

**Original article :**

**Study on post burn injury depression in a tertiary care hospital of Assam**

**<sup>1</sup>Dr.Soumik Sengupta, <sup>2</sup>Dr. Dipesh Bhagabati, <sup>3</sup>Dr. Hemanta Dutta**

<sup>1</sup>Assistant professor, Department of Psychiatry, LGB regional Institute of Mental Health, Tezpur, Assam, India. Phone- +91-9864559009, email- drsoumiksengupta@gmail.com

<sup>2</sup>Professor & HOD, Department of psychiatry, Guwahati Medical College and Hospital, Guwahati, Assam, India

<sup>3</sup>Senior resident, Department of Psychiatry, LGB regional Institute of Mental Health, Tezpur, Assam, India. Phone- +91-8486279647, email-rubulpd1984@rediffmail.com

**Corresponding author :** Dr. Hemanta Dutta

---

**Abstract:**

**Background:** Depressive symptoms are very usual in patients experiencing burn injury. Various studies have demonstrated that 10-30% of the population suffers from depression who has a history of burn injury. Our aim was to evaluate the prevalence of depression in patients following burn injury.

**Settings and design:** The study was conducted on 50 diagnosed cases of burn injury who were admitted in the Department of General Surgery & Plastic Surgery of Gauhati Medical College and Hospital.

**Methods:** Text revision of the fourth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) criteria and Beck depression inventory were applied to diagnose depression and to assess the severity of depression.

**Results:** The results have shown that 48% of the study population suffered from clinically significant depression. Among them, 20 % were mildly depressed, 20 % were moderately depressed and 8% were found to be severely depressed.

**Conclusion:** Psychological problems like depression are very common in patients suffering from burn injury. So routine screening for depression should be mandatory in those patients.

**Keywords:** Depression, Beck Depression Inventory, Burn injury

---

**Introduction:**

Since man discovered fire, he also accidentally burnt himself. Burns is among the injuries that man still suffers from. The earliest information regarding burn injury is found in the Old Testament (Leviticus, 13:24-28). The oldest data on the treatment of burns is recorded in the Ebers papyrus in 1500BC. Sushruta (800BC), the father of Indian surgery, had given a vivid description of different types of burns and their

management in his classic, Sushruta Samhita. Hippocrates (5th century BC) emphasized wound cleansing and the avoidance of suppuration. Burn injuries are devastating, sudden and unpredictable forms of trauma which affect the victims both physically and psychologically. The experience of being seriously burned and the treatment that follows for the survivors is one of the most frightening and painful known to humanity. Viewed globally, burn

injury is one of the leading causes of trauma death & one of thirty leading causes of worldwide loss of life years due to premature mortality and years lived with disability ( Disability adjusted life year ).<sup>1</sup> The estimated incidence of burns requiring hospital care in the United States & Canada ranges between 19 and 26 admission per 100,000 inhabitants.<sup>2</sup> Of the 250,000 people in the United Kingdom who suffer a burn injury each year 13,000 are considered serious enough to require hospitalization.<sup>3</sup> Males are strongly over-represented in burn statistics all over the world, with India as the only exception and men are known to have the highest risk of burn injury and the highest risk of death due to injury.<sup>1</sup> Children are also at high risk both in developed and in less developed countries.<sup>4,5</sup>

“Depression” is a syndromic condition that is widely prevalent. The National Comorbidity Survey published in 2003, reported 12-month prevalence rates of Major depressive disorder by 6.6% and a lifetime prevalence rate of 16.2%.<sup>6</sup> World Health Organization projects that by the year 2020, depression will remain a leading cause of disability, second only to cardiovascular disease. Rates of depression are substantially higher among traumatically injured and medically ill patients than the estimated 5% in the general population.<sup>7</sup>

Several surveys have shown that depression is widely prevalent among patients who have experienced burn injuries. They have administered different psychiatric disorder assessment tools like Beck Depression Inventory, Hamilton Depression Rating Scale, Mini International Neuropsychiatric Interview etc. on their patients and reported that the prevalence of post myocardial infarction depression is 10-30%.<sup>7-11</sup>

In comparison to the west, very few studies have been done in India, especially in the northeast region. This survey, on these lines intends to ascertain whether the comparable scenario of post burns injury, depression has been found out in our state also, and additionally, with the goal that we can call for a holistic approach to their problems and ease them of their suffering.

