



## The Outcome Analysis of Beck Depression Inventory Scale (BDI-II) and Hamilton Anxiety Rating Scale (HAM-A) Among Patients of Cancer Center of Combined Military Hospital Dhaka

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**Abstract: Background:** The Beck Depression Inventory (BDI) and the Hamilton Depression Rating Scale (HAMD) which is vice versa with equipercenile linking are the most frequently used observer-rated and self-report scales of depression, respectively. It is important to know what a given total score or a change score from baseline on one scale means in relation to the other scale. **Objective:** The aim of the study was to determine the depression symptoms rating scale of Beck Depression Inventory Scale (BDI-II) verses Hamilton Anxiety Rating Scale (HAM-A) among patients of Cancer Center of Combined Military Hospital Dhaka. **Materials and Methods:** It was a cross-sectional study. A total of 150 samples were selected by convenient sampling technique. The patients were studied after histopathological confirmation of diagnosis of cancer. Socio-demographic and other data were collected by face-to-face interview using semi structured questionnaire. The BDI-II and HAM-A was used to screen out the patients with depression and anxiety. The diagnosis was confirmed by a psychiatrist using DSM-5 criteria. Data analysis was done by Statistical Package for Social Sciences (SPSS) version 26.0 and results were presented with appropriate graphs and texts. **Results:** The mean age was 46.5±9.5 years. 65.3% were male and 34.7% respondents were female. Male: female ratio 1.9:1. 40.7% patients had moderate depression symptom followed by 30.0% had mild depression symptom, 17.3% patients had severe depression symptom and 12.0% patients had minimum depression symptom that can be considered as no depression. The overall mean score of Beck Depression Inventory (BDI-II) was 22.1±8.4 with range 5 to 45. Regarding anxiety of cancer patients, 45.3% patients had moderate to severe anxiety symptom followed by 29.3% patients had mild to moderate anxiety symptom, 25.3% patients had minimum anxiety symptom that can be considered as no anxiety symptom. The overall mean score of Hamilton Anxiety Rating Scale (HAM-A) was 21.6±6.7 with range 7 to 30. Comparatively most of the patients of 31-40 age groups had severe depression level symptoms and among above 50-60 year's patients had the most severe anxiety symptoms. According to BD-II and HAM-A rating scale,

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among stage 4 patients 43.8% had severe depression symptom and 87.5% had severe anxiety symptom. **Conclusion:** Study shows that according to the rating scales both depression and anxiety symptoms are significantly higher in cancer patients. Moreover, frequency and severity of depression and anxiety symptom is much more significantly raised among older age group specially stage 4 cancer patients. Compared with both rating scales the depression level had also shown in 31-40 age groups.

**Keywords:** Depression and anxiety, Beck Depression Inventory Scale (BDI-II), Scale (HAM-A), DSM-5 criteria.

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## INTRODUCTION

In 2008, there were 7.6 million cancer-related fatalities globally, or almost 13% of all deaths and over 70% of these deaths took place in low- and middle-income nations. By 2030, it is anticipated that there will be over 11 million cancer-related deaths globally [1]. Psychological stress impacts a significant share of cancer patients. In the published literature, there is a wide range in the prevalence of common mental disorders among cancer patients [2, 3]. A key factor is the presence of pre-existing mental health problems and their severity. Before a cancer diagnosis, research has demonstrated that individuals who have previously accessed mental health services experience excess mortality due to certain cancers, which may reflect late diagnosis, inadequate treatment and a higher rate of adverse health behaviors. The mean prevalence of depression using diagnostic interviews is around 13%, and using all assessment methods, it ranges from about 5 to 20%.7-10. The psychological manifestations typically take the form of adjustment disorder, depressed mood, anxiety, diminished life satisfaction, or loss of self-esteem [4, 5]. A systematic review and meta-analysis shows the prevalence of major depression (15%), minor depression (20%) and anxiety (10%) in patients treated for cancer [6]. The National Mental Health Survey carried throughout Bangladesh in 2018-19 found that among general population Depressive disorder is (6.7%) and Anxiety disorder is (4.5%) [7]. There is very few number of studies done for detection of patients having symptoms of depression and anxiety with cancer in context of Bangladesh. Moreover, there has been no study in the context of Bangladesh Army to determine the proportion of patients having depression and anxiety symptoms with cancer. A systematic review and meta-analysis study focusing on patients with ovarian cancer found that anxiety tended to be higher following treatment (27%) and during treatment (26%), and was lowest pretreatment (19%). Due to reduced clinical consultations and support following treatment, potential transfer to a palliative setting and fear of recurrence, the heightened anxiety may be observed post-treatment. Fear of recurrence an

