Effect of Cognitive-Behavioral Therapy on Distress Management Among Head and Neck Cancer Patients Undergoing Surgery at a Tertiary Care Center in Eastern India

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ABSTRACT

Background: Cancer patients are more susceptible to psychological issues such as nervousness, traumatic stress, and depression because their vulnerability to stress increases after a cancer diagnosis. Multiple harmful effects of psychological strain on health outcomes are possible. Those who have undergone surgery for cancer are more at risk of cancer-related fatigue and psychological distress. Studies in Western countries have shown a 40–80% reduction in cancer-related distress if the patients are subjected to appropriate psycho-oncological interventions.
Objectives: The aims of this study were to: 1) screen head and neck cancer patients for distress using a cancer-specific questionnaire; 2) test the association of cancer-related distress with socio-demographic and clinical characteristics of patients; and 3) evaluate the effect of cognitive behavioral therapy (CBT) on the distress level of head and neck cancer patients about to undergo surgery.
Materials and methods: A pre-tested, semi-structured, self-administered 23-item Questionnaire on Stress in Cancer patients (QSC-R23) was used to measure the level of distress. Three sessions of CBT of one hour duration on every alternate day have been given to elicit the response. Categorical data were analyzed using the Chi-square test. Pre and post-scores were compared using a paired sample t-test. The correlation was done to compare continuous variables using Pearson's correlation test. To determine how other related factors will affect the results, linear regression analysis was used.
Results: The mean age of the 94 participants was 54.64 ± 10.97 years. The mean pre-score was 60.06 ± 20.42, and the post-score was 34.63 ± 5.3. There was a significant improvement in the post score (P-value = 0.0001) implying a reduction in stress among the study participants after the 3 sessions of CBT. Participants with middle/high monthly family income (P-value = 0.013, 95% CI= 0.639-17.418), no past medical history (P-value = 0.0001, 95% CI= 0.639-17.418), and no past psychiatric history (P-value = 0.008, 95% CI= 3.621-20.162) were statistically significantly affected by the difference in distress score.
Conclusion: This study has successfully reported that CBT can reduce distress levels among cancer patients. However, there is still a need to explore this research and produce more relevant, evidence-based literature.

Keywords: Head and neck cancer; Distress; Cognitive Behavioral Therapy.

INTRODUCTION

Despite improvements in diagnosis and treatment, cancer threatens our society severely. After cardiovascular illnesses, it is the second leading cause of death globally [1]. According to GLOBOCAN 2020, published by the International Agency for Research on Cancer (IARC), there were 19.3 million new cases and 10 million cancer deaths worldwide in 2020 [1]. GLOBOCAN predicted that cancer cases in India would increase to 2.08 million, accounting for a rise of 57.5 per cent in 2040 from 2020 [1]. Approximately 2.25 million illnesses, nearly 7 lakh deaths, and over 1 lakh new cases are reported annually in India alone. The Indian Council of Medical Research (ICMR) predicted that the nation would likely record more than 17 lakh new cases and more than 8 lakh fatalities [1].

Head and neck cancers rank as the sixth most common malignancy in the world, with over 630,000 new cases identified each year and more than 350,000 fatalities. The incidence and geographic distribution of head and neck squamous cell carcinoma (HNSCC), which makes up 5–10% of all new cancer cases worldwide, vary significantly by region [2].

Anxiety, post-traumatic stress disorder, and depression are among the emotional illnesses that cancer patients are more likely to develop, as well as the appearance and physical well-being of head and neck cancer patient is more vulnerable to various psychological complications due to the effects of both cancer itself and cancer treatment [3]. Long waiting periods, a lack of information, poor communication between patients and clinic staff, and insufficient psychosocial care can all increase patients' stress levels [4]. A cancer diagnosis, which is a considerable source of psychological stress in and of itself, comes after an extended period of difficult cancer treatment [5]. It should come as no surprise that patients with a cancer diagnosis present to the clinics in a state of severe psychological and emotional anguish [6]. According to studies, 40% of patients reported high-stress levels one year after receiving a breast cancer diagnosis, and nearly half of the patients at baseline reported high-stress levels [7].