#### **Materials and method**

**Study area:** The study was done in Gauhati Medical College and Hospital, which is a tertiary care health center, situated at Gauhati, Assam.

#### **Design of the study:**

The period of study extended from August 2008 to July 2009. The study sample comprises of 50 consecutively selected subjects admitted in the Department of General Surgery & Plastic Surgery of Gauhati Medical College and Hospital and diagnosed as having Burn injury and meeting the selection criteria. The diagnosis of Burn injury was made using the admissible criteria of burn by “American College of Surgeons Committee on Trauma”. The Control group consists of 50 literate subjects selected from the General Surgery Department comprising of other surgical illnesses. The subjects were matched by age, sex and education. After selecting subjects and controls as per selection criteria, informed consent for participation in the study was taken from all patients and control subjects. The patients diagnosed with Burn injury as per selection criteria and the controls, then were subjected to a detailed interview and tools were administered within 2 weeks after hospitalization. Time period of interview ranged from 90-120 minutes. In all cases, privacy of interview and confidentiality were strictly maintained.

**The aim of the study:** To assess the prevalence of depression in patients following burn injury.

**Inclusion Criteria:** - a) Both male and female patients. b) Age between 18-64 years. c) Literate in Assamese, English or Bengali.

**Exclusion Criteria:** - a) Patients with previous major psychiatric illness (eg. Schizophrenia, Bipolar disorder, Major depressive disorder, generalized anxiety disorder). b) History of taking psychotropic drugs. c) Patients with history of alcohol or other substance abuse. d) Patients unable to do self rating BDI scale. e) Patients in delirium. f) Burn associated with pre-existing medical illness. g) Burn with concomitant trauma or any other physical disorders.

**Tools which are used in the study:** a) Informed consent form b) Proforma for socioeconomic data c) Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV) d) Beck Depression Inventory (BDI)

**DSM:**

DSM, published by the American Psychiatric Association, provides a common language and standard criteria for the classification of mental disorders. DSM-IV-TR was published in 2000.

**Beck Depression Inventory (BDI):**

The Beck Depression Inventory (BDI), created by Aaron T Beck, is a 21-question multiple-choice self-report inventory; one of the most widely used instruments for measuring the severity of depression. Its development marked a shift among health care professionals, who had until then viewed depression from a psychodynamic-perspective, instead of it being rooted in the patient's own thoughts. In its current version, the questionnaire is designed for individuals aged 13 and over, and is composed of

items relating to symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex.<sup>12</sup>

The standard cutoffs are as follows:<sup>12</sup>

- 0–9: indicates minimal depression
- 10–18: indicates mild depression
- 19–29: indicates moderate depression
- 30–63: indicates severe depression

**Statistical data analysis**

The information has been analysed using statistical software packages like SPSS, XLSTAT and Microsoft office Access.

**Results:**

The study comprises of 50 subjects, age ranging from 18 – 64 years. Study group includes 50 patients of Burn Injury, meeting the inclusion criteria. Control group comprises of 50 patients of other surgical diseases with age and sex matched. In male percentage of cases in different age groups are: 64% in age group of 18 – 30, 22% in the age group of 31 – 40, 8% in the age group of 41 – 50, and 6% in the age group of 51 – 64. In this sample, 72% of cases are Hindu and 28% of cases are Muslim. Among males 50% are primary school pass, 25% are class X pass, 25% are class XII pass and among females 63% are primary school pass, 30.4% are class X pass, 4.4% are class XII pass and 2.2% are graduate. In marital status, there are no male subjects in the divorced/ separated or widow/ widower group. Among men 50% are married and 50% are single, while in females 69.6% are married, 26% are single, 2.2% are divorced and 2.2% are widow. In socio-economic status, among males 25% are from lower middle class, 50% are from middle class and 25% are from

high class, while in females 30.4% are from lower class, 43.5% are from lower middle class, 13% are from middle class, 10.8% are from upper middle class and 2.2% are from high class.

Among men 25% are from rural background, 75% are from urban background. In females 65.2% and 34.8% are from rural and urban background respectively. In occupational status 25% males are employed and 75% are self-employed. Among

females 93.5% are unemployed, 4.3% are self-employed and only 2.2% are employed. In case of family type, 56% of cases are from nuclear families and 44% are from joint families. Among the cases 25% of males are from nuclear families and 75% are from joint families. Among females, 58.7% are from nuclear families and 41.3% are from joint families. The data have been portrayed by table 1.