important area of unmet need for cancer survivors is one of the most commonly reported issues [8]. A lack of outward physical symptoms in ovarian cancer also means that self-monitoring is difficult. On younger cancer survivors, few studies have focused specifically and more research is needed in this area. According to a research study of young adult cancer survivors aged 15 to 39 years in the United States moderate (23% vs 17%) and severe (8% vs 3%) mental distress was significantly higher in those living with cancer for at least 5 years after diagnosis, compared to controls [9]. 75 and 52% of people with cancer with moderate and severe distress, respectively, had not talked to a mental health professional, with the cost of treatment a potential barrier. The prevalence of major depression in cancer patients greatly exceeds than that among the general population in Bangladesh (6.7%) [10]. Symptoms of anxiety in patients with cancer more often coexist with clinical depression than present as anxiety alone and treatment for depression may also resolve anxiety and depression is a common cancer consequence with a greater prevalence than in the general population, it is sometimes overlooked.

## OBJECTIVE

The object of the study was to analysis the outcomes of Beck Depression Inventory Scale (BDI-II) and Hamilton Anxiety Rating Scale (HAM-A) among patients of Cancer Center of Combined Military Hospital Dhaka, Bangladesh.

## MATERIALS AND METHODS

### Study Design

This is a cross-sectional observational study.

### Place of Study

This study was carried out in the Cancer Center, Combined Military Hospital (CMH), Dhaka. CMH Dhaka is a tertiary level hospital which was established in 14 August 1947. CMH Dhaka is a 1200 bedded specialized hospital that provides outdoor and indoor treatment for the armed forces

personnel, entitled civilians and civilians not entitled. Cancer Center is a part of CMH Dhaka that was inaugurated on 13 May 2018 to cope with increasing number of cancer patients and to provide modern treatment facilities to them. Cancer center is a 100 bedded facility that has been providing indoor and outdoor treatment for cancer patients in armed forces including civilian population. It facilitates chemotherapy, radiotherapy, brachytherapy and day care treatment for the cancer patients. Monthly turnover of patient in this cancer center is around 1500 in out-patient department and around 200 admitted cases on an average. A good number of highly qualified medical and radiation oncologist provides treatment here. There is no study done among cancer patients to see the proportion of patients having depression and anxiety symptoms with cancer in this treatment facility. In context of Bangladesh armed forces no study has been done regarding this subject before.

### Period of Study

July, 2020 to December, 2020

### Study Population

All available cancer patients of all age attending OPD and admitted in the inpatient department of Cancer Center, CMH Dhaka within the study period.

### Sampling Technique

Convenient sampling technique was applied for selecting the samples

### Inclusion Criteria

- i. All available cancer patients attending OPD and inpatient department of Cancer Center, CMH Dhaka during the study period.
- ii. Patients do not have any past history of psychiatric disorder.
- iii. Patients were included irrespective of age and sex.
- iv. Patients had no past history of substance abuse.

### Exclusion Criteria

- i. Unwilling to participate.
- ii. Seriously ill/ Unconscious/Confused/ Comatose patient.
- iii. Patient who does not want to give written consent.

### Sample Size

The sample size is adjusted to 174. The study group was constituted of 150 cancer patients due to lack of resources and time constraint.

### Data Collection Technique

Data were collected anonymously by face to face interview using BDI-II & HAM-A and another socio demographic semi-structured questionnaire from the patients who are fulfilling the inclusion criteria and getting treatment as an inpatient or outpatient from Cancer Center CMH Dhaka. The patients were informed that the purpose of the research is to find out proportion of patients having depression and anxiety symptoms among them.

### Statistical Analysis

Data was processed and analyzed with the help of computer program SPSS version 26. Quantitative data were expressed as frequency and percentage, mean and standard deviation with texts, tables, graphs and figures. A probability (p) value of < 0.05 was considered statistically significant and  $p < 0.001$  was considered highly significant but  $p > 0.05$  taken as non-significant.

### Equipment

#### Beck Depression Inventory Scale (BDI-II)

The BDI-II is a 21 items self-report instrument for measuring the severity of depression in adults and adolescents.

