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## The prevalence and correlates of depressive symptoms in patients with cancer treated in a Tertiary health care facility in Southern Sri Lanka

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### ABSTRACT

*Depression is a common co-morbidity of cancer. Further, depression and cancer are significant public health issues. Depressive symptoms are found to cause deterioration of quality of life (QoL), leading to physical disabilities/impairments, poor drug adherence, prolonged hospitalization, shortened survival time and risk of suicides. This study identified the prevalence of depressive symptoms and explored correlates of depressive symptoms among patients with cancer in Sri Lanka. A descriptive cross-sectional survey was conducted with a sample of 393 cancer patients undergoing treatment at a tertiary care hospital in Southern Sri Lanka. An interviewer-administered questionnaire and the Centre for Epidemiological Studies-Depression scale (CES-D) were used to collect information on prevalence and correlates of depressive symptoms. Basic descriptive statistics, independent t-test, and Pearson correlation coefficients were used in the statistical analysis. The mean age of the sample was 56 ±11.9 years and 59% were women. Elevated depressive symptoms (CES-D score ≥ 16) were found in 8.4% of the patients (95% CI: 5.3%, 10.7%). Patients who reported having any form of impairments scored high on CES-D, compared to those with no physical impairments ( $p < 0.01$ ). Patients with low income as well as those with low education had higher scores in CES-D scale. Depressive symptomatology appears to be a considerable health issue in this group. Correlates of depressive symptoms include poor income, low education level, and self-reported physical impairments; these correlates need to be considered in psychological interventions of patients with cancer.*

**KEYWORDS:** Cancer, CES-D, depressive symptoms, impairments, Sri Lanka

## 1 INTRODUCTION

Incidence and mortality rates of cancer are rising worldwide, and a similar trend has been observed in Sri Lanka as well (Ministry of Healthcare and Nutrition 2017; Bray et al. 2018). According to the new Global Cancer data (GLOBOCAN), number of new cases and deaths were 19.2 million and 9.9 million in 2020, compared to new cases and deaths in 2018 which were 18.1 million and 9.6 million (GLOBOCAN 2020).

A cancer is a life-threatening and life-altering incident and carries both physical and psychological consequences (Smith 2015). Further, it creates a higher distress than non-malignant diseases with poorer prognoses. Higher distress of cancer patients may lead to anxiety, depression or both (Smith 2015). Depression is a common comorbidity found in nearly 10% cancer patients, and it also causes harmful consequences on the quality of life (QoL) (Tian 2009), survival rates (Smith 2015; Baraki, Tessema, & Demeke 2020), treatment adherence (Pitman 2018), repeated hospitalization (Prieto 2002), and suicidal ideation (Yousaf 2005).

The prevalence of depression of patients with cancer would be three times higher than the depression rate of general population (Linden 2012). Previous studies have reported different prevalence of depressive symptoms (DS) among patients with different cancer. In China, the prevalence of DS among patients with head and neck cancer and oral cancer was 61% and 65% respectively (Yuan 2020) while 69% of the patients with breast

cancer in Egypt were having depressive symptoms (Alagazi et al. 2020).

Several factors have been identified as contributors to the occurrence of DS among patients with cancer (Kim et al. 2018). Niedzwiedz et al (2019) have reported individual characteristics such as age, gender, ethnicity, marital status, disability/impairment, religion, co-morbid health conditions, and genetic factors as correlates; psychological responses of the patients diagnosed with cancer such as anger, hopelessness, coping behavior, change in self-image, grief, fear and denial; social and contextual factors such as education level, occupation, income, family, social support, healthcare system, and welfare system; cancer characteristics such as type of cancer pain, stage, grade, prognosis and curability, functional declines, and recurrence; prior psychological factors such as personality, pre-existing psychotic disorders, previous suicidal behaviors, and prior coping behavior; cancer treatments such as type/phase/cost/length/setting/side-effects of treatment, response to treatment, burden of treatment, long-term complications were found to be the major correlates of depressive symptoms found in cancer patients.

