Sapporo Medical Journal
Volume 55, Issue 02, February, 2021

The Prevalence of Depression among Cancer Patients and Their Caregivers: A Cross-Sectional,Single Center Study

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Abstract— **Background:** Our aim was to determine the prevalence of depression and anxiety in cancer patients and to correlate depression and anxiety in the patients and their caregivers. **Methods:** This was a cross-sectional study conductedfrom1st of March 2013 to30th of May 2015. Cancer patients and their caregivers seen in the outpatient clinics and day care unit of King Abdulaziz University Hospital in Jeddah, Saudi Arabia, were included in the study. The data was collected by questionnaires using the Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder(GAD-7) screening tools for depression and anxiety disorder, respectively. Consent was obtained from all participants. The data were analyzed using Statistical Package for the Social Sciences. Descriptive and comparative analyses were done using frequency, chi-square, and Cohen's kappa. **Results:** The total study population was 294 participants (147 patients and 147 caregivers). Depression and anxiety were found in 72.2% and 66% of patients and 66% and 42.8% of caregivers, respectively. Agreement between patients and caregivers was statistically significant for many points of the questionnaires(*P*-value <0.05). **Conclusions:** In conclusion, the prevalence of depression and anxiety were high in both cancer patients and their caregivers. More attention should be directed toward detecting psychological changes in these vulnerable individuals. Routine screening along with social support should be included in clinical practice to improve the quality of patient care andtheir caregivers.

Keywords: Cancer, Depression, Anxiety disorder, caregivers

1. Introduction:

Depression is a common mental disorder estimated to affect 350 million people worldwide.It influences different aspects of the patient's life—physical, social, and financial—and it may lead to suicide.[1]

Cancer on its own is a leading cause of death,withannual cancer deaths increasing from 7.6 to 13 million.[2]Cancer also has devastating mental effects. The most common psychopathologies in cancer patients are depression and anxiety,[3,4]which are disabling disorders on their own that can also have a detrimental influence on other aspects of the patient's life. In a study conducted at three oncology centers,Derogatis et al. showed that approximately 85% of the cancer patients with a positive mental condition were experiencing a disorder with depression or anxiety as the central symptom.[5]

The continuous increase in the number of cancer patients has increased the interest in cancer-related issues like pain, fatigue, and mental disorders. Many studies discussed the common mental disorders in cancer patients,such as depression, anxiety, and adjustment disorders, and there has been great interest in the diagnosis of depressive disorders in outpatient or hospitalized cancer patients.[6,7]Other studies examined the monitoring of symptoms after diagnosis, and still others went deeper and discussed the treatment of depression in cancer patients.[8,9]Previous studies also focused on the psychological status of cancer patients and evaluatedthe sociodemographic variables that make cancer patients more susceptible to depression.[10]

Studying depression in cancer patients is essential because comorbid illnesses complicate the treatment of both conditions and may lead to poor adherence to treatment and less desirable outcomes. The number of people who will be affected by cancer will increase to include partners, family members, friends, and most importantly the caregivers. Many cancer patients are treated as outpatients rather than inpatients, so the burden on the caregiver has increased. The caregivers of patients with cancer experiencehigh levels of anxiety and depression,[11,12] and they also suffer from lower life satisfaction and poorer physical health compared with those of non-caregivers.[13]A study conducted at the University of Texas Health Science Center in 2011 showed that the caregivers of cancer patients had a greater prevalence and severity of affective symptoms, such as sadness and distress, than the patients themselves.[14]In fact,family caregivers with anxiety or depression were at a high risk of suicide.[15]Caregivers often experience a decline in physical health, personal welfare, and well-being as different aspects of their life are affected while caring for a cancer patient, including disturbed sleep,[16]a sense of fatigue, and the impact of the care on their daily schedule,[17] which may affect their overall productivity. A study in Iran in 2012 reported that the changes in the patient's mental condition could also influence family members and resultedin inactivation of any productive actions.[18]

Many studies have evaluated the burden of caregivers of patients with chronic diseases such as stroke and dementia; however, the burden of family members of cancer patients has not been evaluated in depth.[19]The well-being of both cancer patients and their caregivers and family members is an important topic to study, as it may contribute to the prognosis of the patient's illness and alsoassure a healthy psychological, physical, and social life for the caregiver. Currently, there are limited studies evaluating the prevalence and correlation of depression or their relevance to the quality of life of the cancer patient caregivers in Saudi Arabia. The aim of the current study was to determine the prevalence of depression and the relationship between depression in cancer patients and depression in their caregivers in a single center at Jeddah, Saudi Arabia.

Primary objective:

The primary objective was to determine the prevalence of depression in cancer patients and caregivers at King Abdulaziz University Hospital.

Secondary objectives:

The secondary objectives were to obtain objective data on the type and frequency of mental disorders in cancer patients and to correlatethe frequency of depression with sociodemographic data.

2. Methods:

This was a descriptive, cross-sectional study that was carried out during the period from March 2013 to May 2015. The participants were selected by convenience method from King Abdulaziz University Hospital, Jeddah, Saudi Arabia. A total of 147 participants were sought for the current study. We included cancer patients seen in the outpatient clinic and day care unit during the study period and their caregivers. The caregivers had to be providing care for adult patients with cancer and willing to participate in this study. All participants agreed to participate and signed an informed consent form approved by the Research Ethics Committee of the University Faculty of Medicine.

