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Relation of cancer: Related fatigue with depression and functional status among elderly patients undergoing radiotherapy

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Abstract
Background: Cancer related fatigue, depression and functional dependence are among a confusing array of symptoms which commonly presented in the patients undergoing cancer treatment. These symptoms especially fatigue still largely ignored in older adults, hence, identifying these symptoms and analyzing the correlation which can be exist may have a special concern and are considering important cues for effective management of these symptoms.
Aim: To determine the relation of cancer related fatigue with depression and functional status among elderly patients undergoing radiotherapy.
Method: This is a descriptive correlational study designcarried on 120 elderly cancer patients that were attending the outpatient of the Oncology Department, Enam Medical College & Hospital, Dhaka, Bangladesh and were undergoing radiotherapy, patients were interviewed individually by the researcher to collect data using the study tools; Tool-I: Interview questionnaire sheet, Tool-II: Revised Piper Fatigue Scale, Tool-III: Geriatric Depression Scale –short form, Tool-IV: Katz and Akpom scale, and Tool-V: Lawton and Brody scale.
Results: Fatigue was positively correlated with depression and Katz scale for activity of daily livings; the higher fatigue was associated with higher depression and lower independency level. Also, there was a positive moderate correlation between depression and functional dependence in anactivity of daily livings.
Conclusion: Fatigue, depression, and functional dependence are commonly and correlated symptoms in elderly cancer patients undergoing radiotherapy.

Keywords: cancer, cancer related fatigue, depression, elderly patients, functional status, radiotherapy

1. Introduction

Now a day, cancer is a major health burden worldwide. An estimated 12.7 million new cancer cases occurred with 7.6 million deaths (around 13% of all deaths). Incidence and mortality rates of most cancers are increasing in several less developed countries due to adoption of unhealthy lifestyles like smoking, physical inactivity and consumption of calorie-dense food. In the 1960s, almost 25% of global cancer burden was diagnosed in low-income and lower middle-income countries. In 2010, nearly 55% of the global cancer burden was found in these countries. By 2030, over 9 million cancer patients are assumed to die in developing countries. Globally, the number of older adults with cancer is rapidly growing and it is expected to increase significantly [1]. In the USA, over 60 % of new cancer diagnoses and approximately 70 % of cancer mortality occur in patients aged 65 years and over [2]. This increase reflected both population growth and demographic change mainly due to ageing of population [3]. At the same time, the early diagnosis, improved treatment, and better supportive care have improved cancer survival rates in the United States [4], consequently, a greater number of elderly patients will become cancer survivors and these patients may have persistent side effects from cancer therapy and will need continued supportive care interventions [5]
. Elderly patients are more likely to have side effects of cancer therapy and often presents with age-related physiological changes in multiple organ systems andincreasing comorbidities, which predispose to fatigue [6].Cancer-related fatigue (CRF) is the most prevalent and distressing side effect of cancer and its treatment affecting both cancer patients and survivors [7]. Although it has been estimated that up to 70 % of elderly with cancer experience fatigue, this symptom is still largely ignored in ageing population [6]. CRF is more severe, persistent, and debilitating than normal fatigue which caused by lack of sleep or overexertion and it is not relieved by rest or sleep [8], therefore, the National Comprehensive Cancer Network(NCCN) define cancer related fatigue as "distressing persistent, subjective sense of physical, emotional and/or cognitive tiredness related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning" [9].Cancer related fatigue is a multi-factorial, hence, the development of fatigue can be influenced by a variety of contributing factors which includes demographic, medical, psychological, behavioral, andbiological factors. Being unmarried and having low income are considered a demographic factor for developing fatigue in some reports [10]. Additionally, especially in older adults, the other contributing factors as medical comorbidities, medications, nutritional issues, physical deconditioning, depression, and sleep disorder are also influence the development of fatigue [6, 10]. The exactly mechanism responsible for CRF are not yet completely understood but there are a variety of biological mechanisms have been proposed and investigated over the past two decades. These include cytokine dysregulation, hypothalamic pituitary-adrenal (HPA) axis dysregulation, five hydroxy tryptophan (5-HT) neurotransmitter dysfunction, alterations in adenosine triphosphate (ATP) and circadian rhythm

