n (%)				Total
	Minor	Mild	Moderate	Severe	
<6 months	9 (14.8%)	13 (21.3%)	11 (18%)	28 (45.9%)	61
6-<12 months	4 (18.2%)	9 (40.9%)	5 (25.7%)	4 (18.2%)	22
12-<24 months	2 (12.5%)	3 (18.8%)	8 (50%)	3 (18.8%)	16
≥24 months	9 (11.4%)	29 (36.7%)	17 (21.5%)	24 (30.4%)	29
Total	24 (13.5%)	54 (30.3%)	41 (23%)	59 (33.1%)	178

$\chi^2 = 16.371, P = 0.060$.

Table 8 Family history of depression in patients with depressive disorder

Family history and depression	n (%)
Positive family history for depression	29 (14.4%)
No family history of depression	173 (85.6%)
Total	202 (100.0%)

than among those with minor, mild, and moderate forms of depression (Table 11). However, the mean score of suicidality is still of low degree.

Discussion

Depression is a common clinical entity, with the lifetime risk of major depressive disorder being 20–25% for women and 7–12% for men, whereas the point prevalence being 5–9% for women and 2–3% for men. Depression is, in fact, the most common psychiatric problem encountered in the outpatient primary care settings (Katon and Sullivan, 1990).

Of 2304 studied individuals in outpatient clinics of Assiut University Hospitals, 202 were classified as currently

Table 9 Relationship between family history for depression and severity of current depressive episode

Degree of severity	Family history of depression		Total
	Present	Absent	
Minor	2 (7.7%)	24 (92.3%)	26
Mild	4 (6.9%)	54 (93.1%)	58
Moderate	6 (13.3%)	39 (86.7%)	45
Severe			
Severe without psychotic features	7 (17.5%)	33 (82.5%)	40
Severe with psychotic features	10 (30.3%)	23 (69.7%)	33
Total	29 (14.4%)	173 (85.6%)	202

$\chi^2 = 10.749, P = 0.030$.

Table 10 Relationship between severity of depression and degree of impairment in patients with depressive disorders

Degree of severity	n	Sheehan Disability Scale (mean ± SD)
Minor	26	5.0 ± 3.137 ^{d,c,b,e}
Mild	58	6.98 ± 2.982 ^{d,c,a,e}
Moderate	45	12.78 ± 4.166 ^{d,b,a,e}
Severe		
Severe without psychotic features	40	20.0 ± 5.844 ^{c,b,a,e}
Severe with psychotic features	33	22.58 ± 3.849 ^{c,b,a}

^aSignificant versus minor.
^bSignificant versus mild.
^cSignificant versus moderate.
^dSignificant versus severe without psychotic features.
^eSignificant versus severe with psychotic features.

Table 11 Relationship between severity of depression and risk of suicide among patients with depressive disorders

Diagnosis	n	Mean ± SD
Minor	26	0.19 ± 0.402 ^{d,e}
Mild	58	0.38 ± 0.671 ^{d,e}
Moderate	45	1 ± 1.567 ^{d,e}
Severe		
Severe without psychotic features	40	2.38 ± 2.789 ^e
Severe with psychotic features	33	3.52 ± 3.709 ^{a,b,c,d}

^aSignificant versus minor.
^bSignificant versus mild.
^cSignificant versus moderate.
^dSignificant versus severe without psychotic features.
^eSignificant versus severe with psychotic features.

having depressive disorders, representing 8.8% of the studied sample; of them 167 patients had major depressive disorder, representing 7.25% of the entire sample.

Several studies have been conducted to estimate the prevalence of depression in primary care settings. Berardi *et al.* (2002) reported point prevalence of depression to be in the range of 7.8–9% in primary care units in three Italian areas, which is almost consistent with the results of the present work. Similarly, in the USA, Katon and Schulberg (1992), and Olfson *et al.* (2000) reported that, in primary care settings, the point prevalence of major depression ranges from 4.8 to 8.6%.

The higher percentage of depression among primary care patients in the present study can possibly be attributed to the seriousness of associated medical conditions (e.g. malignancy in which depression was identified in almost 50% of studied patients), duration of the current medical condition (the percentage of depression was strongly related to the duration of medical illness among studied individuals), associated painful or disabling conditions, and, finally, economic burden posed by medical illness (e.g. costly investigations and treatments, unemployment, and loss of job).