Data were collected by distributing the Patient Health Questionnaire (PHQ), a self-administered version of the screening instrument PRIME-MD (Primary Care Evaluation of Mental Disorders). The PHQ-9 is the depression module, which scores each of the nine DSM-IV criteria from "0" (not at all) to "3" (nearly every day), and has been validated.[20,21]The Generalized Anxiety Disorder (GAD-7) score was calculated by assigning scores of 0, 1, 2, and 3 to the response categories of "not at all," "several days," "more than half the days," and "nearly every day," respectively, and adding together the scores for the seven questions.Scores of 5, 10, and 15 were taken as the cutoff points for mild, moderate, and severe anxiety, respectively. These questionnaires were completed by both the cancer patients and their caregivers. The questionnaires also included items regarding sociodemographic data (age, income, marital status, educational level, and employment status), type and location of the cancer, and the management plan. A written informed consent was obtained from both the patient and

their caregiver.Ethics approval obtained from the Research Ethics Committee of the University Faculty of Medicine, King Abdulaziz University, as well as all relevant guidelines and regulations.
The data were coded and entered into the statistical computer program Statistical Package for the Social Sciences(SPSS) version 20.0.
Descriptive analysis was done for all data to obtain means, standard deviations, frequencies, and percentages. Comparative analysis was done by using chi-square and Cohen’s kappa.

3. Results:

Distribution of the patients according to nationality:

The study included 147 patients and 147 caregivers. Table 1 shows the distribution of the patients according to their nationality. Of all patients, 30.6% were Saudi and 69.4% were non-Saudi.

Table 1: Distribution of the patients according to their nationality.

Nationality	Number	Percent
Saudi	45	30.6
Non-Saudi	102	69.4
Total	147	100.0

The non-Saudipatient nationalities are summarized in Table 2. There were 17non-Saudi nationalities, of which the most frequent were Yemeni (20.4%), Syrian (9.5%), Pilipino (6.5%), and Egyptian (5.4%).

Table 2: Distribution of non-Saudipatients according to their nationalities

	Nationality	Number	Percent of Total Participants	Percent of Total Non-Saudi
	Saudi	45	30.6	
				Non-Saudi
1	Yemeni	30	20.4	29.4
2	Syrian	14	9.5	13.7
3	Pilipino	10	6.8	9.8
4	Egyptian	8	5.4	7.84
5	Eritrean	6	4.1	5.88
6	Palestinian	6	4.1	5.88
7	Pakistani	5	3.4	4.9

8	Sudanese	5	3.4	4.9
9	Bangladeshi	3	2.0	2.94
10	Chadian	3	2.0	2.94
11	Ethiopian	3	2.0	2.94
12	Indian	3	2.0	2.94
13	Jordanian	2	1.4	1.96
14	Chinese	1	0.7	0.98
15	Malaysian	1	0.7	0.98
16	Moroccan	1	0.7	0.98
17	Nigerian	1	0.7	0.98
	Total	147	100.0	

Distribution of the patients according to sex:

Table 3 shows that the 42 Saudi female patients constituted 93.3% of the Saudi patients, 35.9% of the female patients, and 28.6% of all patients, whereas the three Saudi male patientsrepresented 6.7% of the Saudi patients, 10.0% of the male patients, and only 2.0% of all patients. In the total population, 20.4% were male and79.6% were female.

Table 3: Distribution of the patients according to sex

Nationality		Sex		Total
		Male	Female	
Saudi	Number	3	42	45
	% within Nationality	6.7%	93.3%	100.0%
	% within sex	10.0%	35.9%	30.6%
	% of Total	2.0%	28.6%	30.6%
Non-Saudi	Number	27	75	102
	% within Nationality	26.5%	73.5%	100.0%
	% within sex	90.0%	64.1%	69.4%

	% of Total	18.4%	51.0%	69.4%
Total	Number	30	117	147
	% within sex	100.0%	100.0%	100.0%
	% of Total	20.4%	79.6%	100.0%

Distribution of the patients according to age:

The patient distribution according to age is shown in Table 4; more than half (50.3%) of all patients were between 46 and 60 years of age. Patients aged <36 years were 12.9% and those aged >75 years were only 0.7% of all patients.

Table 4: Distribution of the patients according to age.

	Nationality	Age (years)							Total
		<18	18-25	26-35	36-45	46-60	61-75	76-85	%
Saudi	Number	0	0	0	12	25	7	1	45
	% within Nationality	.0%	.0%	.0%	26.7%	55.6%	15.6%	2.2%	100.0
	% within Age	.0%	.0%	.0%	38.7%	33.8%	31.8%	100.0	30.6
	% of Total	.0%	.0%	.0%	8.2%	17.0%	4.8%	.7%	30.6
Non-Saudi	Number	8	5	6	19	49	15	0	102
	% within Nationality	7.8%	4.9%	5.9%	18.6%	48.0%	14.7%	.0%	100.0
	% within Age	100.0	100.0	100.0	61.3%	66.2%	68.2%	.0%	69.4
	% of Total	5.4%	3.4%	4.1%	12.9%	33.3%	10.2%	.0%	69.4
Total	Number	8	5	6	31	74	22	1	147
	% within Age	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	% of Total	5.4%	3.4%	4.1%	21.1%	50.3%	15.0%	0.7%	100.0

Distribution of the patients according to theirmarital status:

The marital status distribution is represented in Table 5. Most (71.4%) of the patients were married (33.3% of whom were Saudi and 66.7% of whom were non-Saudi patients), and 4.8% were divorced (42.9% of whom were Saudi and 57.1% of whom were non-Saudi).

Table 5: Distribution of the patients according to theirmarital status

Nationality		Marital Status				Total
		Single	Married	Divorced	Widow	
Saudi	Number	4	35	3	3	45
	% Within Nationality	8.9%	77.8%	6.7%	6.7%	100.0%
	% of Total	2.7%	23.8%	2.0%	2.0%	30.6%
Non-Saudi	Number	18	70	4	10	102
	% within Nationality	17.6%	68.6%	3.9%	9.8%	100.0%
	% of Total	12.2%	47.6%	2.8%	6.8%	69.4%
Total	Number	22	105	7	13	147
	% within Nationality	15.0%	71.4%	4.8%	8.8%	100.0%
	% within Marital Status	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	15.0%	71.4%	4.8%	8.8%	100.0%

Distribution of the patients according to known chronic illnesses:

Table 6shows thatonly 51(34.7%) of all cancer patients had known chronic illnesses; of these 51 patients,35.30% had both diabetes mellitus (DM) and hypertension (HTN), 31.37% had HTNonly, 22.45% had DM only, and 5.88% had congestive heart failure (CHF).