disruption [11]. The cytokinesdysregulation especially the pro-inflammatory cytokines is the most approved mechanism and has an empirical attention [10]. Cancer therapy and the tumor itself can contribute to elevated level of cytokine in plasma which results in increased level of fatigue via cytokine signaling in the central nervous system. Before a cancer therapy, thepro-inflammatory cytokines (PICS) as interlukin-1 (IL-1), IL-6, and tumor necrosis factor (TNF- α) are found in the micro environment of tumors, an increased level of these cytokines will lead to development of anemia, cachexia, anorexia and depression which having a role in developing CRF [12]. During a cancer treatment, the activation of these cytokinesis usually related to tissue damage from radiation or chemotherapy [10], these cytokines serves as a mediator for inflammatory response or sickness behavior through stimulating the brain to induce sickness feeling. Fatigue is one component of "sickness behavior" which defined as a coordinated set of adaptive behavioral changes that occur in patient with active infection or inflammation to promote survival. Patients with cancer usually complain of symptoms that may be similar to physiologic components of sickness behavior syndrome (SBS) that precipitated by infection or inflammation. Behavior symptoms of sickness may include pyrexia, general fatigue, decreased appetite, disturbance in sleep, diminished interest of activity, and cognitive impairment. These changes are caused by the release of inflammatory cytokines, therefor, the pro-inflammatory cytokines have an important role in developing fatigue [13, 14]. Also, it has been found that inflammation play a role in the development of depression [15], this is evidenced by Meszaros *et al*., (2012) and Iacovides & Andreoulakis, (2011), who demonstrated that patients with inflammatory disorders have elevated rates of depression comorbidity. Therefore, fatigue and depression have some similarity in its mechanism by which inflammation playing a role in developing both symptoms in cancer patients [15]. Fatigue and depression have been found to be highly correlated both in cancer patients and in cancer survivors [16]; depression is often a part of a cluster of interrelated symptoms, including fatigue and insomnia [17]. The high prevalence of depression in cancer patients make it a particular concern especially in elderly [18], which ranged from 16%-26% in oncology elderly patients. The identification of depression in elderly is challenging and it usually unrecognized and untreated. This under recognition may be related to certain factors, it may be due to an older adult tend to hide their affective symptoms like sadness and instead presenting with fatigue and decreased initiation. Another factor is that the health care professionals considers the depression is normal part of aging [19, 20]. Although fatigue and depression are heterogeneous symptoms and can be measured independently, both symptoms can be overlapped; lack of energy and feeling weakness is one of a diagnostic criterion that confirming depression. Understanding the factors that can independently cause fatigue and/or depression, and the nature of relationship between two these symptoms have a particular concern [21]. Cancer-related fatigue adversely affects psychological, social, and physical well-being, it impairs usual functioning and inter feres with patient's ability to perform their daily activities. Additionally, fatigue and depression may act synergistically among cancer patients resulted in deterioration in the quality of life and impaired functional status [15]. The older adults with cancer have a profound negative impact on their functional status; it was attributed to physiological changes that affects musculoskeletal system [22], moreover, comorbidity and chronic musculoskeletal diseases that more prevalent in elderly are common causes of disability, which complicating the optimal functioning [23].Functional status is the ability of persons to ambulate and perform daily living activities to meet their basic needs, fulfill usual roles, and maintain their independency [24]. Level of physical activity can be influenced by fatigue in which patients presenting with sever fatigue are usually less active and more dependent. Thus, assessment of functional status and CRF is an important aspect to plan an intervention program in order to improving physical activity that can help in preserving functional status and minimizing cancer fatigue [25]. As large number of cancer patients regularly attends Enam Medical college Hospital, Dhaka, Bangladesh this study may reflect representative data about the national cancer scenario in our country.

2. Aim of the study

To determine the relation of cancer related fatigue with depression and functional status among elderly patients undergoing radiotherapy.

3. Materials and methods

This is a descriptive correlational study design carried on 120 elderly cancer patients that were attending the outpatient of the Oncology Department, Enam Medical College & Hospital, Dhaka, Bangladesh and were undergoing radiotherapy, patients were interviewed individually by the researcher to collect data using the study tools; Tool-I : Interview questionnaire sheet, Tool-II: Revised Piper Fatigue Scale, Tool-III: Geriatric Depression Scale –short form, Tool-IV: Katz and Akpom scale, and Tool-V: Lawton and Brody scale.

3.1. Subjects

A Purposive sample of one hundred and twenty (120) elderly cancer patients collected within a period of three months (from the 1st of May to the 1st of August, 2018), aged 50 years and above, attending the above mentioned setting, scheduled to receiving radiotherapy, and able to communicate. Those who diagnosed with a psychiatric or neurological disorder, or having sever organ failure were excluded from the study sample.

Tools

Five tools were used to collect data for this study:

1. Tool Interview questionnaire sheet

This tool was designed by the researcherand includedthree parts.

Part one: the demographic characteristics of the older adults such as age, sex, marital status, level of education living condition and place of residence.

Part two: includes clinical data as medical history of chronic diseases.

Part three: Disease related characteristics which include cancer type, treatment type, number of radiation sessions, and side effects of radiotherapy.

2. Tool The Revised Piper fatigue scale (PFS-R)

It is a multidimensional self-report instrument that is widely used for assessing cancer related fatigue in cancer patients, and developed by Piper *et al*., 1998 [26]. The scale consists of 22 numerical items using a 0-10 numeric scale while 0 represent no fatigue and 10 represent a maximum fatigue, and

five additional open ended questions related to the temporal dimension of fatigue, its perceived cause, effect, relief, and additional symptoms but not included in the scoring. These 22 items divided into four subscales which measure four dimensions of fatigue: behavioral/severity (6 items), affective meaning (5 items), sensory (5 items), and cognitive/mental (6 items). The severity codes are: none (0), mild (1-3), moderate (4-6) and severe (7-10).

3. Tool Geriatric Depression Scale (GDS-SF) short form

It is an effective tool used for screening and assessment of depression in older adults and developed by Sheikh and Yesavage, 1986 [27]. The scale consists of 15 questions with "yes" or "no" answers which focused on mood rather than physical symptoms. It was modified from the long form scale (30-item) to focus on items with the highest correlation to depressive symptoms in validation studies. Of the 15 items, assign one point (1) for questions number (1, 5, 7, 11, 13) when answered negatively and assign one point (1) for the rest of questions when answered positively. The scores are added and categorized as the following: No depression: 0-4; mild: 5-8; moderate: 9-11; and severe: 12-15.

4. Tool Katz and Akpom scale

Katz scale is frequently used in clinical practice as a part of a comprehensive geriatric assessment (CGA) to measure patient's ability to perform the basic activity of daily living (ADL) independently. It was developed by Katz and Akpom, 1976 [28], and consists of six items including bathing, dressing, toileting, transferring, continence, and feeding. These six different items were measured and scored according to the patient's actual performance of these functions. Each item was scored from 1 to 3; where 1 indicates full independence, 2 indicates that the patient need assistance, and3indicates total dependence. The score of each item was added to obtain the total score and patients were categorized as the following: totally dependent: patient who scored 13 to 18 points, partially dependent: patient who scored 7 to 12 points, and independent: patients who scored 6 points.