Psychological distress may have a negative impact on life quality in a number of ways. Numerous populations have shown a correlation between chronic stress and an increased risk of infections, aging faster, and cardiovascular illnesses [8]. Additionally, it was linked to poor physical and psychological well-being and a noticeably shorter period without contracting an illness than participants who had not experienced considerable stress [9].

Cancer-related exhaustion and psychological stress are pervasive in surgical cancer patients. After having surgery, returning to work or engaging in daily activities might be difficult due to poor health, which puts people and families in danger of going without enough food [9]. In head and neck cancer patients surgical complications are an adverse event inherent to the procedure that can alleviate the psychological impact [10].

A better understanding of the psychological stress that surgical cancer patients experience both before and after the surgery can lessen the level of distress. Disease-specific questionnaires produce results that more closely reflect the patient's perceptions; they are also more therapeutically meaningful since they identify the effects of (psycho-oncological) treatment [11, 12]. The 'Questionnaire on Stress in Cancer patients-(Revision) 23-item' (QSC-R23), created and psychometrically tested in Germany, is one such tool. It contains 23 cancer-specific stress-related questions that must be addressed regarding their applicability and level of distress [6, 13]. But some time in advance head cancer patient stress and depression are not reduce very well in comparison with patient in with early stage of head and neck cancer patient [14].

If patients receive the proper psycho-oncological therapies, studies have shown a 40–80% reduction in cancer-related discomfort [15]. Patients have been found to benefit from Cognitive Behavioral Therapy (CBT) by lowering their levels of stress, anxiety, and depression, as well as improving their overall well-being. However, there is insufficient proof that CBT can have the same effects on cancer patients [16]. A recent study reported that anxiety, depression, and fatigue in cancer patients were tremendously reduced through CBT and mindfulness-based cognitive therapy [17]. The usefulness of CBT in reducing fatigue has also been confirmed in several studies, and it has been reported that CBT is significantly more effective than usual care that includes the treatment for cancer, based on the guidelines of the comprehensive cancer center [18]. In a study by Cohen and Cotton also investigated the efficacy of CBT in cancer patients and found diminished symptoms of anxiety and depression [19]. Another study by Eichler et al. shows a 70% decline in fatigue, 33% in anxiety, and 57% for depression among breast cancer patients following the CBT [20]. However, to our best knowledge, no study has investigated the effectiveness of CBT in relieving psychological problems in patients with head and neck cancer. Therefore, the main aim of this study was to use a cancer-specific questionnaire to screen for distress in head and neck cancer patients, test the relationship between cancer-related distress and patient socio-demographic characteristics, and assess the impact of CBT on the stress levels of HNSCC patients who are about to have surgery.

MATERIALS AND METHODS
Setting and Design

This experimental study was conducted at IMS and SUM Hospital, Bhubaneswar, a well-known tertiary care center in Eastern India. Informed consent was obtained from the patients. Following the approval of patient consent, the study was put forward to the IEC for ethical approval. The study was approved by the Institutional Ethical Committee (Approval letter no- DMR/IMSSH/SOA/180338). The study was conducted for a period of 2 years from January 2016 to December 2017. This study used a pre-tested, semi-structured, self-administered 23-item Questionnaire on Stress in Cancer patients (QSC-R23). The QSC R23 is a disease-specific questionnaire to assess psychosocial stress in cancer patients (all diagnoses and treatment settings). It contains 23 items that potentially describes everyday stress in all areas of life. Each problem has to be answered twice: does it apply to the test person at present, and if it does, to what extent does this problem cause distress? The range of the response categories varies between 0 ($1/4$ the problem does not apply to me) and 5 ($1/4$ the problem applies to me and is a very big problem). The construct validity has been demonstrated by correlation analysis with diverse psychological tests such as HADS depression

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and HADS anxiety scale. The reliability has been analyzed via Cronbachs alpha, which is 0.89 for the total score [21]. In this study stress score should calculate total score before CBT (pre counseling total score) and the total score after CBT (post counseling total score).