Table 6: Distribution of the patients according to known chronic illnesses

Known Chronic Illness	Number	Percent of Total (n = 147)	Percent of Known Chronic Illness (n = 51)
DM alone	14	9.5	27.45
HTN alone	16	10.9	31.37
Both DM & HTN	18	12.2	35.30
CHF	3	2.0	5.88
No known chronic illnesses	91	61.9	
Other illnesses	5	3.4	

Known Chronic Illness	Number	Percent of Total (n = 147)	Percent of Known Chronic Illness (n = 51)
DM alone	14	9.5	27.45
HTN alone	16	10.9	31.37
Both DM & HTN	18	12.2	35.30
CHF	3	2.0	5.88
No known chronic illnesses	91	61.9	
Other illnesses	5	3.4	
Total	147	100.0	100.0

According to the cross tabulation in Table 7, there was no significant association between nationality and chronic illness(chi-square = 1.924, df = 3, and *P* = 0.588).

Table 7: Nationality–chronic illness cross tabulation

Nationality		Chronic Illness				Total
		DM	HTN	CHF	DM &HTN	
Saudi	Number	3	5	1	8	17
	% within Nationality	17.6%	29.4%	5.9%	47.1%	100.0%
	% within Chronic Illness	21.4%	31.3%	33.3%	44.4%	33.3%
	% of Total	5.9%	9.8%	2.0%	15.7%	33.3%
Non-Saudi	Number	11	11	2	10	34
	% within Nationality	32.4%	32.4%	5.9%	29.4%	100.0%
	% within Chronic Illness	78.6%	68.8%	66.7%	55.6%	66.7%
	% of Total	21.6%	21.6%	3.9%	19.6%	66.7%
Total	Number	14	16	3	18	51
	% within Nationality	27.5%	31.4%	5.9%	35.3%	100.0%
	% within Chronic Illness	100.0%	100.0%	100.0%	100.0%	100.0%

	Nationality	Chronic Illness				Total
		DM	HTN	CHF	DM &HTN	
Saudi	Number	3	5	1	8	17
	% within Nationality	17.6%	29.4%	5.9%	47.1%	100.0%
	% within Chronic Illness	21.4%	31.3%	33.3%	44.4%	33.3%
	% of Total	5.9%	9.8%	2.0%	15.7%	33.3%
Non-Saudi	Number	11	11	2	10	34
	% within Nationality	32.4%	32.4%	5.9%	29.4%	100.0%
	% within Chronic Illness	78.6%	68.8%	66.7%	55.6%	66.7%
	% of Total	21.6%	21.6%	3.9%	19.6%	66.7%
Total	Number	14	16	3	18	51
	% within Nationality	27.5%	31.4%	5.9%	35.3%	100.0%
	% within Chronic Illness	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	27.5%	31.4%	5.9%	35.3%	100.0%

According to the cross tabulation in Table 8,there was no significant association between sex and chronic illness (chi-square = 1.311, df = 3, *P* = 0.727).

Table 8:Sex–chronic illness cross tabulation

	Sex	Chronic Illness				Total
		DM†	HTN‡	CHF§	DM &HTN	
Male	Number	3	3	0	5	11
	% within sex	27.3%	27.3%	.0%	45.5%	100.0%
	% within Chronic Illness	21.4%	18.8%	.0%	27.8%	21.6%
	% of Total	5.9%	5.9%	.0%	9.8%	21.6%
Female	Number	11	13	3	13	40
	% within sex	27.5%	32.5%	7.5%	32.5%	100.0%
	% within Chronic Illness	78.6%	81.3%	100.0%	72.2%	78.4%

	% of Total	21.6%	25.5%	5.9%	25.5%	78.4%
Total	Number	14	16	3	18	51
	% within sex	27.5%	31.4%	5.9%	35.3%	100.0%
	% within Chronic Illness	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	27.5%	31.4%	5.9%	35.3%	100.0%

[†]DM is diabetes mellitus.[‡]HTN is hypertension.[§]CHF is congestive heart failure

According to the cross tabulation in Table 9, there was no significant association between marital status and chronic illness (chi-square = 13.950, df = 3, *P* = 0.124).

Table 9: Marital status–chronic illness cross tabulation

Marital Status		Chronic Illness				Total
		DM[†]	HTN[‡]	CHF[§]	DM &HTN	
Single	Number	0	2	1	0	3
	% within Marital Status	.0%	66.7%	33.3%	.0%	100.0%
	% within Chronic Illness	.0%	12.5%	33.3%	.0%	5.9%
	% of Total	.0%	3.9%	2.0%	.0%	5.9%
Married	Number	13	10	2	14	39
	% within Marital Status	33.3%	25.6%	5.1%	35.9%	100.0%
	% within Chronic Illness	92.9%	62.5%	66.7%	77.8%	76.5%
	% of Total	25.5%	19.6%	3.9%	27.5%	76.5%
Divorced	Number	0	0	0	2	2
	% within Marital Status	.0%	.0%	.0%	100.0%	100.0%
	% within Chronic Illness	.0%	.0%	.0%	11.1%	3.9%
	% of Total	.0%	.0%	.0%	3.9%	3.9%
Widow	Number	1	4	0	2	7
	% within Marital Status	14.3%	57.1%	.0%	28.6%	100.0%

	% within Chronic Illness	7.1%	25.0%	.0%	11.1%	13.7%
	% of Total	2.0%	7.8%	.0%	3.9%	13.7%
Total	Number	14	16	3	18	51
	% within Marital Status	27.5%	31.4%	5.9%	35.3%	100.0%
	% within Chronic Illness	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	27.5%	31.4%	5.9%	35.3%	100.0%

[†]DM is diabetes mellitus.