Further, symptoms of depression are difficult to differentiate from some symptoms of cancer such as fatigue, weight loss, sleeplessness, poor appetite, etc. (Taylor 2006; Vachon 2006). Therefore, patients may be reluctant to seek treatment for depression. Patients with cancer should be screened for depression and offered appropriate

treatment if they are found to be depressed. Recently, attention has been paid to psychiatric issues found in cancer patients. Healthcare professionals have recognized the value of psychological health of patients with cancer. Relieving symptoms of depression and discovering the relevant psychosocial factors of DS have been identified as important components in cancer management.

The prevalence and correlates of depressive symptoms among patients with cancer in Sri Lanka are poorly understood. Such information is very important to identify the burden of cancer and to plan proper interventions. The objective of this research is to identify the prevalence of depressive symptoms in patients with cancer, and to explore correlates of depressive symptoms.

This study was conducted to fill this information gap by examining the prevalence and correlates of depressive symptoms among patients with cancer who were treated in a tertiary care hospital in Southern Sri Lanka.

## **2 MATERIALS AND METHODS**

### **2.1 Study Design, Setting and Sampling**

A descriptive cross-sectional questionnaire based study was conducted at the Cancer unit, Teaching Hospital Karapitiya (THK), Galle, with 400 cancer patients who were diagnosed with cancer and were on follow-up treatment for more than six (06) months (( $N = Z^2 P (1-P) / d^2$ , where  $Z = 1.96$ ,  $P =$  anticipated population proportion = 50%)) (Kirkwood 2003).

The inclusion criteria included the conditions having confirmed primary diagnoses as any type of cancer based on the histology reports; aged 25 years or older; confirmed diagnosis with more than six (06) months period; undergoing/continuous treatment such as chemotherapy or radiotherapy or planned for such treatments; able to understand local language (Sinhala) and ability to provide informed consent. We assumed that patients below 25 years were not able to provide information for this research. Cancer patients with any non-cancer surgical problems, end-stage of cancer or medical condition, acute stage with worsening symptoms, or patients who were diagnosed and treated for depression, currently on treatment, or having depression prior to the cancer diagnosis or after the diagnosis were not included in the study.

International Classification of Diseases - 10 (ICD -10) (WHO-ICD 2015) was used to categorize patients. Hence, subjects were categorized into 10 groups, and 07 patients who did not fall into those 10 primary groups were excluded from the final analysis (n=393).

### **2.2 Study Instruments and Data Collection**

Interviewer Administered Questionnaire (IAQ) was designed to explore different correlates (independent variables- socio-demographic profile and clinical characteristics such as age, gender, marital status, education, current employment, income, type of cancer, stage, time since diagnosis, type of treatment, co-morbid

conditions and self-reported physical impairments) and other tools/scales (Sinhala version of Centre for Epidemiological Studies-Depression-CES-D scale to measures the depressive symptoms and a measure of physical impairments-dependent variables).

Socio-demographic data were gathered from all consented in-ward cancer patients using admission registers and interviews (response rate was 100%). The CES-D (Radloff 1977) scale was used to screen depressive symptoms of cancer patients. The score of CES-D ranges from 0 to 60 and higher scores indicate the presence of more symptomatology or patients with high risk group. This scale has already been translated into local language, validated and used (Ferdinando 2006; Perera 2011; De Silva et al. 2014) for Sri Lankan population.

A scale was developed, pre-tested and validated to assess self-reported physical impairments (SRPI) that could affect daily functioning of the patients at any time during the past six (06) months. This questionnaire consisted of 07 items to assess SPRI which are supposed to deteriorate daily functions of the patients with cancer. Following 07 areas were assessed using one question to assess each area: - walking, attending self-care, feeding, vocalizing, hearing, vision, and involvement in household work. Higher scores indicate a higher level of impairment (total score range 0-21; cut-off for severe impairment =15).

For the scale validation, this SRPI scale was found to have a positive correlation

with the CES-D (convergent validity= 0.376;  $p < 0.01$ ); the severity of DS should be increased with increasing scores of SPRI, and negatively correlated with the WHOQOL-BREF (divergent validity= - 0.440;  $p < 0.01$ ); it is well-known that QoL is negatively correlated with DS.