Inclusion criteria

All HNSCC patients admitted to the hospital for surgery after onco-surgical consultation and accepted to participate in the study were included in the study.

Exclusion criteria

Non- HNSCC, patients admitted for less than three days before their surgery, patients < 18 years of age, and those who did not give consent to participate were excluded from the study.

All the patients data were collected. This was followed by a briefing of the patients about the QSC-R23 questionnaire. The total stress score was calculated for each participants (pre-score). A total of 94 participant were given their responses in the QSC-R23 questionnaire with 5 point scale, each item contains stress related questions. Then before giving CBT, stress score were collected and calculated with cutoff point at 41.5 which means the patient with $\geq$ 41.5 were considered as having more stress. Less than 41.5 total score was considering as low stress. All participants were given three sessions of CBT of one-hour duration on every alternate day with only one session a day. The session given by the clinical psychologist and psychologist cum counselor. These sessions were carried out in the outpatient department with the selected participants. At the end of the third counselling session, each participant was administered the QSC-R23 again. Each participant took three sessions of CBT which was of one hour. In this study the level of distress factor contains physical and psychological complaints, fears, and social problems related to cancer disease. Therefore, a one hour of session every day is good to reduce the cancer related distress. Because researcher focuses specific aspect of stress which is related to cancer before surgery. The total stress score was calculated for each participant (post-score).

Data entry, cleaning, and compilation were done using Microsoft Excel. Software from IBM Corp., Armonk, New York, USA, called statistical package for social sciences (SPSS), version 20.0 was used for the statistical analysis. While categorical data were expressed as a percentage, continuous variables were expressed as mean and standard deviation. Categorical data were analyzed using the Chi-square test. Paired sample *t*-test was applied to compare pre and post scores. The correlation was done to compare continuous variables using Pearson's correlation test. A P-value of < 0.05 was considered a statistically significant difference. The difference of the distress score was calculated as the total post-score subtracted from the total pre-score.

RESULTS

A total of 94 patients were enrolled in the study. The mean age of the participants was 54.64 ± 10.97 years, and males constituted 56.4% (n = 53). The majority (84%, n = 79) of the participants belonged to the Hindu religion. The mean number of years of education was found to be 3.16 years. Most participants (52.13%, n = 49) were from urban areas. The majority 68.1%, n = 64) of the patients had middle/ high family income. The majority (58.51% , n = 55) of the

participants lived in nuclear and single families. Significant past medical history was elicited among 62.77%(n = 59) of the participants, while only 3.19% (n = 3) had a past psychiatric history. They were continuing anti-depression and anti-anxiety medication; previously, two patient were diagnosed with depression and one patient had general anxiety disorder by a psychiatrist. Substance use was reported by about 68% (n = 64) of the participants. Almost one third of the patients who participated in our study were in the early stages of cancer, when they attended the CBT session it was observed that there was an effective improvement in their mental health condition and decreasing of stress level with short period of time. Therefore, the time of effect had also highly impactful in this study for getting result easily.

After the evaluation of the stress questionnaire, we found that 56 participants had a high level of stress and 20 participants had a moderate or low level of stress before the CBT session because the evaluation of stress score was calculated with a cutoff number of 41.5. Therefore, the mean pre-counseling score (pre-score) of distress was found to be 60.06 ± 20.42, with a minimum score of 12 and a maximum score of 105. Similarly, after 3 session of CBT, we found that the high level of stress was reduced in post stress questionnaire. The post-counselling score (post-score) of distress was found to be 34.63 ± 5.31, with a minimum score of 20 and a maximum score of 48. The dependent variable, stress score was examined using Shapiro Wilk's Test. Both pre and post scores were found to be normally distributed. There was a significant improvement in the post score as compared to the pre score (P-value = 0.0001) implying a reduction in distress among the study participants after the 3 sessions of CBT.