#### Hamilton Anxiety Rating Scale (HAM-A)

To measure the severity of anxiety symptoms, the HAM-A was one of the first rating scales developed and is still widely used today in both clinical and research settings. The scale consists of 14 items, each defined by a series of symptoms, and measures both psychic anxiety and somatic anxiety. The BDI-II and HAM-A was used to screen out the patients with depression and anxiety. The diagnosis was confirmed by a psychiatrist using DSM-5 criteria.

## RESULTS

This was a cross sectional study was conducted to determine the proportion of patients having depression and anxiety symptoms with cancer. One fifty (150) respondents were collected by convenient sampling technique. BDI-II and HAM-A scale was applied to measure the depression and anxiety of the cancer patients.

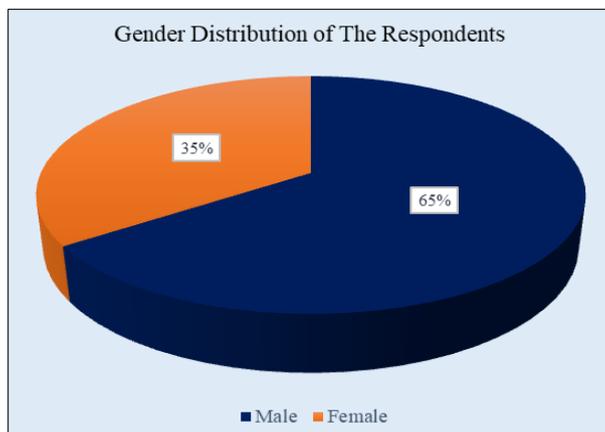
Table 1 show that the age distribution of the study respondents, in this series age ranged from 24-60 years. Maximum patients 41.3% were between 51-60 followed by 30.0% Patients age within 41-50 years and minimum 8.0% in age group 20-30 years. Mean age  $46.5 \pm 9.5$  years.

**Table 1: Distribution of study respondents according to age (N=150)**

Age group (in years)	n	%
20-30 yrs.	12	8.0
31-40 yrs.	31	20.7
41-50 yrs.	45	30.0
51-60 yrs.	62	41.3
Mean ±SD	46.5±9.5	
Range	(24.0 - 60.0) years	

Figure I show the sex distribution of study respondents. Among 150 respondents, 98(65.3%)

were male and 52(34.7%) respondents were female. Male: female ratio 1.9:1.



**Figure I: Sex distribution of study respondents (N=150)**

Table 2 showed that the type of depression symptom of cancer patients. Among 150 cancer patients, maximum 61(40.7%) had moderate depression symptom followed by 45(30.0%) patients had mild depression symptom, 26(17.3%)

patients had severe depression symptom and 18(12.0%) patients had minimum depression symptom. The overall mean score of Beck Depression Inventory (BDI-II) was 22.1±8.4 with range 5 to 45.

**Table 2: Distribution of the study patients by type of Depression (N=150)**

Type of depression	n	%
Minimum depression (0-13)	18	12
Mild depression (14-19)	45	30
Moderate depression (20-28)	61	40.7
Severe depression (29-63)	26	17.3
Mean ±SD (BDI-II score)	22.1±8.4	
Range (min-max)	(5-45)	

Table 3 showed that the type of anxiety symptom of cancer patients. Among 150 cancer patients, maximum 68(45.3%) had moderate to severe anxiety symptom followed by 44(29.3%)

patients had mild to moderate anxiety symptom, 38(25.3%) patients had minimum anxiety symptom. The overall mean score of Hamilton Anxiety Rating Scale (HAM-A) was 21.6±6.7 with range 7 to 30.