### **2.3 Statistical Analysis**

Basic descriptive statistics were analysed to describe the sample and participants' characteristics. Pearson correlation coefficients were performed to find out the bivariate relationship among CES-D scores and different variables like clinical characteristics, SRPIs, etc. Independent t-test was used to examine the other correlates such as age, marital status, income, etc. which affect depressive symptoms. Statistical significance was set at  $p < 0.05$ . The data were analysed using the Statistical Package of Social Sciences (SPSS) version 16.0.

### **2.4 Ethical Approval**

Ethical approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Ruhuna, Galle, Sri Lanka. In addition, relevant approvals were obtained from the THK and relevant consultant oncologists. Written informed consent was obtained from all the participants. The confidentiality of the participant details was maintained throughout the study.

### 3 RESULTS & DISCUSSION

#### RESULTS

The mean age ( $\pm$ SD) of the participants was 56 ( $\pm$ 11.9) years and 59% of them

were women. The socio-demographic data and clinical characteristics of the participants are given in Table 1 and Table 2.

**Table 1:** Socio-demographic profile of the participants (n=400)

Variables	Categories	n	(%)
Age	< 55 Years	186	(46)
	> 55 Years	214	(54)
Gender	Male	164	(41)
	Female	236	(59)
Marital status	Married	327	(82)
	Unmarried/separated/divorced/ single	73	(18)
Educational status	1-5 years (illiterate or primary education)	37	(9)
	6- 12 years (secondary education)	359	(90)
	More than 12 years (Graduate/diploma)	04	(1)
Current employment status at the time of the survey			
	Currently working	105	(26)
	Currently not working	125	(30)
	Unemployed (e.g. Housewife)	150	(39)
	Retired/ pensioner	20	(5)
Household income (monthly) at the time of the survey			
	Lower income (< SLR. 10,000)	234	(59)
	Higher income (> SLR. 10,000)	166	(41)

n (%) –number and percentages of patients

A large proportion of participants was aged more than 55 years with low- income and were married and employed. The prevalence of elevated depressive

symptomatology (CES-D score  $\geq$  16) among study participants was 8.4% (n=33) (95% CI: 5.3%, 10.7%).

**Table 2:** Clinical characteristics of the sample (n =393)

Variables	Categories	n	(%)
Stage of cancer	Tumor	359	(91)
	Node	16	(4)
	Metastasis	18	(5)
Time since diagnosis	06-12 months	236	(66)
	1-2 years	49	(12)
	> 2 years	88	(22)
Previous Surgical intervention	Done	230	(58)
	Not done	163	(42)
Co-morbidities	Medical (e.g. Renal failure)	68	(17)
	Surgical (e.g. Diabetic ulcers)	73	(19)
	Both	31	(8)
	None	221	(56)
Current/ planned treatment	IV chemotherapy alone	266	(68)
	Radiotherapy alone	65	(16)
	Both or other	62	(16)
Self- Reported physical impairments (SRPIs) (score range 0-21)	Severe (total score $\geq 15$ )	203	(52)
	Moderate (score 10-15)	160	(41)
	Lower (score 1-9)	30	(7)
	No/absent (<1)	0	

n (%) –number and percentages of patients

In the analysis, point prevalence of elevated depressive symptoms by cancer types are calculated and given in table 3.

**Table 3: Prevalence of DS among cancer types**

Cancer Types	n	> 16 CES-D (%)
Uterine cancer	4	17%
Lung cancer	3	12%
Breast cancer	11	11%
Ovarian cancer	3	10%
Head/Neck cancer	5	9%
Gastro-Intestinal cancer	3	8%
Oral cancer	2	6%
Blood/lymph cancer	1	3%
Colon cancer	1	3%
All cancer types		8.4%

n (%) –number and percentages of patients

Nine out of ten participants (n=363, 93%) reported experiencing moderate to severe form of SRPIs at any point during previous 6 months following their diagnosis or treatment for cancer. Limitations in independently feeding/swallowing (30%), limitations in walking (23%), limitations in involvement in household work (20%) and limitations in coherently vocalising with others (15%) were the common SRPIs found.