5. Tool Lawton and Brody Scale

The Lawton Instrumental Activities of Daily Living Scale (IADL) is an appropriate instrument to assess independent living skills especially in older adults. It was developed by Lawton and Brody, 1969 [29] and consists of eight items which considered more complex than ADLs. It includes ability to use telephone, shopping, food preparation, housekeeping, laundry, transportation, responsibility for own medication and handling finances. The areas of food preparation, housekeeping, laundering are excluded for men. Each item was scored from one to three; score 3 indicate that the patient can perform the task without any assistance, score 2 indicate that the patient need some help to perform the task and score 1 indicate that the patient unable to perform the task at all. The total score of the scale range from 8-24 point and patients can be categorized as the following; independent: patients who scored 21-24, partially dependent: patients who scored 13-20, and totally dependent: patients who scored 8 12.

Statistical Analysis

Data entry and statistical analysis were done using Windows SPSS version 20.0. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, means and standard deviations for quantitative normally distributed variables, while medians and ranges were used for quantitative not normally distributed variables. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables. Statistical significance was considered at p-value ≤0.05.

4. Results

[Table-1] shows the socio-demographic characteristics of the studied subjects, the age of studied elders ranged from 50 to 67 with a mean age of 54.1±4.7 years. Females constituted 55.0% of the study subjects while males constituted 45.0%. Regarding the marital status, the majority of patients (83.3%) were married and 16.7% of them were widows or divorced. Concerning the residence of the studied elders, the majority of them (85%) were living in rural areas and 15% in urban areas. Regarding the level of education, about half of the studied sample (51.7%) were illiterate and 29.2 % of them were able to read and write As regards to patient's occupation before retirement, 45% of studied elders were housewives, while workers and farmers constituted 44.2% of study sample The rest of the patient (10.8%) were employee. In relation to living condition, about three quarter of studied elders (74.2%) living with spouse and kids while 18.3% of them living with one of sibling.

Table 1: Distribution of the elderly cancer patients according to their demographic characteristics (N=120)

Items	No= (120)	%
Age (In years)		
40-49 yrs	77	64.2
50+	43	35.8
Mean±SD (Min-Max)	54.1±4.7 (50.0-67.0)	
Gender:		
Male	54	45.0
Female	66	55.0
Residence:	102	85.0
Rural	102	85.0
Urban	18	15.0
Unmarried (divorced/widow)	20	16.7
Married	100	83.3
Education		
Illiterate	62	51.7
Read/write	35	29.2
Basic/intermediate	18	15.0
University	5	4.2
Occupation before retirement:		
Employee	13	10.8
Worker/farmers	53	44.2
Unemployed/housewife	54	45.0
Living condition		
With spouse	9	7.5
With spouse and kids	89	74.2
With one of sibling	22	18.3

Table 2: Distribution of elderly patients according to their medical history and disease related characteristics (N=120)

Items	No= (120)	%
Having other chronic disease		
Yes	75	62.5
No	45	37.5
Diseases: @		
Hypertension	29	24.2
Diabetes	24	20.0
Musculoskeletal disease	24	20.0
Cardiac disease	19	15.8
Other (renal, GIT, Respiratory)	27	22.5
Diagnosis (cancer): @		
Breast	42	35.0
Lung	11	9.2
Gastrointestinal	11	9.2
Lymphoma / Gynecological	18	15
Prostate / Urinary bladder	18	16.6
Endocrine/ Oropharyngeal	10	8.4
Others (Bone, Sarcomas, Skin)	10	8.3
Site of radiotherapy:		
Pelvi-abdominal	46	38.3
Breast	36	30.0
Head and neck	25	20.9
Chest	9	7.5
Thigh / Lower back	4	3.3
No. of sessions:		
Less than 10 sessions	37	30.8
More than 10 sessions	83	69.2
Have gastrointestinal (GI) side effects		
Yes	118	98.3
No	2	1.7
Have skin side effects		
Yes	76	63.3
No	44	36.7
Other side effects: @		
Fatigue	110	91.6
Insomnia	86	71.7
Weight loss	54	45.0
Chest pain	32	26.7
Dysuria	31	25.8
Pyrexia	1	0.8
@) Not mutually exclusive		

[Table-2] shows the distribution of elderly cancer patients according to their medical history and disease related characteristics, the table shows that more than half of the studied sample (62.5%) suffered from other chronic disease and the hypertension was most frequently disease reported by the studied sample which represent 24.2% of the studied elders, while diabetes mellitus was found in 20%. Concerning the cancer type, breast cancer was more prevailing among the studied elders which constituted 35% followed by lung and gastrointestinal cancer which constituted the same percentage (9.2%).As for the duration of cancer, more than half of study sample (53.3%) diagnosed with cancer for more than six months, While 46.7% of them diagnosed within less than six months. Regarding the site of radiation, 38.3% of the study sample received radiation at pelvic/abdominal site, 30% at breast site and 19.2% at head and neck site. In relation to number of radiation sessions, slightly more than tow third (69.2%) of study sample received more than ten sessions, while the rest of them (30.8%) received less than ten sessions. Concerning the radiation side effects, the majority of studied elders (98.3%) were suffering from gastrointestinal side effects, while more than half (63.3%) were suffering from skin side effects. Regarding the other side effects, fatigue and insomnia were more reported which constituted 91.6% and 71.7% respectively.

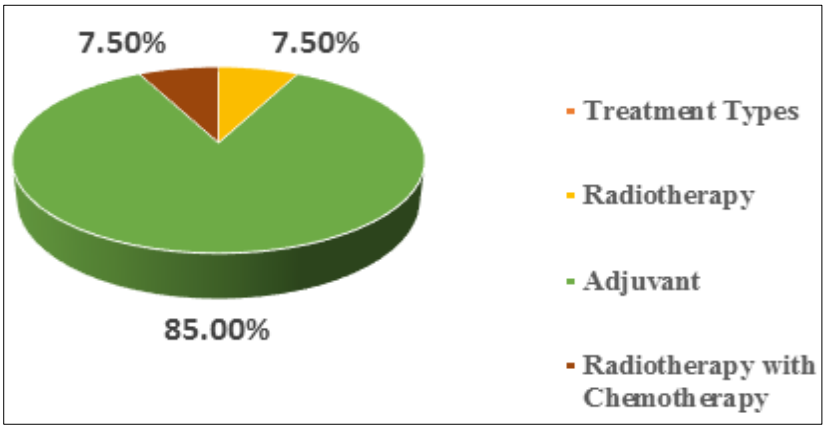

Fig 1: Distribution of the elderly cancer patients according to the treatment types.