**Table 3: Distribution of the study patients by type of Anxiety (N=150)**

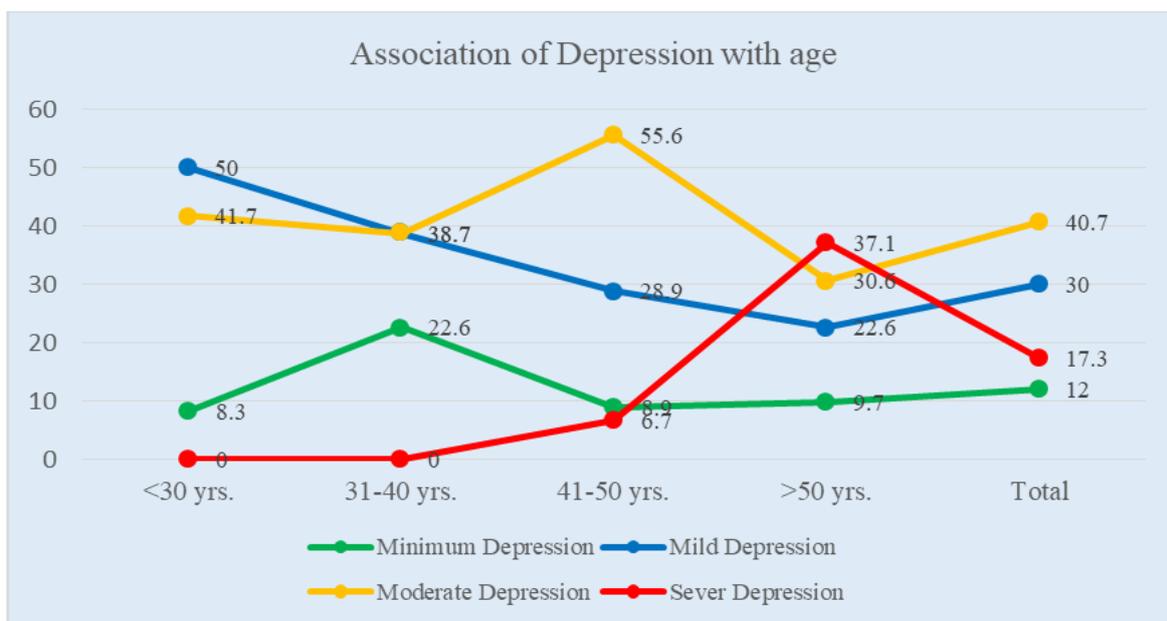
Type of anxiety	n	%
Mild anxiety (<17)	38	25.4
Mild to moderate anxiety (18-24)	44	29.3
Moderate to severe (25-30)	68	45.3
Total	150	100
Mean ±SD (HAM-A score)	21.6±6.7	
Range (min-max)	(7-30)	

Table 4 showed that among 12 respondents age below 30 years, moderate depression symptom was found in 41.7% cases, out of 31 patients within 31-40 years maximum (77.4%) had mild to moderate depression symptom; among 45 patients age group 41-50 years, maximum (55.6%) had

moderate depression symptom, above 50 years of age 62 patient's maximum 37.1% had severe depression symptom. According to Beck Depression Inventory (BDI-II), most severe depression score was found in the age group of 31-40 years.

**Table 4: Association of Depression with age (N=150)**

Age group (years)	n	Level of Depression				p-value
		Minimum Depression	Mild Depression	Moderate Depression	Severe Depression	
<30 yrs.	12	1(8.3%)	6(50.0%)	5(41.7%)	0(0.0%)	<0.001 <sup>s</sup>
31-40 yrs.	31	7(22.6%)	12(38.7%)	12(38.7%)	0(0.0%)	
41-50 yrs.	45	4(8.9%)	13(28.9%)	25(55.6%)	3(6.7%)	
>50 yrs.	62	6(9.7%)	14(22.6%)	19(30.6%)	23(37.1%)	
Total (N)	150	18(12.0%)	45(30.0%)	61(40.7%)	26(17.3%)	



**Figure II: Association of Depression with Age among study respondents (N=150)**

Table 5 shows that, among 12 respondents age below 30 years, moderate to severe anxiety symptom was found in 25.0% cases, out of 31 patients within 31-45 years maximum (51.6%) had mild anxiety symptom; among 45 patients age group 41-50 years, maximum (40.0%) had moderate to

severe anxiety symptom, above 50 years of age 62 patient's maximum 62.9% had moderate to severe anxiety symptom. According to Hamilton Anxiety Rating Scale (HAM-A), most severe anxiety score was found in the above 50 year's group.