There was no significant association detected between CES-D scores and the variables like type of cancer ( $r=0.015$ ,  $p<0.01$ ), time since diagnosis ( $r=0.007$ ,  $p<0.01$ ), treatment methods ( $r=0.094$ ,  $p<0.01$ ) cancer stage ( $r=0.056$ ,  $p<0.01$ ) and previous surgical interventions/co-morbid conditions ( $r=0.005$ ,  $p<0.01$ ). But CES-D score was weakly and significantly associated with SRPIs ( $r= -0.325$ ,  $p<0.01$ ). Pearson correlation was further applied to learn association between CES-D scores and different SRPIs of cancer patients. There were positive, but weak and

significant correlations between the depressive symptoms and different SRPIs; attending self-care ( $r=0.289$ ,  $p<0.01$ ), walking ( $r= 0.239$ ,  $p<0.01$ ), hearing ( $r=0.237$ ,  $p<0.01$ ), feeding ( $r=0.210$ ,  $p<0.01$ ), vocalizing ( $r=0.206$ ,  $p<0.01$ ), involvement in household work ( $r=0.168$ ,  $p<0.01$ ) and vision ( $r=0.113$ ,  $p<0.01$ ) (data were not shown).

Table 4 shows the correlates of depressive symptoms among patients with cancer. Participants who were younger as well as with less number years of education had a slightly higher mean CES-D score. Participants who had a lower education level and a lower monthly income were found to have a higher mean CES-D than those of others ( $p<0.01$ ). In relation to SRPIs, there was a significant difference among two groups; those who reported experiencing moderate to severe SRPIs obtained high mean CES-D score, compared to those who didn't have SRPIs ( $p<0.01$ ).

**Table 4:** Correlates of depressive symptoms (CES-D scores) among patients with cancer

Categories/ variables		CES-D( $\pm$ SD)	<i>p</i>
Age	< 55 Years	7.02 $\pm$ 6.0	0.69
	> 55 Years	6.77 $\pm$ 6.8	
Gender	Male	6.88 $\pm$ 4.8	0.93
	Female	6.93 $\pm$ 7.2	
Marital status	Married	6.91 $\pm$ 6.3	0.98
	Unmarried/Single	6.89 $\pm$ 6.5	
Educational status	Less years of education (Up to Grade 10)	8.08 $\pm$ 6.5	0.008
	More years of education (Grade 10-higher level)	6.30 $\pm$ 6.2	

Employment status	Employed Unemployed (e.g. housewife)	7.14±6.2 6.53±6.5	0.36
Household income level (monthly)	Lower income (≤ SLR. 10,000) Higher income (> SLR. 10,000)	7.68±6.9 5.78±5.2	0.003
Time since diagnosis	06 -12 months >12 months	6.89±5.6 6.93±7.5	0.96
Self- reported physical impairments (SRPIs)	Moderate to severe No/absent	8.15±6.9 5.30±5.1	0.001

Analysis was performed with Independent t-test; Significance value  $p < 0.01$

## DISCUSSION

### 3.1 The prevalence of depressive symptoms

In this study, we have examined the prevalence of depressive symptoms among patients with cancer, and correlates of such depressive symptoms (DS). The prevalence of DS 8.4%; poor income, low level of education and self-reported physical impairments (SRPI) were found to be the correlates of DS.

Few studies assessed the prevalence of DS among Sri Lankan patients with cancer (Prabhath & Ruben 2020). The prevalence of DS in this study was consistent with similar studies conducted in other countries. According to the meta-analysis done by Krebber et al. (2014), a pooled prevalence of DS among cancer patients during the treatment was 14%, 9% in the first year post- treatment, and 8% one year or more post-treatment. Prevalence of DS in this study was lower than the global reported rate of DS for the different cancer types (Leave 2010). However, disparities in rates of depression in those with

different cancers have been noted in other studies, and higher prevalence rates have been reported previously elsewhere. In China and Egypt, reported prevalence of DS was 66.7% and 68.7% (Hong & Tian 2013; Alagazi et al. 2020) and in Iran, reported prevalence of DS was 48% (Nikbakhsh et al. 2014). These findings suggested that the rates for DS in cancer patients in Sri Lanka and some other Asian countries may be lower than rates reported in the Western/developed countries; in India, reported prevalence of DS was 28%. Further, psychological distress of cancer patients is high and tend to develop DS (Alagazi et al. 2020). This discrepancy could be attributable to the difference in the study sample in terms of types of cancer, stage of cancer, the scale/tool used for screening or other socio-demographic differences and severity of DS considered (Caruso et al. 2017).