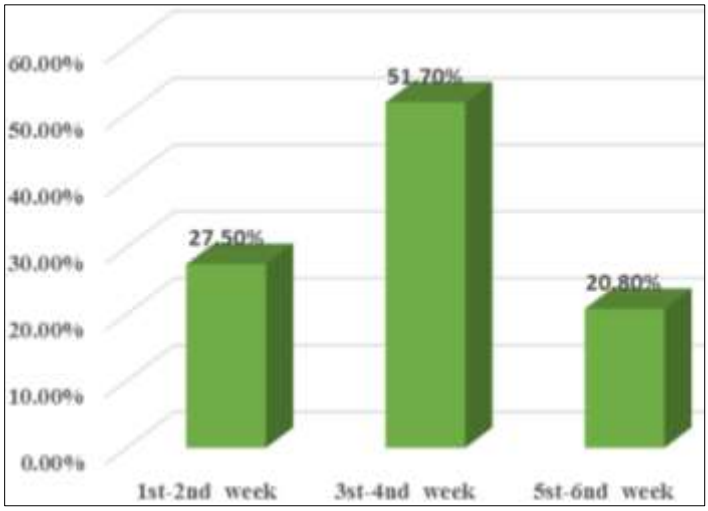

Fig 2: Distribution of the elderly cancer patients according to start of radiotherapy from weeks.

[Figure-1] show the distribution of the elderly cancer patients according to the treatment types. The figure shows that the majority of studied elders (85%) were undergoing to adjuvant radiotherapy. [Figure-2] show the distribution of the elderly cancer patients according to start of radiotherapy from weeks. The figure shows that patients who were in 1st -2nd week of radiation sessions constituted 27.5% of studied elders, while slightly more than half (51.7%) were in 3rd - 4th week and 20.8% of them were in 5th - 6th week.

Table 3: Symptoms severity (fatigue, depression) and level of independency among the elderly cancer patients (N=120)

Items	N=120	%
Fatigue		
Mild	10	8.3
Moderate	106	88.3
Severe	4	3.3
Depressio		
Mild	77	64.2
Moderate	43	35.8
TotalKatz		
Independent	61	50.8
Partially dependent	59	49.2
Total Lawton		
Dependent	88	73.3
Independent	32	26.7

[Table-3] shows symptoms severity and level of independence in elderly cancer patients, concerning the fatigue level, the majority of studied elders (88.3%) were moderately fatigued, 8.3% were mild and 3.3% were severe. In relation to depression severity, more than half of studied elders (64.2%) were suffering from mild depression, while the rest of them (35.8%) were suffering from moderate depression. Regarding the level of independence, slightly more than half (50.8%) of the study sample were independent, while the rest of them (49.2%) were partially dependent in their activity of daily living (ADLs), while more than two third (73.3%) of the study sample were partially dependent, and the rest of them (26.7%) were independent in their instrumental activity of daily living (IADLs).

Table 4: The correlation matrix of elderly cancer patients' fatigue, depression and functional status (N=120)

Items	Spearman's rank correlation coefficient		
	Fatigue	Depression	Katz(ADLs)
Fatigue			
Depression	.45**		
Katz	.334**	.503**	
Lawton	0.04	-0.11	-362**

(**) Statistically significant at p<0.01

[Table-4] shows the correlation matrix of elderly cancer patients" fatigue, depression and functional status, this table show moderate positive and significant correlation between fatigue and depression (r =. 45**), and between fatigue and activity of daily livings according to Katz scale (r =.334**).It was observed that there was moderate positive and significant

correlation between depression and activity of daily livings according to Katz scale (r =. 503**);this positive correlation means that higher depression significantly correlated with more dependency level, and a moderate negative correlation between Katz and Lawton scale (r =.-.362**); the higher score in Katz means more dependency, while in Lawton means more independency and this explained the negative correlation.