[‡]HTN is hypertension.

[§]CHF is congestive heart failure

Distribution of the patients according to known mental illness:

Table 10shows the distribution of cancer patients according to known mental illness; 10.2% haddepression (8.2%) or anxiety (2.0%).

Table 10: Distribution of the patients according to known mental illness

Known Mental Illness	Numbery	Percent of all Patients (n = 147)	Percent of Known Mental Illness (n = 15)
Depression	12	8.2	80.0
Anxiety	3	2.0	20.0
Other	7	4.8	
No Known Mental Illness	125	85.0	
Total	147	100.0	100.0

Distribution of the patients according to their caregiver relationship

The distribution of the cancer patients according to their caregiver relationship was 83.0% were 1st degree relatives, 9.5% were 2nd degree, 3.4% were 3rd degree, and 4.1% were not related. (Table 11)

Table 11: Distribution of the patients according to theircaregiver relationship

Sex	Relative Degree of Caregiver	Total

		1st Degree	2nd Degree	3rd Degree	Not Related	
Male	Number	26	1	2	1	30
	% of Total	17.7%	0.7%	1.4%	0.7%	20.4%
Female	Number	96	13	3	5	117
	% of Total	65.3%	8.8%	2.0%	3.4%	79.6%
Total	Number	122	14	5	6	147
	% of Total	83.0%	9.5%	3.4%	4.1%	100.0%

PHQ-9 depression severity

This was calculated by assigning scores of 0, 1, 2, and 3 to the response categories of "not at all," "several days," "more than half the days," and "nearly every day," respectively. The PHQ-9 total score for the nine items ranged from 0 to 27. Scores of 5, 10, 15, and 20 representedcut points for mild, moderate, moderately severe, and severe depression, respectively. The PHQ-9 items were as follows:

	PHQ-9
1	Little interest or pleasure in doing things
2	Feeling down, depressed, irritable, or hopeless
3	Trouble falling or staying asleep, or sleeping too much
4	Feeling tired or having little energy
5	Poor appetite, weight loss, or overeating
6	Feeling bad about yourself—or feeling that you are a failure or have let yourself or your family down
7	Trouble concentrating on things, like school work, reading the newspaper, or watching TV
8	Moving or speaking so slowly that other people could have noticed.Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual
9	Thoughts that you would be better off dead, or of hurting yourself in some way

GAD-7 anxiety severity

This was calculated by assigning scores of 0, 1, 2, and 3 to the response categories of "not at all," "several days," "more than half the days," and "nearly every day," respectively. The GAD-7 total score for the seven items ranged from 0 to 21. Scores of 5, 10, and 15 representedcut points for mild, moderate, and severe anxiety, respectively. The GAD-7 items were as follows:

	GAD-7
1	Feeling nervous, anxious or on edge
2	Not being able to stop or control worrying

3	Worrying too much about different things
4	Trouble relaxing
5	Being so restless that it is hard to sit still
6	Becoming easily annoyed or irritable
7	Feeling afraid as if something awful might happen

Distribution of the patients according to theirPHQ-9 scores

Table 12 displays the PHQ-9 scoresfor thecancer patients. The highest score was 21, and 8.8% of the patients had a score of zero. Overall, 27.9% of the patients did nothave depression, 38.8% had mild depression, 25.9% had moderate depression, 6.1% had moderately severe depression, and 1.4% had severe depression.

Table 12: Distribution of the patients according to theirPatient Health Questionnaire (PHQ-9)scores

PHQ-9 Score for Cancer Patients				
		Score	Number	Percent
1	no depression	0–4	41	27.9
2	mild depression	5–9	57	38.8
3	moderate depression	10–14	38	25.9
4	moderately severe depression	15–19	9	6.1
5	severe depression	20–27	2	1.4
		Total	147	100.0

Distribution of the patients according to theirGAD-7scores

Table 13 displays the GAD-7 scoresfor the cancer patients; 11.6% of the patients had a score of zero, and the highest score was 21. Overall, 34.0% of the patients did not have anxiety, 40.1% had mild anxiety, 21.1% had moderate anxiety, and 4.8% had severe anxiety.

Table 13: Distribution of the patients according to theirGeneralized Anxiety Disorder (GAD-7)scores

GAD-7 Score for Cancer Patients				
		Score	Number	Percent
1	no anxiety	0–4	50	34.0
2	mild anxiety	5–9	59	40.1

3	moderate anxiety	10–14	31	21.1
4	severe anxiety	15–21	7	4.8
		Total	147	100.0

Distribution of the caregivers according to theirPHQ-9scores:

Table14 displays the PHQ-9 scores for thecaregivers. The highest score was 22, and 14.3% of the caregivers had a score of zero. Overall, 34.0% of the caregivers did nothave depression, 25.2% had mild depression, 21.1% had moderate depression, 16.3% had moderately severe depression, and 3.4% had severe depression.

Table 14: Distribution of the caregivers according to theirPatient Health Questionnaire (PHQ-9) scores

		PHQ-9 Score for Caregivers		
		Score	Number	Percent
1	no depression	0–4	50	34.0
2	mild depression	5–9	37	25.2
3	moderate depression	10–14	31	21.1
4	moderately severe depression	15–19	24	16.3
5	severe depression	20–27	5	3.4
		Total	147	100.0

Distribution of the caregivers according to theirGAD-7scores:

Table 15 displays the GAD-7 scores for the caregivers. The highest score was 20, and 18.4% of the caregivers had a score of zero. Overall, 57.1% of the caregivers did not have anxiety, 23.1% had mild anxiety, 13.6% had moderate anxiety, and 6.1% had severe anxiety.