Factors such as family support may play a role, and these participants reported that they had close family bonds, and their religion had impacted as a major source of emotional support, psychological distress etc. (Weeratunga et al. 2019). In Sri

Lankan culture, an adverse life event such as chronic illness makes the family members rally round the patients playing a key role in the provision of care and support; people turn to religion to cope with such circumstances (Oztunc et al. 2013), and this is an area demanding further research. Whereas, some studies have reported that the bereaved family caregiver has a higher risk of having DS, and is unable to provide proper support to relieve depression of the cancer patients (Jho et al. 2016).

Higher level of psychological distress (66%) had been reported by the same group of cancer patients according to the findings of previous publications (Weeratunga et al. 2016; Weeratunga et al. 2019). Both psychological distress and DS were significantly and positively correlated with each other; it would be one cause of developing DS among the same cancer patients as already proven by Smith (2015). Higher distress of cancer patients may lead to anxiety, depression, or both. Hence no possible influencing factors to be found out in this study, or impact of different correlates on DS among these cancer patients.

### **3.2 Correlates of depressive symptoms**

In this study, subjects who are from low income groups tend to have higher DS. One study of breast cancer patients has reported that the employment status of family members having a relationship with DS directly influenced the income of the family, and could influence development of DS (Prabahth & Ruban 2020). According to them, male partner's

unemployment status was important as an indicator of family income of many families in Sri Lanka (Prabath & Ruban 2020). Further, they have discovered an association between the partner's unemployment status and the occurrence of DS (Prabath & Ruban 2020). A study done in Southeast Asia with over 9000 cancer patients revealed that economic hardship is a strong predictor of poor health-related QoL among cancer patients (Spiegel & Riba 2015), causing to develop DS. Further, breast cancer patients who obtained adequate financial support and having a monthly income led to develop lower DS than that of other patients in India; it could be similar to the Sri Lankan situation (Srivastava 2016).

Lower education level of patients with cancer had a higher level of DS in this study, and the results were consistent with some study findings showing that educational inequality led to moderate to severe depression among cancer patients (Srivastava 2016; Friberg 2019). As reported, there was an influence of education level (Hong 2014; Sonar 2019) and socio-economic status of cancer patients on anxiety, stress and depression level (Sonara 2019; Tsaras 2019). The possible explanation could be, if these cancer patients have a higher education level, and a better understanding of the cancer disease, this may lead to early screening which may improve their recovery and reduce their DS.

The prevalence of elevated DS was high among the subjects who had higher scores of SRPI, compared to others; yet majority of the participants in this study had

reported that they were affected by some form of SRPI. Physical impairment and resulting pain, fatigue and discomfort may put such patients at risk of developing DS. Associations between functional impairment and depression were reported in previous studies as well (Park et al. 2017). A study of 303 elderly cancer patients found that 17% of them had a limitation for activities of daily living (ADL), 59% had limitation for instrumental ADL, and the prevalence of functional disabilities was positively associated with age (Spiegel & Riba 2015). In addition, the period of impairment had some influences on DS; a study conducted in breast and prostate cancer patients in USA had reported, 60% of females experienced physical disability at 12 months, and it reduced to 36% at 18 months; 29% of male patients reported physical disability at 12 months following diagnosis, and it decreased to 17% at 18 months; their impairments were reduced while the time period since diagnosis increased (WHO 2001).

Impact of age and gender on the psychological health of cancer patients has been extensively addressed in the literature. In the current study, neither age nor gender was related to the development of DS. Similarly, a study conducted among 111 cancer patients undergoing chemotherapy found no gender and age difference in the prevalence of depression (Yusof et al. 2016). High prevalence of DS was reported among women than in men, and the prevalence rates seem to be increasing with age (Ell et al. 2005; Walker et al. 2014). Younger age was one of the risk factors of developing DS among

cancer patients (Trill 2102; Yan 2019) as in the findings of the current study that younger patients had reported higher DS than the elder patients. As Yan's explanation (2019), young people play the key role of the labor force and are creators for society. Hence, they need to bear extensive responsibilities and pressure from family and society; it would be a severe problem to the family's financial state once they were diagnosed as cancer. Therefore, young-aged people were more likely to be depressed (Yan et al. 2019).