Depression in medical illnesses

Depression often accompanies medical conditions seen in primary care settings (Nelson and Woodwell, 1998). Despite the substantial burden associated with depression, the well-established diagnostic criteria, and effective treatment options (Chisholm *et al.*, 2003), approximately one-third to half of the cases of major depression in primary care settings are undetected (Simon and VonKorff, 1995). Denial of illness and fear of social stigma are two factors that may contribute to poor recognition. In addition, local factors such as health policy, health service organization, sociocultural factors, and health provider training and attitudes may all play a role in the recognition and treatment of depression (Pies and Rogers, 2005).

Depression was found in almost 50% of studied patients with various malignant conditions.

This is in partial agreement with the findings of Grassi *et al.* (1996), who identified depression in 45% of home care patients with various cancer types, and also with the findings of Chen *et al.* (2000) and Razavi *et al.* (1990), who reported depression in almost 43.7 and 33.3% of studied inpatients with various cancer types, respectively. All the above studies are cross-sectional studies that used the Hospital Anxiety and Depression Scale. Similarly, in a cross-sectional study that used DSM criteria for diagnosis, Bukberg *et al.* (1984) reported depression in 42% of oncology inpatients with various cancer types.

Depression appears to be highly prevalent in people with cancer. Psycho-social and pharmacologic interventions offer some benefits in the treatment of depressive symptoms in cancer patients (Meyer and Mark, 1995; Van Heeringen and Zivkov, 1996; Sheard and Maguire, 1999).

The risk factors responsible for the manifestation of depression are many, such as the duration of treatment,

previous case history of depression, years from the onset of disease, advanced age, type of cancer, readmission to the hospital, fear of death and social isolation, financial difficulties, etc. (Morris *et al.*, 1977; Mishra *et al.*, 2006; Pasquini and Biondi, 2007). In addition, advanced malignancy, poor prognosis, sense of losing control, physical disability, exhaustion, fatigue, and pain are among the main factors that increase the risk of manifestation of depression (Onitilo *et al.*, 2006; Kathleen *et al.*, 2007).

For example, Groenvold *et al.* (1999) reported that several studies have demonstrated significant anxiety and depression on diagnosis of localized breast cancer and during the following years. In general, longitudinal studies have found attenuation of anxiety and depression over time.

People can successfully adapt to new situations (Folkman and Lazarus, 1980), such as having an increased risk for early death and losing a breast. Further, the perception of cancer as a threat and a source of stress is a simplistic one. Many cancer patients are not only successful in adapting to their new situation, but may also have more happy and meaningful lives after they are confronted with their mortality (Taylor, 1983; Rieker *et al.*, 1989; Andrykowski and Hunt, 1993). In one study, more positive adaptation was observed in breast cancer patients compared with that in those with benign breast diseases 2 years after diagnosis (Andrykowski *et al.*, 1996). It should also be noted that estimates based on groups may mask important differences between individuals; anxiety and depression scores for a group of breast cancer patients may average out the effect of successful coping and adaptation in some patients and severe distress and maladjustment in others. Further, anxiety and depression fluctuate over time, especially in the initial weeks after a major life event, and for some the reaction is delayed.

The permanency of end-stage renal disease is catastrophic for the individual and his or her family. It may disrupt a normal lifestyle and may require considerable psychological and social adjustment (Abram, 1969). The deterioration from being a 'renal patient' to a 'dialysis patient' results in progressively more difficult restrictions, crises, and threats of personal loss (Friedman *et al.*, 1970). Chronic recurring stress on an almost daily basis commonly gives rise to elevated levels of depression in this patient group (Czaczkes and De-Nour, 1978).

Depression is also associated with increased functional disability in rheumatoid arthritis patients. Longitudinal studies have shown that depression occurs following deterioration in functional ability, particularly with regard to activities that an individual regards as being important, for example, visiting the family or going away on a holiday. A 10% reduction in the ability to perform these valued activities is followed by a seven-fold increase in depression over the subsequent year (Katz and Yelin, 1995).