Table 15: Distribution of the caregivers according to theirGeneralized Anxiety Disorder (GAD-7) scores

GAD-7 Score for the Caregivers				
Score			Number	Percent
1	no anxiety	0–4	84	57.1
2	mild anxiety	5–9	34	23.1

3	moderate anxiety	10–14	20	13.6
4	severe anxiety	15–21	9	6.1
Total			147	100.0

Distribution of the study sample according to what happened if a patient checked off any problem:

Table 16 displays the answers of the cancer patients and the caregivers on the question "What happened if a patient checked off any problem?" The comparison between the answers of the two groups shows that the answer "Not Difficult at all" had the highest percentage both forthe cancer patients (56.5%) and for the caregivers (54.4%). The answer "Extremely difficult" had the same percentage (4.1%) for the two groups.

Using the chi-square goodness-of-fit test to compare the observed and expected frequencies in each category to test that all categories contained the same proportion of values, we found *P*< 0.05;therefore, the observed and expected frequencies in each category were not the same.

Table 16:What happened if a patient checked off any problem?

If you checked off any problem	Cancer Patient		Caregiver	
	Number	Percent	Number	Percent
Not difficult at all	83	56.5	80	54.4
Somewhat difficult	39	26.5	47	32.0
Very difficult	19	12.9	14	9.5
Extremely difficult	6	4.1	6	4.1
Total	147	100.0	147	100.0
Expected number in each category	36.8		36.8	
Chi-Square	92.646		93.571	
Df	3		3	
P-value	0.000		0.000	

Relation between the cancer patients' and the caregivers' answers to the question "What happened if a patient checked off any problem?"

To determine if there was a significant relation between the cancer patients' and the caregivers' answers to the question "What happened if a patient checked off any problem?"Cohen's kappa "k" was used to measure the agreement between the evaluations of the two raters (cancer patientsand caregivers). The value of Cohen's kappa "k" was 0.084, standard error was 0.060, but *P* was 0.153. Because *P*was >0.05,there was a significant relation between the cancer patients' and the caregivers' answers to the question "What happened if a patient checked off any problem?"

Measuring the agreement between the evaluations of cancer patients and caregivers on rating the PHQ-9 score:

Cohen's kappa "k" was used to measure the agreement between the evaluations of the two raters (cancer patients and caregivers) when both were rating the same object (PHQ-9 score). A value of 1 indicated perfect agreement. A value of 0 indicated that agreement was no better than chance. Kappa was available only for tables in which both variables used the same category values and both variables had the same number of categories.

Table 17 reports the kappa values, standard error, *P*-value, and confidence interval (CI) for the nine items of the PHQ-9. The results show that:

- Items 2, 3, 5, 7, 8, and 9 had significant agreement betweenthe cancer patients and the caregivers ($P< 0.05$).
- Items 1, 4, and 6 did not have significant agreement betweenthe cancer patients and the caregivers ($P> 0.05$).
- The highest kappa value was 0.179 for rating item number 7 (Trouble concentrating on things, like school work, reading the newspaper, or watching TV).

Table 17:Kappa values for PHQ-9 items

	PHQ-9 Items	Kappa "k"	Standard Error	*P*-value	CI†
1	Little interest or pleasure in doing things	0.088	0.060	0.099	not sig.‡
2	Feeling down, depressed, irritable, or hopeless	0.175	0.058	0.001	0.061, 0.289
3	Trouble falling or staying asleep, or sleeping too much	0.149	0.052	0.004	0.047, 0.251
4	Feeling tired or having little energy	0.084	0.056	0.078	not sig.
5	Poor appetite, weight loss, or overeating	0.119	0.056	0.021	0.009, 0.229
6	Feeling bad about yourself—or feeling that you are a failure or have let yourself or your family down	0.107	0.056	0.063	not sig.
7	Trouble concentrating on things, like school work, reading the newspaper, or watching TV	0.179	0.059	0.001	0.063, 0.295
8	Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual	0.126	0.069	0.015	−0.009, 0.261
9	Thoughts that you would be better off dead, or of hurting yourself in some way	0.134	0.082	0.028	−0.027, 0.295

†CI is confidence interval.

‡not sig. is not significant

Measuring the agreement between the evaluations of the cancer patients and the caregivers on rating the GAD-7 score:

Table 18 reports thekappa value, standard error, *P*-value, and CI for the seven items of the GAD-7. The results show that:

- All items except item 5 had significant agreement betweenthe cancer patients and the caregivers ($P< 0.05$).
- The highest kappa value was 0.190 for rating item numbers 2 (Not being able to stop or control worrying) and 3 (Worrying too much about different things).

Table 18: Kappa values for GAD-7 Items

	GAD-7 Items	Kappa "k"	Standard Error	*P*-value	CI†
1	Feeling nervous, anxious, or on edge	0.143	0.057	0.005	0.031, 0.255
2	Not being able to stop or control worrying	0.190	0.061	0.001	0.070, 0.310
3	Worrying too much about different things	0.190	0.056	0.000	0.080, 0.300
4	Trouble relaxing	0.155	0.06	0.006	0.037, 0.273
5	Being so restless that it is hard to sit still	0.023	0.064	0.713	not sig.
6	Becoming easily annoyed or irritable	0.103	0.053	0.036	−0.001, 0.0207
7	Feeling afraid as if something awful might happen	0.162	0.058	0.004	0.048, 0.276

†CI is confidence interval

4. Discussion:

It is widely known that mental disorders in the form of anxiety and depression are highly prevalent among cancer patients as well as their primary caregivers. Moreover, they are frequently undiagnosed and untreated in most societies, possibly leading to appalling consequences, such as sleep disturbances, altered cognition, suicidal ideation, and loss of the hope that is essential for survival.[22–24]