**Table 5: Association of Anxiety with age (N=150)**

Age group (years)	n	Level of Anxiety			p-value
		Mild Anxiety	Mild to Moderate Anxiety	Moderate to Severe Anxiety	
<30 yrs.	12	6(50.0%)	3(25.0%)	3(25.0%)	<0.001 <sup>s</sup>
31-40 yrs.	31	16(51.6%)	7(22.6%)	8(25.8%)	
41-50 yrs.	45	12(26.7%)	15(33.3%)	18(40.0%)	
>50 yrs.	62	4(6.5%)	19(30.6%)	39(62.9%)	
Total (N)	150	38(25.3%)	44(29.3%)	68(45.3%)	

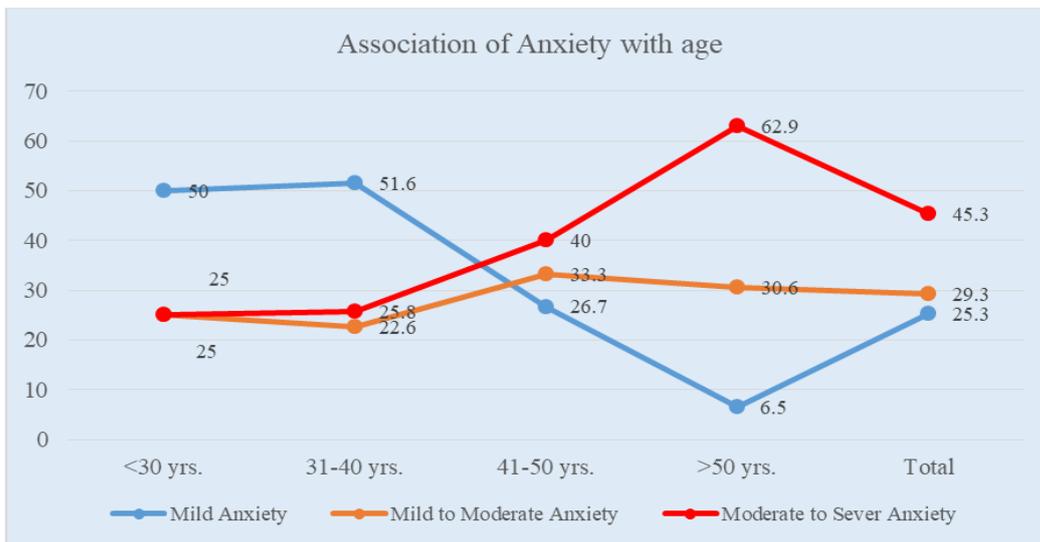


Figure III: Association of Anxiety with Age among study respondents (N=150)

Table 6 showed the association of depression symptom with cancer stage. Among 32 patients with stage 4, maximum (43.8%) had severe depression symptom, among 42 patients with stage 3 maximum (35.7%) patients had moderate

depression symptom, among stage 2 maximum (84.0%) had mild to moderate depression symptom. According to BD-II rating scale, most of stage 2 patients had the maximum depression level.

Table 6: Association of depression with cancer stage (BD-II) (N=150)

Cancer stage	n	Level of Depression				p-value
		Minimum Depression	Mild Depression	Moderate Depression	Severe Depression	
Stage 1	26	7(26.9%)	6(23.1%)	13(50.0%)	0(0.0%)	<0.001 <sup>s</sup>
Stage 2	50	8(16.0%)	21(42.0%)	21(42.0%)	0(0.0%)	
Stage 3	42	3(7.1%)	12(28.6%)	15(35.7%)	12(28.6%)	
Stage 4	32	0(0.0%)	6(18.8%)	12(37.5%)	14(43.8%)	
Total (N)	150	18(12.0%)	45(30.0%)	61(40.7%)	26(17.3%)	