5. Discussion

Neoplastic diseases will soon be the leading cause of death in North America and Western Europe [5]. The incidence of cancer increases exponentially with age; therefore, cancer is considered the disease of the elderly [30], and the elderly cancer patients may face greater treatment related toxicities due to the aging [31]. One of the most prevalent and distressing symptoms associated with cancer and its treatment is cancer related fatigue (CRF) [32]. During a cancer therapy, fatigue can affect the patient‟s ability to tolerate treatment and may result in treatment discontinuation, as well as, it can interfere with activity of daily livings, interfere with usual functioning and diminishes the quality of life [33]. In the present study, the major characteristics of the studied elders were young old, female, married, illiterate, and house wives. Regarding the age, it is considered the major risk factor for many cancers and older adults make up the largest segment of the cancer population [34]. In this study, the majority of elders were young old with a mean age of 64.1±4.7. This can be attributed to the treatment type in which the majority of studied elders were received radiation as an adjuvant treatment especially after a surgery, a surgery options usually omitted in very old or frail elderly due to the higher complication that may occur. These finding are in line with the finding of studies conductedin Canada and Jordan by Koo *et al*., (2012), and Ahmed and al Gamal, (2014), who revealed that the average age of elderly patients was 65±12 years, and 63.4 years old respectively [35, 36]. This is in contrast with the finding of a study conducted in France by Corre *et al* (2016) who found that the median age was 77 years old in the elderly with Advanced Non–Small Cell Lung Cancer [37]. As for sex, females constituted more than one half of the study subjects. This may be attributed to the fact that certain types of cancers are associated with gender like breast cancer, which more common in females and constituted more than one third of study sample. This is in line with the finding of a study conducted in USA by Hurria et al., (2011),and a study conducted in Mexico by Zepeda *et al*., (2016), which reveals that females were constituted more than one half of the study sample [38, 39]. These finding are in contrast with a studies in Portugal and California by Silveira *et al*.,(2011), and Miaskowski *et al*., (2011), who reported that male was more prevailing in their studies [40, 41]. In relation to presence of other chronic disease, hypertension was reported by almost one quarter of the studied elders followed by diabetes mellitus. This result may be attributed to the fact that advancing age is usually associated with presence of numbers of chronic disease and comorbidities. These findings are in line with a study conducted in a china by Yong *et al*. (2012), and a study conducted in Thailand by Chindaprasirt *et al*., (2014), which reported that the hypertension was the most common chronic disease in cancer patients [42, 43]. As for cancer type, the probability of developing breast cancer increases with ageing which more than 50% of breast cancer cases diagnosed in women older than 65 years old [44]. In the current study, breast cancer was the commonest type of cancer which reported by more than one third of the study subjects, this may be explained by the fact that radiation therapy is standardly offered after breast-conserving surgery (BCS) or when regional lymph nodes are involved. After lumpectomy, adjuvant radiotherapy considers a standard of care [45]. This result is in line with a study by Magdy, (2015), and a study by Tag elmelok, (2015), in Egypt, el Mansoura which found that breast cancer was more prevalent in their studies [46, 47]. Radiotherapy-induced fatigue is a common early and long-lasting side effect of radiation therapy which usually underestimated [48]. In the current study, more than three quarter of the study subjects had a moderate fatigue level according to the revised piper fatigue scale with a total mean score 5.5±1.0. This may be attributed to the majority of patients in this study were in a third and fourth week of radiation therapy and fatigue tend to increase after the second week of treatment. This finding agrees with Borneman *et al*., (2011), and with I wase *et al*., (2015), who reported that moderate fatigue was more prevailing among their study subjects [49, 50]. This finding is in contrast with Kim *et al*., (2013), who reported that majority of women undergoing radiation therapy for breast cancer had a mild fatigue score on PFS [51]. Fatigue and depression are usually associated symptoms (10), in elderly cancer patients, depression may be related to specific health risks as longer hospital stay and increase mortality rates [15]. In this study, nearly two third of the study subjects had a mild depression according to geriatric depression scale-short form (GDS-SF).This finding agrees with Frazzetto *et al*., (2012),who reported that nearly half of elderly breast cancer patients and survivors were mild depressed [52]. In contrast, a study done in India by Kroenke *et al*., (2010), who found that the mean score of depression was 1.64 on a 0-4 scale of Hopkins Symptom Checklist (SCL) depression scale, which represent moderate depression [53]. CRF has a considerable negative impact on normal functioning, it interferes with patient‟s ability to perform normal daily activities and overall quality of life [54]. In the current study, according to Katz scale, slightly more than half of the study subjects were independent while the rest were partially dependent in their activity of daily living (ADLs). According to Lawton scale for instrumental activity of daily living (IADLs), nearly three quarter of patients were partially dependent while the rest were independent. The more limitation in IADLs may be attributed to the fact that these activities are more complex than ADLs, another explanation is that females were more prevailing in this study, which hada responsibility of food preparation, laundry and housekeeping tasks. These finding supported by Gironés *et al*., (2010), who reported that the majority of breast cancer survivors were independent in ADL while found more limitation in IADLs as the majority were partially dependent. In this context, Kim *et al*., (2011), reported that the majority of Korean elderly cancer patients were independent in their ADls and IADLs [55, 56]. Fatigue and depression are strongly correlated in cancer populations. The association between two these variables is complex; fatigue is a symptom of depression, but may also precipitate depressed mood due to interference with social, occupational, and leisure activities [10]. The finding of this study approved that a moderate positive and significant correlation between fatigue and depression; the higher fatigue was associated with higher depression. Fatigue can lead to functional limitation making the patients less active and more dependent on caregiver, this absolutely had a negative impact

on psychological status of the patients and precipitate depression. This finding is in line with other studies in Iran and United States, Vahdaninia *et al*., (2010) and Brown *et al*., (2013), who demonstrated that there was a strong positive and significant correlation between fatigue and depression [57, 58]. Functional status is also another important concern which usually affected by fatigue and aging process [59].The present study tests the association between fatigue and functional ability in terms of activity of daily living (ADL) and instrumental activity of daily living (IADL), the results revealed that a statistically significant and a moderate positive correlation between fatigue and Katz score for ADL; the higher score in Katz scale means more dependency, hence, higher fatigue was significantly correlated with more dependency in ADLs. This finding agrees with Cheng and Lee, (2010), who assess effect of fatigue on functional status in older adults with cancer using Karnofsky performance scale (KPS) for functional status and symptoms distress scale (SDS-C) for fatigue and other symptoms, they found a negative moderate correlation between KPS and fatigue. Lower score in KPS means lower functional status, so that, the correlation was negative which means that the patients scored higher fatigue experience lower functional status [17]. Also, Rotonda *et al*., (2013), Who studied the factors associated with fatigue after surgery in breast cancer women and concluded that an increase in fatigue score was significantly correlated with decreased physical and role functioning [60]. In aging population, depressive symptoms can interfere with the elder‟s ability to perform the basic activity of daily living [61]. Therefore, the current study analyzed the associations between depression and functional status, it has been found that a significant and amoderate positive correlation between depression and Katz scale for ADLs. This means the higher depression score is significantly correlated with more dependency. Patients who are dependent in their basic activity usually need assistance and those patients appeared to perceive their dependency as a source of burden for their caregivers, this cause additional stress to the patient and become depressed. Another explanation of why depression and functional status were associated is that dependency on other usually related to loss of power over decision making and those patients were relying on other to decide on them behave on what and when to do most of things of their daily livings. The finding of this study is in line with Yagli *et al*., (2015), who suggested that depressive symptoms were worse among more sedentary patients with breast cancer and also found a negative correlation between physical activity level and psychological status in which women who were less active experience higher depression [62]. In the same context, Magyari *et al*., (2017), conducted a study to evaluate psychological distress and its risk factors among Hodgkin lymphoma survivors, their results revealed that psychological distress was significantly lower in active patients [63]. Moreover, Tejada *et al*., (2017), also concluded that colorectal cancer patients who are functionally independent may have better results in anxiety and depression at 1 year after surgery [64].