In that context, both the patients' morbidity and mortality are profoundly impacted through different means, including deterioration of their quality of life and treatment noncompliance.[25,26] Some studies have proposed thatdepressionmay be implicated in cancerprogression or survival[27]; others concluded that accurate clinical assessment and treatment of these psychiatric disorders may have a powerful positive effect in those patients' quality of life.[28]

In our cross-sectional study, we found that 72.2% of the patients suffered from some degree of depression; the remaining 27.8 % were classified as non-clinically depressed.In our study, depression was defined as any score >5 on the PHQ-9 questionnaire. The scoring system was used in an inclusive way, scoring positively the somatic symptoms that could be related to oncological causes, such as fatigue, weight/appetite loss, and psychomotor retardation. Accordingly, the actual number of clinically depressed patients may be inflatedby not excluding any possible medically related symptoms.

These somatic symptoms can be explained by many physiological pathways in cancer patients, most importantly: pain that is the most common symptom, cancer treatments, metabolic and endocrine abnormalities includingelectrolyte imbalance and hormone dysfunction, and neurological abnormalities that could be due to a primary brain tumor or brain metastases.[28,29]Assessing depression in such patients can be problematic because of the overlap between the common symptoms of the patient's illness and the diagnostic symptoms of depression.[30]

Lie et al. used the same scoring system as in this study; they showed different depression prevalence rates in the same cancer population when applying different methods: inclusive 13.7%, exclusive 14.9%, and sum-score 45.3%.[30]However, this was not utilized in our study.

A similar study conducted in 2014 at the same center, King Abdulaziz University Hospital, revealed a depression prevalence of 30% in colon cancer patients by screening with the Structured Clinical Interview for Depression (SCID) and for depressive symptoms using the Hamilton Depression Rating Scale (HDRS).[31] This finding was not entirely representative of ours, possibly because of the inclusion of only one type of cancer in that study sample.

In our patient population, anxiety was assessed using the GAD-7 scoring system and defined as any score >5. The prevalence rate was 66% in the cancer patients; not surprisingly, this result was in agreement with the current literature. This finding was expected in such patients as shown in many studies, and a number of factors are responsible for this occurrence, including intrusive and obstructive thoughts, often involving fear of death, disability, or disease recurrence.[24,32]

In the current literature, there is a large variation in both the local and international prevalence of depression and anxiety in cancer patients, ranging from 9%–67%[33–36] and 6%–65%,[33,37–40] respectively; that variation could be attributed to multiple reasons, mainly differences in the method of assessment or cutoff scores, different population sizes, and different patient characteristics, such as type of cancer, staging, treatment, and patient age, as well as care settings, either hospitalization or outpatient management.

The figures in our study may be related to sex differences in this cross-sectional population, in which females represented almost 80% of the study sample. This was found to be significant in the study by Bergerot et al., the results of which suggested that females reported more distress, anxiety, and depression than males.[41]

One of the main purposes of our study was to draw attention to caregivers, who experience substantial psychological morbidity at the onset of the patient's illness; a longitudinal relationship was found between the level of depressive symptoms in caregivers and the number of patient symptoms reported.[42]

In our study, a significant number of primary caregivers and patients were screened and labeled as positive for anxiety and depression in comparison with the general Saudi population.[43,44]

The prevalence of depression in the primary caregivers was 66%, which was higher than the 49.9% in the general Saudi population reported by Al-Qadhi et al.[43] Furthermore, the prevalence of depression in the present study was similar to those reportedin previous studies conducted in Saudi,[45]which were generally higher than that reported in non-Saudi caregiver studies.[42,46]

These findings suggest that primary caregivers living in Saudi Arabia are emotionally vulnerable, and that screening for depression and the availability of assistance may be necessary in Saudi.

In this study sample, the prevalence of anxiety in the caregivers was 42.9%, which agreed withresults from previous studies that ranged from 20% to 40 %.[47] This result could be related to worrying about the future, managing with the situation, fear of loss and being alone, solitary responsibility for children, or unusual tasks at home.[48]

In contrast to the previous reports in the literature, the caregivers' psychological morbidity in the current study sample was less than that of the patients.[49–52] This discrepancy may be the result of differing study populations, sample sizes, research methods, or the high degree of heterogeneity in primary caregiver characteristics.

The results of the current study indicated a need for psychological support for numerous relatives caring for patients affected by different tumor types.

Particular attention was paid to the relation between the cancer patients'and the caregivers'answers to the question "What happened if a patient checked off any problem?" The agreement was measured when both were rating the same object on the GAD-7 score and the PHQ-9 score,and was statistically significant in this study sample with the highest value for rating PHQ-9 item no.7 (Trouble concentrating on things, like school work, reading the newspaper or watching TV) and GAD-7 item no.2 (Not being able to stop or control worrying) and no. 3 (Worrying too much about different things).

The most likely explanation for this result is that the psychological illnesses of the patients were affecting the primary caregivers, meaning that anxiety and depression in patients and caregivers are correlated.[46]

Key limitations of this study were that the assessment of both anxiety and depression were in the form of self-report, not a clinical evaluation, and the inclusive application of the PHQ-9 did not account for the possibility of overlap between cancer-related symptoms and depression diagnostic symptoms. An exclusive method might have revealed a different prevalence rate in this population. Lastly, the cross-sectional nature of the studycould result in a biased sample. A longitudinal study may overcome the sample distribution dilemma.

5. Conclusion

In conclusion, the prevalence of depression and anxiety were high in both cancer patients and their primary caregivers in King Abdulaziz University Hospital. More attention should be directed toward detecting psychological changes in these vulnerable individuals. Routine screening along with social support should be included in clinical practice to improve the quality of patient care.