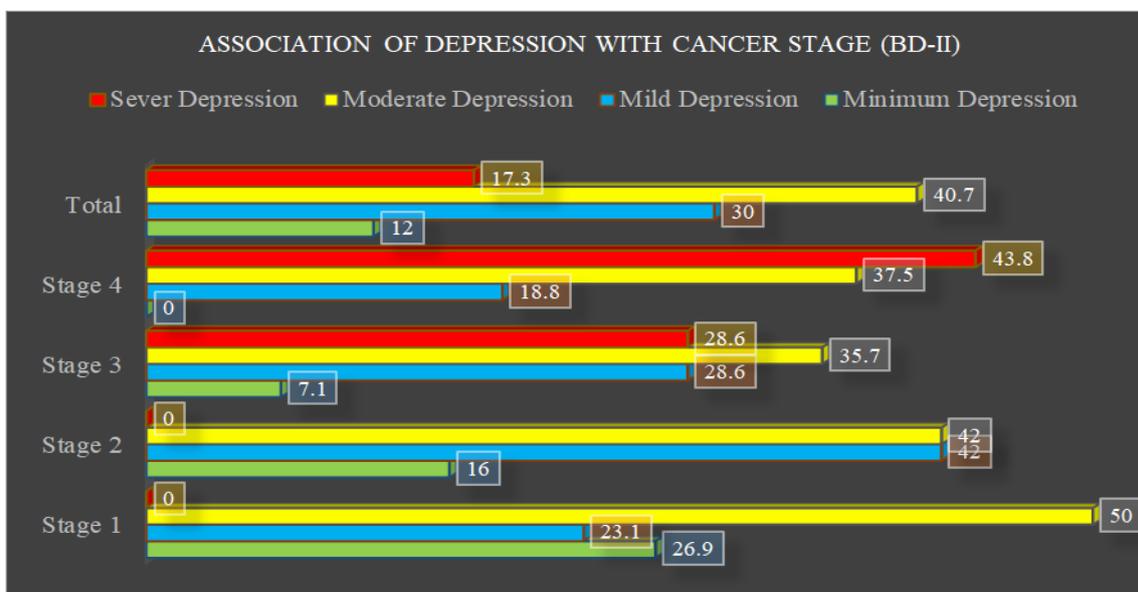


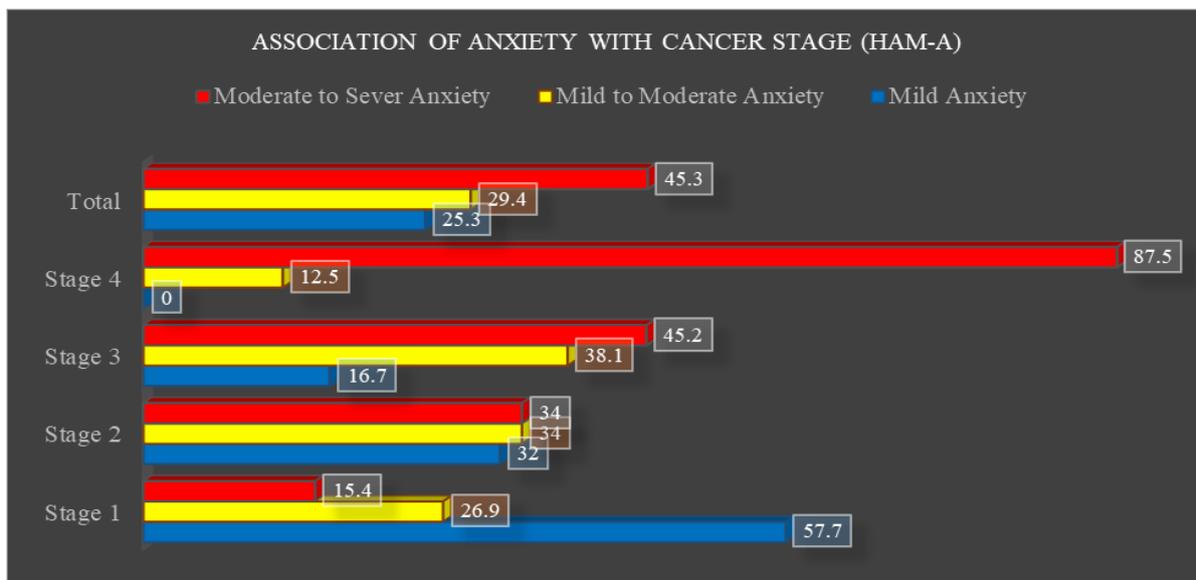
Figure IV: Association of depression with cancer stage (BD-II) among study respondents (N=150)

Table 7, showed the association of anxiety symptom with cancer stage. Among 32 patients with stage 4, maximum (87.5%) had moderate to severe anxiety symptom, among 42 patients with stage 3 maximum (45.2%) patients had moderate to severe

anxiety symptom, among stage 2 maximum (34.0%) had mild to moderate anxiety symptom. According to HAM-A rating scale, most of the stage 4 cancer patients had severe anxiety symptom.