Table:1: Distribution of the study group based on socio demographic variables

Age	Male (n=4)		Female (n=46)		Total (n=50)	
	No	%	No	%	No	%
18 - 30	2	50	30	65.22	32	64
31 – 40	1	25	10	21.74	11	22
41 – 50	1	25	3	6.52	4	8
51 - 64	-	-	3	6.52	3	6
Religion	Male (n=4)		Female (n=46)		Total (n=50)	
	No	%	No	%	No	%
Hindu	3	75	33	71.7	36	72
Muslim	1	25	13	28.3	14	28
Others	-	-	-	-	-	-

Education	Male		Female		Total	
	No	%	No	%	No	%
Primary school pass	2	50	29	63	31	62
Class X pass	1	25	14	30.4	15	30
Class XII pass	1	25	2	4.4	3	6
Graduate	-	-	1	2.2	1	2
Post Graduate	-	-	-	-	-	-
Professional	-	-	-	-	-	-
Marital Status	Male		Female		Total	
	No	%	No	%	No	%
Single	2	50	12	26	14	28
Married	2	50	32	69.6	34	68
Divorced / Separated	-	-	1	2.2	1	2

Widow / Widower	-	-	1	2.2	1	2
Locality	Male		Female		Total	
	No	%	No	%	No	%
Rural	1	25	30	65.2	31	62
Urban	3	75	16	34.8	19	38
Socio-economic Status	Male		Female		Total	
	No	%	No	%	No	%
Lower	0	0	14	30.4	14	28
Lower Middle	1	25	20	43.5	21	42
Middle	2	50	6	13	8	16
Upper Middle	0	0	5	10.9	5	10
High	1	25	1	2.2	2	4
Occupation	Male		Female		Total	
	No	%	No	%	No	%

Unemployed	-	-	43	93.5	43	86
Employed	1	25	1	2.2	2	4
Self- employed	3	75	2	4.3	5	10
Type of Family	Male		Female		Total	
	No	%	No	%	No	%
Nuclear	1	25	27	58.7	28	56
Extended	-	-	-	-	-	-
Joint	3	75	19	41.3	22	44

The table 2 shows number and percentage of cases and controls having depression according to BDI. Amongst the male, 2% of cases and 2% of controls have clinically depression and in females 46% of cases and 16% of controls have clinically depression. In cases the mean score in BDI is 13.46 and in controls the mean score is 7.24

Table: 2: Score on Beck Depression Scale in Study Group and Control Group.

Sex	Study Group					Control Group				
	No.	%	Total %	Mean score	Std. Deviation	No.	%	Total %	Mean score	Std. Deviation
Male	1	2%	48%	13.46	8.28	1	2%	18%	7.24	5.22
Female	23	46%				8	16%			

Table 3 shows the number of cases and controls having depression, according to Beck Depression Inventory. Among burn patients out of 50 patients 24 have clinically significant depression and among control patients out of 50 patients, 9 patients have clinically significant depression according to BDI scale.

Table: 3: Comparison between Study Group and Control Group in BDI Scale.

	Study Group (Burn patients)	Control Group (No burn patients)	Chi-Square test			
			Value	df	p-value	Significance
Depression	24	9	8.865	1	0.002	Significant
No depression	26	41				
Total	50	50				



Table: 4: Distribution of Severity of Depression, according to Beck Depression Inventory in Study Group.

Total Depression		Severity of Depression					
		Mild		Moderate		Severe	
No.	%	No.	%	No.	%	No.	%
24	48%	10	20%	10	20%	4	8%

Table 4 and figure 1 shows the number and percentage of cases and severity of depression according to the BDI. 48% of the cases have found clinically depression. 20% of cases are having mild depression, 20% of cases are having moderate depression and 8% of cases are having severe depression.