Further research in multiple centers is recommended in this demographic area for the purpose of generalization of the rate implicated in this study. Standardized definitions and methods of assessment are also recommended for screening and diagnosing such psychiatric disorders in cancer patients. Implementation of a separate tool that was specifically designed for caregivers of ill patients was also contemplated, and social awareness may aid in this situation.

6. References:

[1]. Marina Marcus M, Yasamy T, van Ommeren M, Chisholm D, Saxena S. Depression: A global public health concern; 2012.
[2]. World health statistics 2012: Global Health Observatory (GHO) data, Cancer Mortality and Morbidity. World Health Organization.
[3]. Arrieta O, Angulo LP, Núñez-Valencia C, Dorantes-Gallareta Y, Macedo EO, Martínez-López D, Alvarado S, Corona-Cruz JF, Oñate-Ocaña LF. Association of Depression and Anxiety on Quality of Life, Treatment Adherence, and Prognosis in patients with advanced non-small cell lung cancer. Ann Surg Oncol. 2013; 20:1941-8.
[4]. Pirl WF. Evidence report on the occurrence, assessment, and treatment of depression in cancer patients. J Natl Cancer Inst Monogr J Natl Cancer. 2004:32-9.

[5]. Derogatis LR, Morrow GR, Fetting J, Penman D, Piasetsky S, Schmale AM, Henrichs M, Carnicke CL. The prevalence of psychiatric disorders among cancer patients. JAMA. 1983;249:751-7.
[6]. Bukberg J, et al. Depression in hospitalized cancer patients. Psychosom Med. 1984; 46:199-212.
[7]. Massie MJ. Prevalence of depression in patients with cancer. J Natl Cancer Inst Monogr. 2004; 32:57-71.
[8]. Shi Q, Smith TG, Michonski JD, Stein KD, Kaw C, Cleeland CS. Symptom burden in cancer survivors 1 year after diagnosis: a report from the American Cancer Society's Studies of Cancer Survivors. Cancer. 2011; 117:2779-90.
[9]. Rodin G, Lloyd N, Katz M, Green E, Mackay JA, Wong RK, Supportive Care Guidelines Group of Cancer Care Ontario Program in Evidence-Based Care. The treatment of depression in cancer patients: a systematic review. Support Care Cancer. 2007; 15:123-36.
[10]. Luckett T, Goldstein D, Butow PN, Gebski V, Aldridge LJ, McGrane J, Ng W, King MT. Psychological morbidity and quality of life of ethnic minority patients with cancer: a systematic review and meta-analysis. Lancet Oncol. 2011; 12:1240-8.
[11]. Park B, Kim SY, Shin JY, Sanson-Fisher RW, Shin DW, Cho J, Park JH. Prevalence and predictors of anxiety and depression among family caregivers of cancer patients: a nationwide survey of patient-family caregiver dyads in Korea. Support Care Cancer Off J Multinat Assoc Support Care Cancer. 2013; 21:2799-807.
[12]. Moser MT, Künzler A, Nussbeck F, Bargetzi M, Znoj HJ. Higher emotional distress in female partners of cancer patients: prevalence and patient-partner interdependencies in a 3-year cohort. Psychooncology. 2013; 22:2693-701.
[13]. Haley WE, LaMonde LA, Han B, Narramore S, Schonwetter R. Family caregiving in hospice: effects on psychological and health functioning among spousal caregivers of hospice patients with lung cancer or dementia. Hosp J. 2001; 15:1-18.
[14]. Palos GR, Mendoza TR, Liao KP, Anderson KO, Garcia-Gonzalez A, Hahn K, Nazario A, Ramondetta LM, Valero V, Lynch GR, Jibaja-Weiss ML, Cleeland CS. Caregiver symptom burden: the risk of caring for an underserved patient with advanced cancer. Cancer. 2011; 117:1070-9.
[15]. Park B, Kim SY, Shin JY, Sanson-Fisher RW, Shin DW, Cho J, Park JH. Suicidal ideation and suicide attempts in anxious or depressed family caregivers of patients with cancer: A nationwide survey in Korea. PLOS ONE. 2013; 8:e60230.
[16]. Carter PA. Caregivers' descriptions of sleep changes and depressive symptoms. Oncol Nurs Forum. 2002; 29:1277-83.
[17]. Jensen S, Given BA. Fatigue affecting family caregivers of cancer patients. Cancer Nurs. 1991; 14:181-7.
[18]. HeidariGorji MA, Bouzar Z, Haghshenas M, Kasaeeyan AA, Sadeghi MR, Ardebil MD. Quality of life and depression in caregivers of patients with breast cancer. BMC Res Notes. 2012; 5:310.
[19]. Lim SM, Kim HC, Lee S. 'Psychosocial Impact of Cancer Patients on Their Family Members.' Cancer Res Treat Cancer Research and Treatment. Cancer Res Treat. 2013;45:226-33.
[20]. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001;16:606-13.
[21]. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006;166:1092-7.
[22]. Rhee YS, Yun YH, Park S, Shin DO, Lee KM, Yoo HJ, Kim JH, Kim SO, Lee R, Lee YO, Kim NS. Depression in family caregivers of cancer patients: the feeling of burden as a predictor of depression. J Clin Oncol. 2008; 26:5890-5.
[23]. Centers for Disease Control and Prevention. Depression [internet]. Centers for disease control and prevention; 2014 [cited Sep 19 2015]. Available from: http://www.cdc.gov/mentalhealth/basics/mental-illness/depression.htm.
[24]. Stark DP, House A. Anxiety in cancer patients. Br J Cancer. 2000; 83:1261-7.
[25]. Dauchy S, Dolbeault S, Reich M. Depression in cancer patients. EJC Suppl. 2013; 11:205-15.

[26]. DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. Arch Intern Med. 2000; 160:2101-7.