**Table 7: Association of anxiety with cancer stage (HAM-A) (N=150)**

Cancer stage	n	Level of Anxiety			p-value
		Mild Anxiety	Mild to Moderate Anxiety	Moderate to Severe Anxiety	
Stage 1	26	15(57.7%)	7(26.9%)	4(15.4%)	<0.001 <sup>s</sup>
Stage 2	50	16(32.0%)	17(34.0%)	17(34.0%)	
Stage 3	42	7(16.7%)	16(38.1%)	19(45.2%)	
Stage 4	32	0(0.0%)	4(12.5%)	28(87.5%)	
Total (N)	150	38(25.3%)	44(29.4%)	68(45.3%)	



**Figure V: Association of anxiety with cancer stage (HAM-A) among study respondents (N=150)**

**DISCUSSION**

Cancer which causing a large number of deaths is a major public health problem. Most of the patients with cancer have psychological disorders and are in dire need of appropriate treatment. The mere knowledge of diagnosis with ongoing ambiguity regarding the course of illness add up to considerable distress. [10] Depression and anxiety are the commonest psychological problem among these patients. Till now very less attention has been paid to cancer patient’s mental status. Hence, this cross-sectional study was aimed to assess outcomes of Beck Depression Inventory II Scales (BDI-II) and Hamilton Anxiety Rating Scale (HAM-A) among patients of Cancer Center of Combined Military Hospital Dhaka, Bangladesh. According to the estimates from International Agency for Research on Cancer (IARC), in 2018 there were 17.0 million new cancer cases and 9.5 million cancer deaths worldwide. [11] Globally, nearly 1 in 6 deaths is due to cancer. In present study showed age variation ranged from 24-60 years. Among them 41.3% were

between 51-60 followed by 30.0% were within 41-50 years and 8.0% in age group 20-30 years. Mean age 46.5±9.5 years. Among 150 respondents, 65.3% were male and 34.7% respondents were female. Male: female ratio 1.9:1. There were significant relationships between anxiety, depression symptoms and the age group of the patients (p<0.001 and p<0.001, respectively) with higher frequency in older ages. There were no significant relationships between anxiety and depression symptom with sex (p>0.05). In agreement with this a study by Nikkbakhsh et al. [12] reported significant association between anxiety, depression with age group and no significant relationship with sex. Jadoon et al. [13] reported a significant association between psychological morbidity and age with patients of age up to 40 years having a higher likelihood of suffering from depression and anxiety. The most frequent cancer related symptom is “depression” which worsens with chemotherapy and persists for a long time even after completion of chemotherapy. It also manifests with recurrence of

disease and ultimately is an independent prognostic factor in morbidity and mortality. The National Cancer Institute report (2008) suggests that 15-25% of cancer patients are affected by depression. [11] Cancer related depression is a pathological affective response to loss of normality and one's personal life as a result of cancer diagnosis, treatment and impending complications. [14] A study found that 66% of cancer patients had depression and anxiety among them. [13] Several studies have indicated that such depression and anxiety not only causes great suffering but also diminishes the quality of life, amplifies pain and other symptoms, decreases adherence to anti-cancer treatment, leads to suicide and acts as a psychological burden on the family. [15] In present study showed 40.7% had moderate depression symptom followed by 30.0% patients had mild depression symptom, 17.3% patients had severe depression symptom and 12.0% patients had minimum depression symptom. The overall mean score of Beck Depression score was  $22.1 \pm 8.4$  with range 5 to 45. Vaidya et al. [16] revealed that among the study subjects 15.78% had borderline clinical depression, 46.31% had moderate depression and 11.57% had severe depression. Swastika and Anupama [17] reported level of depression in cancer patients 40% are in mild depression, 34% are in Moderate depression, 24% are in normal stage and 2% are in severe depression. Polikandrioti et al. [18] in their study noted that 21.5% patients had mild depression, 10.2% had moderate depression and 0.6% had severe depression. These variations in the prevalence of depression can be due to use of different scales, different study population and different study setting. In present study showed the type of anxiety of cancer patients, maximum 45.3% had moderate to severe anxiety symptoms followed by 29.3% patients had mild to moderate anxiety symptom, 25.3% patients had minimum anxiety symptoms. The overall mean score of Hamilton Anxiety Rating Scale (HAM-A) was  $21.6 \pm 6.7$  with range 7 to 30. Naser et al. [19] reported moderate anxiety in 18.0% and 20.0% had severe anxiety. Nikkbakhsh et al. [12] reported 29.3% patients had mild anxiety, 16.7% symptomatic moderate anxiety. So it shows that result from our study is very close to other similar studies. According to the present study, cancer stage 2 in 33.3% cases, 28.0% patients stage 3, 21.3% patients had stage 4 and stage 1 in 17.3% cases. Among 32 patients with stage 4, maximum 43.8% had severe depression symptom, among 42 patients with stage 3 maximum 35.7% patients had moderate depression symptom, among stage 2 maximum 84.0% had mild to moderate depression symptom. Significant relation was found among cancer stage with level of depression symptom ( $p < 0.05$ ). Among 32 patients with stage 4, maximum 87.5% had moderate to severe anxiety