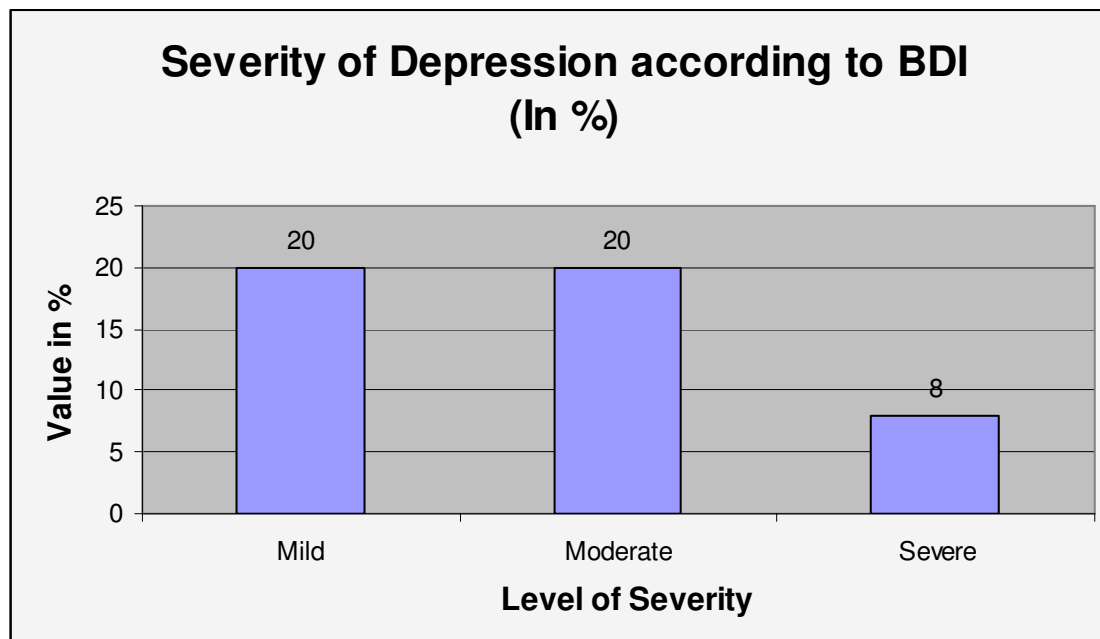


Fig: 1: Figure showing the severity of depression, according to the BDI

### Discussion:

Analysis of the socio- demographic data in our study showed that 92% of patients with burn injury admitted in the hospital for treatment were female. This is contrary to the findings of other Western studies where they found male preponderance.<sup>9,13,14</sup> But it supports the finding of Murray et al.,<sup>1</sup> he reported that males are strongly over-represented in burn statistics all over the world, with India as the only exception.<sup>1</sup> According to World Health Organization report in 1999, in some countries, especially in Asia, females are at higher risk for burns because of the use of open fires for cooking, heating and lighting, which can easily set alight the loose clothing they wear. In India, for example, about 70% of burn victims are women.<sup>16</sup> Patients aged 18-64 years were included in this study. The mean age was 28.8 years for male and 31 years for female in our study. The mean age in our study group is comparable with studies of Charlton et al. and Pallua et al.<sup>8,16</sup> They found the mean age to be 30 years and 33 years in their studies respectively.<sup>8,16</sup>

In our study, the majority of the female (65%) and male (50%) patients were in the age group of 18 to 30 years which is similar with the finding of an epidemiological study of burn by Shanmugakrishnan et al.<sup>17</sup> This study was conducted in a teaching hospital in South India. In their study, the mean age ( $\pm$ SD) was 31.58 ( $\pm$ 11.64) years for males and 30.18 ( $\pm$ 15.60) years for females.<sup>17</sup> They also reported the similar finding that men in the age group of 25 to 34 years and women aged 15 to 24 years suffered from burns significantly more than the other age groups.<sup>17</sup> In an another epidemiological study by Sarma et al.,<sup>18</sup> in Indian Oil Corporation Ltd (Assam Oil

Division) Hospital, Digboi, reported females between the ages of 20 and 40 years commonly received major burns.

The prevalence of depression in burn injury during the period of hospitalization has been reported by many studies. A surprising finding was that studies that used Structured Clinical Interview for DSM-III-R (SCID –III-R) reported very low prevalence rates of major depression during the hospitalization for burn injury. Two studies [Fauerbach et al. (1997); Medianos et al. (2001)]<sup>7,19</sup> that assessed major depression in hospital both reported a 4% prevalence rate. This rate of major depression was not substantially higher than the rate of major depression in the general population reported in the National Comorbidity Study [Kessler et al. 1994]<sup>7</sup> and was substantially lower than the 10% to 38% found in studies of patients with spinal cord injuries [Bombardier et al. (2004)],<sup>20</sup> the 14% reported among traumatic brain injury patients [Deb et al. (1999)],<sup>20</sup> the 20% in post-acute myocardial infarction (AMI) [Thombs et al. (2006)],<sup>21</sup> and the 19% among patients with stroke [Robinson et al. (2003)]<sup>22</sup> when structured interviews were used.