VI Conclusion and Recommendations

Based on findings of the present study, it can be concluded that majority of the studied elders reported a moderate fatigue, which significantly correlated with depression and basic activity of daily livings. Based on the finding of this study the following recommendations are suggested:- Counseling sessions should be offered to elderly patients, families and caregivers to encourage them to ask questions and provide the assistance in a form that they can understand. The individual counseling is recommended to each patient in order to identify the potential risk factors of fatigue which can be important keys for its management. Development and application of educational program for elderly cancer patients involving an educational sessions and through use of brochures and written materials regarding the core information about cancer related fatigue and effective coping strategies, to improve patient's understanding to their fatigue level, to manage it early as possible, and to prevent it to get worse Supportive care interventions (exercise and psychosocial interventions) and treatment for other symptoms (depression) should be a part of a comprehensive management strategy for fatigue, the elderly cancer patients should be informed about such interventions through use of brochures and/or booklet distributed to each patients in the outpatient's clinics, this will help patients to participates in their care plan, making them controlled over their daily activity, and improves their sense of autonomy.

References

1. Bond SM, Bryant AL, Puts M. The evolution of gero-oncology nursing. In Seminars in oncology nursing. 2016; 32(1):3-15.
2. Magnuson A, Allore H, Cohen HJ, Mohile SG, Williams GR, Chapman A, *et al*. Geriatric assessment with management in cancer care: Current evidence and potential mechanisms for future research. Journal of geriatric oncology. 2016; 7(4):242-248.
3. Ibrahim AS, Khaled HM, Mikhail NN, Baraka H, Kamel H. Cancer incidence in Egypt: results of the national population-based cancer registry program. Journal of cancer epidemiology, 2014.
4. Lee C, Longo V. The Impact of Cancer Treatments on Aging. In Advances in Geroscience Springer International Publishing, 2016.
5. Koll T, Pergolotti M, Holmes HM, Pieters HC, van Londen GJ, Marcum ZA, *et al*. Supportive care in older adults with cancer: across the continuum. Current oncology reports. 2016; 18(8):1-10. https://doi.org/10.1007/s11912-016-0535-8
6. Giacalone A, Quitadamo D, Zanet E, Berretta M, Spina M, Tirelli U. Cancer-related fatigue in the elderly. Supportive Care in Cancer. 2013; 21(10):2899-2911.
7. Hodge FS, Itty TL, Cadogan MP, Martinez F, Pham A. The cultural constructs of cancer-related fatigue among American Indian cancer survivors. Supportive Care in Cancer. 2016; 24(3):1235-1240. https://doi.org/10.1007/s00520-015-2902-7
8. Corbett T, Groarke A, Walsh JC, McGuire BE. Cancer-related fatigue in post-treatment cancer survivors: application of the common sense model of illness representations. BMC Cancer. 2016; 16(1):919. https://doi.org/10.1186/s12885-016-2907-8
9. Jones JM, Olson K, Catton P, Catton CN, Fleshner NE, Krzyzanowska MK,*et al*. Cancer-related fatigue and associated disability in post-treatment cancer survivors. Journal of Cancer Survivorship. 2016; 10(1):51-61. https://doi.org/10.1007/s11764-015-0450-2
10. Bower JE. Cancer-related fatigue: mechanisms, risk factors, and treatments. Nature Reviews Clinical Oncology. 2014; 11(10):597-609.