[27]. Giese-Davis J, Collie K, Rancourt KM, Neri E, Kraemer HC, Spiegel D. Decrease in depression symptoms is associated with longer survival in patients with metastatic breast cancer: a secondary analysis. J Clin Oncol. 2011; 29:413-20.

[28]. Winell J, Roth AJ. Depression in cancer patients. Oncol Williston Park. 2004; 18:1554-60; discussion 61-2.

[29]. Winell J, Roth AJ. Psychiatric assessment and symptom management in elderly cancer patients. Oncol Williston Park. 2005; 19:1479-90; discussion 92, 97, 501-7.

[30]. Lie HC, Hjermstad MJ, Fayers P, Finset A, Kaasa S, Loge JH, European Palliative Care Research Collaborative (EPCRC). Depression in advanced cancer--assessment challenges and associations with disease load. J Affect Disord. 2015;173:176-84.

[31]. Shaheen Al Ahwal M, Al Zaben F, Khalifa DA, Sehlo MG, Ahmad RG, Koenig HG. Depression in patients with colorectal cancer in Saudi Arabia. Psychooncology. 2015; 24:1043-50.

[32]. Vahdaninia M, Omidvari S, Montazeri A. What do predict anxiety and depression in breast cancer patients? A follow-up study. Soc Psychiatry Psychiatr Epidemiol. 2010; 45:355-61.

[33]. Aass N, Fosså SD, Dahl AA, Moe TJ. Prevalence of anxiety and depression in cancer patients seen at the Norwegian Radium Hospital. Eur J Cancer. 1997;33:1597-604.

[34]. Krebber AM, Buffart LM, Kleijn G, Riepma IC, de Bree R, Leemans CR, Becker A, Brug J, van Straten A, Cuijpers P, Verdonck-de Leeuw IM. Prevalence of depression in cancer patients: a meta-analysis of diagnostic interviews and self-report instruments. Psychooncology. 2014;23:121-30.

[35]. Massie MJ. Prevalence of depression in patients with cancer. J Natl Cancer Inst Monogr. 2004;32:57-71.

[36]. Hong JS, Tian J. Prevalence of anxiety and depression and their risk factors in Chinese cancer patients. Support Care Cancer. 2014;22:453-9.

[37]. Clinton-McHarg T, Carey M, Sanson-Fisher R, Tzelepis F, Bryant J, Williamson A. Anxiety and depression among haematological cancer patients attending treatment centres: prevalence and predictors. J Affect Disord. 2014;165:176-81.

[38]. Mehnert A, Koch U, Schulz H, Wegscheider K, Weis J, Faller H, Keller M, Brähler E, Härter M. Prevalence of mental disorders, psychosocial distress and need for psychosocial support in cancer patients - study protocol of an epidemiological multi-center study. BMC Psychiatry. 2012;12:70.

[39]. Tan SM, Beck KR, Li H, Lim EC, Krishna LK. Depression and anxiety in cancer patients in a Tertiary General Hospital in Singapore. Asian J Psychiatr. 2014;8:33-7.

[40]. Yang YL, Liu L, Wang XX, Wang Y, Wang L. Prevalence and associated positive psychological variables of depression and anxiety among Chinese cervical cancer patients: a cross-sectional study. PLOS ONE. 2014;9:e94804.

[41]. Bergerot CD, Clark KL, Nonino A, Waliany S, Buso MM, Loscalzo M. Course of distress, anxiety, and depression in hematological cancer patients: association between gender and grade of neoplasm. Palliat Support Care. 2015;13:115-23.

[42]. Braun M, Mikulincer M, Rydall A, Walsh A, Rodin G. Hidden morbidity in cancer: spouse caregivers. J Clin Oncol. 2007;25:4829-34.

[43]. Al-Qadhi W, Ur Rahman S, Ferwana MS, Abdulmajeed IA. Adult depression screening in Saudi primary care: prevalence, instrument and cost. BMC Psychiatry. 2014;14:190.

[44]. Al-Shehri SZ, Sabra AA, Taha AZ, Khamis AH, Hafez AS. Depression and anxiety among males attending Primary Health Care Centers, Eastern Saudi Arabia: prevalence and predictors. Life Sci J. 2012; 9.

[45]. Alibrahim OA, Al-Sadat N, Elawad NA. Gender and risk of depression in Saudi Arabia, a systematic review and meta-analysis; 1. J Public Health Afr. 2010;1:e7.

[46]. Grunfeld E, Coyle D, Whelan T, Clinch J, Reyno L, Earle CC, Willan A, Viola R, Coristine M, Janz T, Glossop R. Family caregiver burden: results of a longitudinal study of breast cancer patients and their principal caregivers. CMAJ. 2004;170:1795-801.

[47]. Swore Fletcher BA, Dodd MJ, Schumacher KL, Miaskowski C. Symptom experience of family caregivers of patients with cancer. Oncol Nurs Forum. 2008;35:E23-44.

[48]. Winterling J, Wasteson E, Arving C, Johansson B, Glimelius B, Nordin K. Factors associated with psychological distress and grief resolution in surviving spouses of patients with advanced gastrointestinal cancer. Support Care Cancer. 2010;18:1377-84.

[49]. Weitzner MA, McMillan SC, Jacobsen PB. Family caregiver quality of life: differences between curative and palliative cancer treatment settings. J Pain Symptom Manag. 1999;17:418-28.

[50]. McMillan SC. Quality of life of primary caregivers of hospice patients with cancer. Cancer Pract. 1996;4:191-8.

[51]. Nijboer C, Tempelaar R, Sanderman R, Triemstra M, van Spruijt RJ, van den Bos GA. Cancer and caregiving: the impact on the caregiver's health. Psychooncology. 1998;7:3-13.

[52]. Hinds C. The needs of families who care for patients with cancer at home: are we meeting them? J Adv Nurs. 1985;10:575-81.