The studies used validated questionnaires to diagnose depression during the hospitalization reported higher prevalence of depression during hospitalization. Charlton et al. (1983)<sup>23</sup> found 33% of patients had 'moderate to severe' depression. Choiniere et al. (1989)<sup>24</sup> found depression in 30% of patients. Ptacek et al. (2002)<sup>25</sup> reported a 23% prevalence of moderate and 10% prevalence of severe depression on Day 5 during the hospital admission period.

Our study found that the prevalence of moderate to severe depression in 28% of patients with burn injury within 2 weeks of hospital stay. Mean ( $\pm$ SD) days of

the assessment were 6.44 ( $\pm 3.44$ ) days in our study. These findings are similar to the findings of Ptacek et al. (2002)<sup>25</sup> and Charlton et al. (1983).<sup>23</sup>

In the control group prevalence of depression was found to be 18%. In our study, control group consists of other surgical diseases. 18% prevalence is slightly higher than the rate of depression in the general population reported in the National Comorbidity Study by Kessler et al. (2003).<sup>7</sup> Kessler et al. (2003)<sup>7</sup> reported lifetime prevalence rate of depression to be 16.2%.

Out of the depressed patients, 20% of patients had mild depression, 20% patients had moderate depression and 8% of patients had severe depression (BDI Scale). Our finding is comparable with studies of Bras et al. (2006),<sup>26</sup> Thombs et al. (2006),<sup>27</sup> Ptacek et al. (2002).<sup>25</sup>

The mean score of depression was 13.46 (BDI) in the subject population. Our finding is almost similar with other western studies [ Bras et al.(2006), Shalev et al. (1998)].<sup>26,28</sup>

This study was undertaken to determine the prevalence of depression following Burn injury.

Our study found a high prevalence of depression (48% in BDI) in patients following burn injury during the period of hospitalization. We did not find any significant correlation of depression with other socio-demographic variables like gender, religion, family type, employment status, education and marital status.

#### **Summary and conclusion:**

On analysis of clinical variables in relation to depression we found patients with head or neck burn

were more depressed compared to patients with burn in other sites. Regarding the surface area of burn, patients with more body surface area of burn (TBSA) were more depressed compared to those who had less body surface area of burn. Burn injury and its subsequent treatment are the most painful experiences a person can encounter. Emotional factors like depression can have an effect on the healing process of the burn injury through suppression of the immunological system. Depression is having implication on both morbidity and mortality associated with cardiovascular diseases. We should not only successfully treat large burns and their complications, but should provide the necessary rehabilitation and psychological support required for readjustment back into the society. Here we recommend routine screening for depression in post burn injury cases, so that we can approach in a holistic way.

#### **Limitations of the study-**

The study has certain limitations:-

The sample taken was small. A larger sample would have been more representative.

Less male subjects in this study compared to female subjects.

During the early stages of any injury denial is often mistaken for depression.

We did not assess pre-burn psychopathology.

Patients were evaluated once and further evaluation would have been more helpful to confirm the presence of depression.