symptom, among 42 patients with stage 3 maximum 45.2% patients had moderate to severe anxiety symptom, among stage 2 maximum 34.0% had mild to moderate anxiety symptom. Significant relation was found among cancer stage with level of anxiety symptom ( $p < 0.05$ ). In consonance with present study Khalil et al. [20] reported 25(8.3%) having stage 1 cancer, 33(11%) having stage 2, 35(11.7%) having stage 3, 24(8%) having stage 4, and 183 (61%) not knowing what their cancer stage was. Mushtaq et al. [11] demonstrated the frequency of depression was more in stage III as compare to stage I and II, and the results were statistically significant. Stage of cancer influencing depression and anxiety to provide a basis for subsequent correlational studies on psychological interventions. In accordance Alagizy et al. [21] reported about half (31.8%) of early disease patients (stages I and II) had moderate to severe depression, 26.2% moderate to severe anxiety, and 36% moderate to severe stress, while 68.2% of advanced disease patients (stage III and IV) had moderate to severe depression, 73.8% moderate to severe anxiety, and 64% moderate to severe stress. In present study showed common co-morbidities were peptic ulcer disease 40.0%, diabetes 34.7%, rheumatic disease 24.0%, hypertension 22.0% etc. Nanjaiah et al. [22] regarding type of cancer, maximum patients (20.7%) had breast cancer followed cervical cancer 14.7% and gallbladder cancer 12.7% and lung cancer 11.3%. Khattak et al. [23] reported cancer types included were Leukemia (27.3%), GI malignancies (12.2%), Lymphoma (10.2%), Sarcoma (6.8%), Breast tumors (5.9%) and others were 37.6% All people with cancer has depression and anxiety symptoms at some level. In this study depression was scored by Bengali version of Beck Depression Inventory II Scales (BDI-II), a 21 items questionnaire score ranges from 0 to 63 with higher scores indicating more severe depressive symptoms. In this study 88% among 150 cancer patients had depression symptoms. In agreement with this study Vaidya et al. (2019) [24] reported the proportion of depression was found to be quite high (73.69%) as compared to most of the other studies conducted by Bhattacharyya et al. (2017) 55.7%. [25] Another study by Jadoon et al. (2010) who found the prevalence of depression to be 66%. [26] There can be number of reasons for this difference. In most of the cases in developed countries study showed lower mental illness prevalence compared to developing and poor countries. In our study most of the population are from average income group and from urban area who are cautious about their health and seeking best possible treatment. In present study showed the type of anxiety of cancer patients, maximum 45.3% had moderate to severe anxiety symptoms followed by 29.3% patients had mild to

moderate anxiety symptom, 25.3% patients had minimum anxiety symptoms. The overall mean score of Hamilton Anxiety Rating Scale (HAM-A) was 21.6±6.7 with range 7 to 30. Naser *et al*. [27] reported moderate anxiety in 18.0% and 20.0% had severe anxiety. Nikkbakhsh *et al*. [28] reported 29.3% patients had mild anxiety, 16.7% symptomatic moderate anxiety.

## CONCLUSION

Depression is common in cancer patients. Cancer patients face anguish and a horrible death. Sadness and grief are natural responses to the crises that illness brings. The most important thing to remember is that sadness and anxiety are treatable conditions. Cancer causes a significant amount of psychological morbidity. The impact of cancer produces a great deal of psychiatric morbidity. Psychiatrists can play very important role in an integrated oncology treatment team by providing specialized treatment which will not only reduce psychiatric morbidity but also result in improvement in overall quality of life of cancer patients. Though the Beck Depression Inventory (BDI) and the Hamilton Depression Rating Scale (HAMD) which is vice versa with equipercetile linking are the most frequently used observer-rated and self-report scales of depression, respectively, but it is important to know what a given total score or a change score from baseline on one scale means in relation to the other scale.

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