In contrast to international findings, in our study there was no significant association between marital status, employment status, types of cancer, time since diagnosis, treatment method and the occurrence of DS. A similar trend had been reported in a previous Sri Lankan study about breast cancer patients (Prabath & Ruban 2020). Sometimes, the tools used to assess DS may also be partly contributing to the differences in the figures. Similar to our study, some studies found that cancer stage or treatment was not correlated with DS (Yusof et al. 2016; Park et al. 2017). Although we found that marital status of the participant did not have any association with developing DS, some studies reported the significant difference of rates of DS between married and unmarried patients (Yusof et al. 2016).

A study on 472 women with Breast and Gynecological cancer in United States of America (USA) showed that 24% of them were either moderately or severely depressed (Ell et al. 2005). Another study conducted in USA revealed that the prevalence of depression was

comparatively high in pancreatic cancer patients (33% to 50%), followed by Lung (11% to 44%), Breast (1.5% to 46%), and Colon (13% to 25%) cancer patients (Levav 2010). In Iran, the prevalence of DS among Breast and Stomach cancer was 28% (Nikbakhsh et al. 2014). When comparing the different cancer patients with DS in the current study, other countries had encountered higher DS than our findings for different cancer patients. Some studies mentioned that the type of cancer or the type of treatment was correlated with depression (Nikbakhsh et al. 2014), or varied according to the cancer type (Park et al. 2017), but the cancer stage or treatment status was not correlated with depression (Ell et al. 2005; Yusof et al. 2016; Niedzwiedz et al. 2019).

Cancer treatment options were found to be associated with disfigurement in the body, physical and other functional impairments among them (Walker et al. 2014). Also, chemotherapy and length of treatment period had influenced to increase DS than their counterparts. This may be due to side effects of the treatment and the cost of the treatment (Baraki, Tessema & Demeke 2020). Literature reported that high incidence of depression among terminally ill cancer patients had been reported due to the higher levels of disabilities/impairments (Vachon 2006). It was found that about 59% of elderly cancer patients are affected by disabilities related to instrumental ADL; work-related disabilities are found to be common among cancer patients (Serraino et al. 2001). Cancer-related fatigue (CRF) is associated with functional impairments (Hung et al. 2011). Hence, cancer and

disabilities/impairments are interconnected and influence the psychological health of certain victims; depression may occur due to cancer (Serraino et al. 2001).

Some studies have shown that CRF was relatively common among uterine cancer and breast cancer patients (Ell et al. 2005). Such conditions may have contributed to elevate DS in similar cancer groups in this study. There is evidence for the association between cancer and depression due to different correlates such as cancer pain, CRF which is different from SPRIs etc. (Ell et al. 2005). Although we did not study CRF in the current study, weak level of association was reported between DS and SRPIs that might have contributed to their DS.

#### **4 CONCLUSIONS**

The prevalence of depressive symptoms among patients with cancer in Southern Sri Lanka was considerable. Presence of self-reported physical impairments, low level of education, and low level of income were found to be independently associated with depressive symptoms.

Well-targeted, low-cost psychosocial supportive services should be developed for disadvantaged patients to improve their health outcomes. In advance, psychological status of all cancer patients should be screened during admission to discharge process of cancer patients. It may help to identify patients with psychological impairments, and patients who screen positive should be offered further psychiatric assessment and treatment if specified. Clinicians should also provide integrated care of mental

health, cancer treatment and management of physical impairments. It would be more important in improvement of quality of life of remaining life. Such services should be freely available for needy patients, and periodically thereafter while they are in the treatment institutes, in order to prevent cancer patients from being victims of possible life-long psychological burdens.

## ACKNOWLEDGMENTS

The authors thank all participants, former consultant oncologist (Dr. Upul Ekanayake), Cancer unit, Teaching Hospital- Karapitiya, Galle, as one of the supervisors, administrative staff and healthcare professionals of the hospital, for their support. The research project was granted by the Faculty Research Grant, Faculty of Medicine, University of Ruhuna, Sri Lanka.

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