It appears that family concerns about conception, anxiety prior to menstruation and frustration that follows (while waiting for conception to occur), anxiety because of the stressful nature of the treatment procedures and because of the fear that treatment will fail, and depression

because of the inability to conceive might be risk factors for depressive disorder in women with infertility (Golombok, 1992).

It is probable that tuberculosis is a social stigma, at least in our country. Even now, tuberculosis is thought to be a serious incurable disease, especially by the illiterate and rural population. Being diagnosed with tuberculosis is a psychological trauma for some individuals. Prolonged illness, frequent hospitalization, loss of earning, sense of worthlessness and hopelessness, and conscious and unconscious fear of disease and death are also important factors causing depression.

In addition, some of the antituberculous drugs like isoniazid, ethionamide, and cycloserine are known to cause depression (Storey and Mclean, 1957; Duncan and Kerr, 1962).

The frequency of poststroke depression (PSD) in the present study was found to be 16.3%. In other studies using psychiatric examinations to diagnose depression, the prevalence of PSD in patients varies from 24 to 41%, depending on the time elapsed after stroke (Burvill *et al.*, 1996, Pohjasvaara *et al.*, 1998).

PSD occurs in approximately one-third of stroke survivors and is associated with diminished recovery, including less functional gain in activities of daily living and lower recovery trajectories, even when adjusting for other important covariates, including stroke type and severity (Parikh *et al.*, 1990; Schubert *et al.*, 1992). Possible risk factors associated with depression following stroke include location and size of the stroke, temporal relationship between PSD and stroke, and the size of the ventricle (Robinson, 2003). With respect to the relationship between aphasia and PSD, Robinson (1981) has observed a significantly higher prevalence of PSD among patients with nonfluent aphasia, but not among patients with fluent aphasia.

Depression in relation to overall medical burden

In the present study, the frequency of depressive disorders was significantly higher among patients presenting with 'more than two medical conditions' and among those with 'two medical conditions' compared with those presenting with a single medical condition.

Pertinent to our findings, Lyness *et al.* (2006) reported that overall medical burden, rather than any specific pathology, is most importantly associated with depressive conditions in a broad group of primary care elderly patients. They arrived at the conclusion that, among a broadly diverse group of primary care older patients, association of medical illnesses with depression may either be multimodal or may involve a 'final common pathway' that includes pathobiological elements common to many diseases (e.g. the potential role of inflammatory cytokines) or common psychosocial factors (e.g. personality traits and altered social role functioning).

In the present study, 28.9% of patients receiving corticosteroid therapy have depressive disorders. Research has shown that corticosteroids alter the sodium potassium pump and ion flux across membranes, affecting ATP and norepinephrine metabolism, particularly in the

reticular activating system. Steroids have a direct effect on major target cells in the hippocampus as well as on limbic neurons, increasing norepinephrine uptake in cells of both the limbic system and the cerebral cortex. Glucocorticoids have been shown to potentiate ischemic injury to neurons, an important effect in patients with vasculitis, such as systemic lupus erythematosus. These findings may explain the high incidence of steroid psychosis in patients with lupus and pemphigus. Corticosteroids also affect carrier proteins, displacing drugs and other toxic substances, and decrease central nervous system serotonin levels by shunting tryptophan metabolism from the tryptophan-serotonin pathway to the tryptophan-kyurenine pathway and by altering cyclical AMP, cyclical GAMP, acetylcholine, dopamine, and endorphins in the central nervous system (Hall, 1980).

In the present study, 25% of patients receiving IFN therapy have depressive disorder. It is generally accepted that IFN therapy is associated with the development of depressive symptomatology when administered to patients with HCV and cancer. However, the strength of association is often questioned because many of the studies have not used objective and validated measures of depressive symptomatology or criterion-based instruments (Dieperink *et al.*, 2000). Rates of IFN- α -induced depression range from 0 to 44% (Matsushita *et al.*, 1994; Miyaoka *et al.*, 1999). Although recent changes in the formulation of IFN- α have improved response efficacies for some patients, side effects such as depression persist and occur in at least 20% of patients with HCV who receive pegylated IFN- α (Fried *et al.*, 2002).