11. Weis J. Cancer-related fatigue: prevalence, assessment and treatment strategies. Expert review of pharma coeconomics & outcomes research. 2011; 11(4):441-446.
12. Neefjes EC, van der Vorst MJ, Blauwhoff-Buskermolen, S, Verheul HM. Aiming for a better understanding and management of cancer-related fatigue. The oncologist. 2013; 18(10):1135-1143.
13. Weis J, Horneber M. Definition and prevalence of cancer-related fatigue. In Cancer-Related Fatigue Springer Healthcare Ltd, 2015, 1-10. https://doi.org/10.1007/978-1-907673-76-4_1
14. LaVoy ECP, Fagundes CP, Dantzer R. Exercise, inflammation, and fatigue in cancer survivors. Exercise Immunology Review. 2016; 22(713):82-92. https://doi.org/10.1016/j.rasd.2014.08.015.Social
15. Kruse JL, Strouse TB. Sick and tired: mood, fatigue, and inflammation in cancer. Current Psychiatry Reports. 2015; 17(3):555. https://doi.org/10.1007/s11920-015-0555-3
16. Romito F, Cormio C, Giotta F, Colucci G, Mattioli V. Quality of life, fatigue and depression in Italian long-term breast cancer survivors. Supportive Care in Cancer. 2012; 20(11):2941-2948. https://doi.org/10.1007/s00520-012-1424-9
17. Cheng KKF, Lee DTF. Effects of pain, fatigue, insomnia, and mood disturbance on functional status and quality of life of elderly patients with cancer. Critical Reviews in Oncology Hematology. 2011; 78(2):127-137. https://doi.org/10.1016/j.critrevonc.2010.03.002
18. Spoletini I, Gianni W, Repetto L, Bria P, Caltagirone C, Bossù P, *et al*. Depression and cancer: An unexplored and unresolved emergent issue in elderly patients. Critical Reviews in Oncology/Hematology. 2008; 65(2):143-155. https://doi.org/10.1016/j.critrevonc.2007.10.005
19. Weiss Wiesel TR, Nelson CJ, Tew WP, Hardt M, Mohile SG, Owusu C, *et al*. On behalf of the Cancer Aging Research G. The relationship between age, anxiety, and depression in older adults with cancer. Psychooncology, 2014. https://doi.org/10.1002/pon.3638
20. Deckx L, van den Akker M, Vergeer D, van Abbema D, van den Berkmortel, Franchette Linsen L, *et al*. The Value of Fatigue Severity to Rule Out Depression in Older Adult Patients With Cancer. Oncology Nursing Forum. 2015; 42(4):E302-E309. https://doi.org/10.1188/ 15.ONF. E302-E309
21. Brown LF, Kroenke K. Cancer-related fatigue and its associations with depression and anxiety: a systematic review. Psychosomatics. 2009; 50(5):440-447.
22. Tuna HD, Edeer AO, Malkoc M, Aksakoglu G. Effect of age and physical activity level on functional fitness in older adults. European review of aging and physical activity. 2009; 6(2):99.
23. Richardson J, Dal Bello-Haas V, Loyola-Sanchez A, MacDermid J, Sinclair S. Self-management of Function in Older Adults: The Contribution of Physical Therapy. Current Translational Geriatrics and Experimental Gerontology Reports. 2013; 2(4):215-229. https://doi.org/10.1007/s13670-013-0058-1
24. Hoffman AJ, von Eye A, Gift AG, Given BA, Given CW, Rothert M, *et al*. Testing a theoretical model of perceived self-efficacy for cancer-related fatigue self-management and optimal physical functional status. Nursing research. 2009; 58(1):32.
25. Luctkar-Flude M, Groll D, Woodend K, Tranmer J. Fatigue and Physical Activity in Older Patients with Cancer: A Six-Month Follow-Up Study. Oncology Nursing Forum. 2009; 36(2):194-202. https://doi.org/10.1188/09.ONF.194-202
26. Piper BF, Dibble SL, Dodd MJ, Weiss MC, Slaughter RE, Paul SM, *et al*. The revised Piper Fatigue Scale: psychometric evaluation in women with breast cancer. In Oncology nursing forum. 1998; 25(4):677-684.
27. Yesavage JA, Sheikh JI. 9/Geriatric depression scale (GDS) recent evidence and development of a shorter version. Clinical gerontologist. 1986; 5(1-2):165-173.
28. Katz S, Akpom CA. A measure of primary sociobiological functions. International journal of health services. 1976; 6(3):493-508.
29. Lawton MP, Browdy EM Assessment of older people: self-maintaining and instrumental activities of daily living.Gerontologist. 1969; 3(9):179-186.
30. He S, Sharpless NE. The Impact of Aging on Cancer Progression and Treatment. In Advances in Geroscience Springer International Publishing, 2016, 53-83.
31. Pang A, Ho S, Lee SC. Cancer physicians‟ attitude towards treatment of the elderly cancer patient in a developed Asian country. BMC geriatrics. 2013; 13(1):35.
32. Zombeck JA. Mechanisms of Cancer Related Fatigue. In Pathobiology of Cancer Regimen-Related Toxicities Springer New York, 2013, 217-232.
33. Peoples AR, Roscoe JA, Block RC, Heckler CE, Ryan JL, Mustian KM, *et al*. Nausea and disturbed sleep as predictors of cancer-related fatigue in breast cancer patients: a multicenter NCORP study. Supportive Care in Cancer. 2017; 25(4):1271-1278.
34. Clough-Gorr KM, Silliman RA. Epidemiology of Cancer and Aging. In The Epidemiology of Aging (pp. 377-399). Springer Netherlands, 2012.
35. Koo K, Zeng L, Chen E, Zhang L, Culleton S, Dennis K, *et al*. Do elderly patients with metastatic cancer have worse quality of life scores? Supportive Care in Cancer. 2012; 20(9):2121-2127. https://doi.org/10.1007/s00520-011-1322-6
36. Ahmad MM, Al-Gamal E. Predictors of cancer awareness among older adult individuals in Jordan. Asian Pacific Journal of Cancer Prevention. 2014; 15(24):10927-10932. https://doi.org/10.7314/APJCP.2014.15.24.10927
37. Corre R, Greillier L, Le Caër H, Audigier-Valette C, Baize N, Bérard H, *et al*. Use of a Comprehensive Geriatric Assessment for the Management of Elderly Patients with Advanced Non–Small-Cell Lung Cancer: The Phase, 2016, 3.
38. Randomized ESOGIA-GFPC-GECP 08-02 Study. Journal of Clinical Oncology, 34(13), 1476–1483. https://doi.org/10.1200/JCO.2015.63.5839
39. Hurria A, Togawa K, Mohile SG, Owusu C, Klepin HD, Gross CP, *et al*. Predicting chemotherapy toxicity in older adults with cancer: A prospective multicenter study. Journal of Clinical Oncology. 2011; 29(25):3457-3465. https://doi.org/10.1200/JCO.2011.34.7625
40. Pérez-Zepeda MU, Cárdenas-Cárdenas E, Cesari M, Navarrete-Reyes AP, Gutiérrez-Robledo LM. Cancer and frailty in older adults: a nested case-control study of the Mexican Health and Aging Study. Journal of Cancer