**References:**

1. Murray, C.J & Lopez, A.D. (1997). Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. *Lancet* , 349, 1436- 1442.
2. Goodwin, C.W. Mason, Jr AD. (2002). Epidemiological, demographic, and outcome characteristics of burn injury. In Herndon, D.N (Ed), *Total Burn Care* (pp. 16-30). London: W B Saunders
3. Hettiaratchy, S., & Dziewulski, P. (2004). The ABC of burns. Introduction. *British Medical Journal*, 328, 1366 –1368.
4. Morrow DK, Peterson HD et al. (1996). Etiology and outcome of pediatric burns. *J Pediatr Surg* , 31, 329-333.
5. Delgado, J. (2002). Risk factors for burns in children: Crowding, poverty, and poor maternal education. *Injury Prevention*, 8, 38-41.
6. Kessler, R., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K., Wang, P. (2003). The Epidemiology of Major Depressive Disorder. *JAMA*, 289 (23), 3095-3095.
7. Kessler, RC., Blazer, DG., McGonagle, KA., Swartz, MS., The prevalence and distribution of major depression in a national community sample: The National Comorbidity Survey. *AJP American Journal of Psychiatry*, 151(7), 979-986.
8. Charlton, J., Klein, R., Gagliardi, G., & Heimbach, D. (1983). Factors affecting pain in burned patients--a preliminary report. *Postgraduate Medical Journal*, 59(695), 604-607.
9. Ptacek, J., Patterson, D., Boeve, S., Gibran, N., & Heimbach, D. (2003). Inpatient Depression in Persons with Burns: Final Results. *Journal of Burn Care & Rehabilitation*, 23(1), 1– 9.
10. Bras, M., Loncar, Z., & Mickovic, V. (2006). The Interrelationships Between Pain, Anxiety And Depression In Burn Injured Patients. *European Journal of Pain*, 30, 319-325.
11. Thombs, B., Bresnick, M., & Magyar-Russell, G. (2006). Depression in survivors of burn injury: A systematic review. *General Hospital Psychiatry*, 28(6), 494-502.
12. Beck AT (2006). *Depression: Causes and Treatment*. Philadelphia: University of Pennsylvania Press.
13. Lawrence, J., Fauerbach, J., Heinberg, L., & Doctor, M. (2004). The 2003 Clinical Research Award. *Journal of Burn Care & Rehabilitation*, 25(1), 25-32.
14. Madianos, M., Papaghelis, M., Ioannovich, J., & Dafni, R. (2001). Psychiatric Disorders in Burn Patients: A Follow-Up Study. *Psychotherapy and Psychosomatics*, 70(1), 30-37.
15. Who.int. Burns. [Online]. Available from: <http://www.who.int/mediacentre/factsheets/fs365/en/> [Accessed 9 June 2015].
16. Pallua, N., Künsebeck, H., & Noah, E. (2003). Psychosocial adjustments 5 years after burn injury. *Burns*, 29(2), 143-152.
17. Shanmugakrishnan, R., Narayanan, V., & Thirumalaikolundusubramanian, P. (2008). Epidemiology of burns in a teaching hospital in south India. *Indian J Plast Surg Indian Journal of Plastic Surgery*, 41(1), 34–37-34–37.
18. Sarma, B., & Sarma, N. (1994). Epidemiology, morbidity, mortality and treatment of burn injuries-a study in a peripheral industrial hospital. *Burns*, 20(3), 253-255.

19. Fauerbach, J., Lawrence, J., Haythornthwaite, J., Richter, D., Mcguire, M., Schmidt, C., & Munster, A. (1997). Preburn Psychiatric History Affects Posttrauma Morbidity. *Psychosomatics*, 38(4), 374-385.
20. Deb, S., Lyons, I., Koutzoukis, C., Ali, I., McCarthy, G., (1999). Rate of psychiatric illness 1 year after traumatic brain injury. *Am J Psychiatry*, 156(3), 374-8.
21. Thombs, B., Bass, E., Ford, D., Stewart, K., Tsilidis, K., Patel, U., Ziegelstein, R. (2006). Prevalence of depression in survivors of acute myocardial infarction. *J GEN INTERN MED Journal of General Internal Medicine*, 21(1), 30-38.
22. Robinson, R. (2003). Poststroke depression: Prevalence, diagnosis, treatment, and disease progression. *Biological Psychiatry*, 54(3), 376-387.
23. Charlton, J., Klein, R., Gagliardi, G., & Heimbach, D. (1983). Factors affecting pain in burned patients--a preliminary report. *Postgraduate Medical Journal*, 59(695), 604-607.
24. Choiniere, M., Melzack, R., Rondeau, J., Girard, N. & Paquin, M. J. (1989). The pain of burns: patient versus nurse correlates. *Journal of Trauma*, 29, 1531 – 1539.
25. Ptacek, J., Patterson, D., Boeve, S., Gibran, N., & Heimbach, D. (2002). Inpatient Depression in Persons with Burns: Final Results. *Journal of Burn Care & Rehabilitation*, 23(1), 1-9.
26. Bras, M., Loncar, Z., & Mickovic, V. (2006). The Interrelationships Between Pain, Anxiety And Depression In Burn Injured Patients. *European Journal of Pain*, 30(2), 319-325.
27. Thombs, B., Bresnick, M., & Magyar-Russell, G. (2006). Depression in survivors of burn injury: A systematic review. *General Hospital Psychiatry*, 28(6), 494-502.
28. Shalev, A., Freedman, S., Peri, T., Brandes, D., Sahar, T., Orr, S., & Pitman, R. (1998). Prospective Study of Posttraumatic Stress Disorder and Depression Following Trauma. *AJP American Journal of Psychiatry*, 155(5), 630-637.