Results revealed that potential risk factors for increased depression during IFN- α therapy were age, weeks since diagnosis, weeks on treatment, dose rate, and the cumulative dose. However, none of these correlations approached significance (Loftis *et al.*, 2004).

Depressive disorders and duration of medical/surgical conditions

In the present study, a strong correlation has been found between duration of medical illness and percentage of depression in studied individuals, with a higher percentage among patients who have been sick for more than 24 months.

This is in partial agreement with the findings of Singh *et al.* (1979), who studied prevalence of depression in 105 medical inpatients of a general hospital. The authors reported that a longer duration of illness was strongly associated with the development of depression, with maximum incidence of depression being observed in patients in whom duration of illness was more than 1 year and minimum incidence of depression in patients in whom the duration was less than 15 days in their study.

Furthermore, Sidik *et al.* (2003) studied 4241 residents in the four villages and one small town in Malaysia to determine the prevalence of depression and its association with chronic illness among the elderly in a rural community setting. The prevalence of depression was higher among elderly with chronic illness (9.0%) compared with elderly without chronic illness (5.6%).

These results may be explained in part by the patient's sense of hopelessness and loss of faith in effective treatment, exhaustion of patient's economic resources, loss of social support, and also by disease progression with probably more pain and disability.

Recurrence of depression

Depression is a recurrent, rather than an episodic, condition. About 60% of patients who are recognized as having a major depression by their family physician have had two or more previous episodes (Katon *et al.*, 1995).

In the present study, it was found that, of 202 patients with current depression, 57 patients (27.2%) had experienced previous episode(s) of depression.

Risk of suicide among patients with depressive disorders

Assessment of the risk of suicide among patients with depressive disorders using the suicidality sheet of the MINI plus in the present study revealed that the risk of suicide is significantly higher among patients with severe depression.

This finding is in agreement with those of Brådvik *et al.* (2008) and Adam (1985), who reported an increased risk of suicide in patients with severe depression as compared with patients with moderate and mid depression in general.

It is also in partial agreement with the findings of Perrouda *et al.* (2009), who studied 141 suicide attempters and 670 non-suicide attempters with major depressive disorder using the Montgomery–Asberg Depression Rating Scale to test the hypothesis that suicide attempts are correlated with severity of depression. Results revealed that patients suffering from more severe depression reported higher levels of suicidal ideation. It follows that patients with severe depression should be thoroughly investigated for suicidal ideation. Furthermore, close monitoring and frequent psychological assessment should be implemented.

Degree of impairment in relation to severity of depression

In the present study, the degree of impairment as assessed by SDS is significantly higher in patients with severe and moderate major depressive disorders.

This finding is in partial agreement with that of Aragonesa *et al.* (2006), who reported that the severity of depressive symptomatology measured by a Structured Clinical Interview for DSM-IV is reflected by a higher SDS score.

Pertinent to the present work, evaluated the work, social, and family disabilities of 228 patients with six common anxiety and depressive disorders, as assessed by SDS (major depression, panic disorder, generalized anxiety disorder, social phobia, obsessive–compulsive disorder, and mixed anxiety and depression). Results revealed that patients in the six diagnostic groups had significantly higher work, social, and family disability scores compared with control individuals (i.e. more impairment).

Conclusion

Depression is a common mental health problem, seen frequently in the general medical setting. Frequency of depressive disorders was significantly higher among patients with certain medical conditions (e.g. malignancy, disfiguring conditions, autoimmune conditions, renal diseases, and hepatic diseases). Patients with two or more concurrent medical diseases and receiving certain therapeutic interventions are at high risk of developing depressive disorder. In the present study, a strong correlation has been found between duration of medical illness and percentage of depression, with higher percentage among patients who have been sick for more than 24 months. The degree of impairment was significantly higher among patients with moderate and severe depression, and particularly in patients with severe depression with psychotic features. In addition, suicidality was significantly higher among patients with severe depression, particularly among those with severe depression with psychotic features.

Recommendations

The use of screening scales for depression together with providing sufficient training to nonpsychiatric clinicians in the primary care settings for detection of early cases is recommended. Managing medical conditions in multi-system affection patients might help decrease the risk for developing depression.

Attention must be paid to therapeutic interventions associated with increased risk for depression during their administration.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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