Survivorship. 2016; 10(4):736-742.
41. Silveira AP, Gon alves J, Sequeira T, Ribeiro C, Lopes C, Monteiro E,*et al*. Geriatric oncology: Comparing health related quality of life in head and neck cancer patients. Head and Neck Oncology. 2011; 3(1):1-8.
42. Miakowski C, Lee K, Dunn L, Dodd M, Aouizerat BE, West C, *et al*. Sleep wake circadian activity rhythm parameters and fatigue in oncology patients prior to initiation of radiation therapy. Cancer Nursing. 2011; 34(4): 255-268
43. Yang X, Wang L, He J, Ge C, Chang Y, Fu J, *et al*. Factors related to depressive symptoms among Chinese caregivers of cancer patients. Psycho- Oncology. 2012; 21(10):1063-1070.
44. Chindaprasirt J, Limpawattana P, Pakkaratho P, Wirasorn K, Sookprasert A, Kongbunkiat K,*et al*. Burdens among caregivers of older adults with advanced cancer and risk factors. Asian Pac J Cancer Prev. 2014; 15(4):1643-1648.
45. Westphal T, Rinnerthaler G, Mlineritsch B. Adjuvant medical treatment for breast cancer in elderly and old women. Memo-Magazine of European Medical Oncology. 2016; 9(1):17-19.
46. Gosain R, Pollock YY, Jain D. Age-related Disparity: Breast Cancer in the Elderly. Current Oncology Reports. 2016; 18(11):1-9
47. Magdy S. Relationship between caregiver burden and psychological heath status of family caregiver caring for elderly patients with cancer. Unpublished Master thesis. Mansoura: University of Mansura. Faculty of Nursing, 2015.
48. Tag el Melok M. Coping behavior and health related quality of life of elderly cancer patients. Unpublished Master thesis. Mansura: Universty of Mansura.Faculty of Nursing, 2015.
49. Sourati A, Ameri A, Malekzadeh M. Fatigue. In: Acute Side Effects of Radiation Therapy, Springer International Publishing, 2017, 1-19.
50. Borneman T, Koczywas M, Sun V, Piper BF, Smith-Idell C, *et al*. Effectiveness of a Clinical Intervention to Eliminate Barriers to Pain and Fatigue Management in Oncology. Journal of Palliative Medicine, 2011; 14(2).
51. Iwase S, Kawaguchi T, Tokoro A, Yamada K, Kanai Y, Matsuda Y, *et al*. Assessment of cancer-related fatigue, pain, and quality of life in cancer patients at palliative care team referral: A multicenter observational study (JORTC PAL-09). PLoS ONE. 2015; 10(8):1-11.
52. Kim YH, Kim HJ, Ahn S, Do Seo YJ, Kim SH. Effects of meditation on anxiety, depression, fatigue, and quality of life of women undergoing radiation therapy for breast cancer. Complementary Therapies in Medicine. 2013; 21(4):379-387.
53. Frazzetto P, Vacante M, Malaguarnera M, Vinci E, Catalano F, Cataudella E, *et al*. Depression in older breast cancer survivors. BMC Surgery. 2012; 12(1):14-16.
54. Kroenke K, Theobald D, Wu J, Loza JK, Carpenter JS, Tu W, *et al*. The association of depression and pain with health-related quality of life, disability, and health care use in cancer patients. Journal of pain and symptom management. 2010; 40(3):327-341.
55. Purnell JQ, Mustian K, Jean-pierre P, Palesh O, Peppone LJ, Mohile SG, *et al*. The Psychosocial and Functional Impactof Radiation Therapy In: Adverse Late Effects of Cancer Treatment, Springer-Verlag Berlin Heidel bergm, 2014.
56. Gironés R, Torregrosa D, Díaz-Beveridge R. Comorbidity, disability and geriatric syndromes in elderly breast cancer survivors. Results of a single-center experience. Critical Reviews in Oncology/Hematology. 2010; 73(3):236-245.
57. Kim YJ, Kim JH, Park MS, Lee KW, Kim KI, Bang SM. Comprehensive geriatric assessment in Korean elderly cancer patients receiving chemotherapy. Journal of Cancer Research and Clinical Oncology. 2011; 137(5):839-847.
58. Vahdaninia M, Omidvari S, Montazeri A. What do predict anxiety and depression in breast cancer patients? A follow-up study. Social Psychiatry and Psychiatric Epidemiology. 2010; 45(3):355-361.
59. Brown LF, Rand KL, Bigatti SM, Stewart JC, Theobald DE, Wu J, Longitudinal relationships between fatigue and depression in cancer patients with depression and/or pain. Health Psychology. 2013; 32(12):1199.
60. Sprod LK, Fernandez ID, Janelsins MC, Peppone LJ, Atkins JN, Giguere J, *et al*. Effects of yoga on cancer-related fatigue and global side-effect burden in older cancer survivors. Journal of geriatric oncology. 2015; 6(1):8-14.
61. Rotonda C, Guillemin F, Bonnetain F, Velten M, Conroy T. Factors associated with fatigue after surgery in women with early-stage invasive breast cancer. The Oncologist. 2013; 18(4):467-75.
62. Covinsky KE, Yaffe K, Lindquist K, Cherkasova E, Yelin E, Blazer DG, *et al*. Depressive symptoms in middle age and the development of later-life functional limitations: The long-term effect of depressive symptoms. Journal of the American Geriatrics Society. 2010; 58(3):551-556.
63. Vardar-Yagli N, Sener G, Saglam M, Calik-Kutukcu E, Arikan H, Inal-Ince D, *et al*. Associations among physical activity, comorbidity, functional capacity, peripheral muscle strength and depression in breast cancer survivors. Asian Pacific Journal of Cancer Prevention. 2015; 16(2):585-589.
64. Magyari F, Kósa K, Berecz R, Illés A, Miltényi Z, Simon Z, *et al*. Employment status and health related quality of life among Hodgkin-lymphoma survivors"–results based on data from a major treatment center in Hungary. Health and quality of life outcomes. 2017; 15(1):180.
65. Gonzalez-Saenz de Tejada M, Bilbao A, Baré M, Briones E, Sarasqueta C. Quintana JM, *et al*. Association between social support, functional status, and change in health-related quality of life and changes in anxiety and depression in colorectal cancer patients. Psycho-oncology. 2017; 26(9):1263-1269.