Table 1 enlists the findings from the univariate analysis done to find out the association of socio-demographic, clinical, and behavioral variables in the study with the difference in the distress score. Gender, religion, habitat, and family type had no statistically significant association. Similarly, no significant correlation could be established between the number of years of education and the age of the onset of cancer with the difference in distress score. However, a statistically significant association was found between the difference of distress score with the higher monthly family income (P-value = 0.13), absence of past medical history (P-value = 0.0001), absence of past psychiatric history (P-value = 0.008), no substance abuse (P-value = 0.009), and early stage of cancer (P-value = 0.006). A negative (r = -0.204) but statistically significant correlation was observed for age and the difference in distress score (P-value = 0.045).

The goal of determining the ability of the difference of distress score to be affected by various demographic, clinical, and behavioral variables was explored by performing a linear regression analysis as shown in Table 2.

It was observed that family income (P-value = 0.35, 95% CI= 0.639-17.418), past medical history (P-value = 0.005, 95% CI= 3.621-20.162), and no past psychiatric history (P-value = 0.005, 95% CI= 9.212-50.911) were statistically significantly affected by the difference in distress score. This confirms that patients with middle/ high family income and those without any past medical or psychiatric history experienced a significant reduction in distress post receiving CBT.

DISCUSSION

Cancer patients experience psychological distress, especially during the pre-operative period. Studies already showed

Table 1. Association of socio-demographic and clinical characteristics of the 94 participants with the difference of distress score (difference of distress score = Total Pre score Total Post score)*.

Characteristic	N (%)	Mean difference of score	Std. error of mean	t value	P-value
Gender				1.15	0.25
Male	53 (56.4)	27.58	2.92		
Female	41 (43.6)	22.66	3.12		
Religion				0.018	0.98
Hindu	79 (84)	25.45	2.26		
Others (Muslim/Christian)	15 (16)	25.33	6.34		
Monthly Family Income				-2.53	0.013
Low	30 (31.9)	18.80	2.60		
Middle/High	64 (68.1)	28.55	2.83		
Residence				-0.56	0.57
Rural	45 (47.87)	24.16	3.48		
Urban	49 (52.13)	26.61	2.60		
Family type				-0.17	0.86
Nuclear/ Single	55 (58.51)	25.11	2.73		
Joint	39 (41.49)	25.90	3.48		
Past medical history				-3.64	0.0001
Yes	59 (62.77)	19.80	2.41		
No	35 (37.23)	34.94	3.57		
Past psychiatric history				-2.69	0.008
Yes	03 (03.19)	-5.33	12.17		
No	91 (96.81)	26.45	02.10		
Substance abuse				-2.69	0.009
Yes	64 (68.08)	21.63	2.37		
No	30 (31.92)	33.57	4.09		
Stage of cancer				2.83	0.006
Early	72 (76.60)	27.75	2.66		
Late	22 (23.40)	17.86	2.28		
	Mean	SD	Std. error of mean	Correlation coefficient	P-value
Age per years	54.64	10.97	1.13	-0.20	0.045
Years of education	3.16	4.06	0.42	-0.04	0.72
Age of onset of cancer per years	51.97	10.55	1.09	-0.02	0.85

* P-value < 0.05 was considered a statistically significant difference.

Table 2. Linear regression analysis of factors influencing the difference of score*.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% CI for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Constant	-53.710	26.117		-2.056	0.043	-105.620	-1.799
Age	-0.263	0.179	-0.139	-1.467	0.146	-0.620	0.093
Family income	9.028	4.221	0.204	2.139	0.035	0.639	17.418
Past medical history	11.892	4.161	0.278	2.858	0.005	3.621	20.162
Past psychiatric history	30.061	10.490	0.256	2.866	0.005	9.212	50.911
Substance abuse	7.446	4.183	0.168	1.780	0.079	-0.868	15.760
Stage of Cancer	-5.637	4.659	-0.115	-1.210	0.230	-14.898	3.624

* Dependent Variable: Difference of score

that psychotherapy would have the greatest impact on subjects who were more distressed and thus in greatest need [16]. We speculate same fundamental in our study that cognitive behavior psychotherapy helps reduce of stress in cancer patients who were admitted for surgery. Patients who are diagnosed with head and neck cancers have a relatively high risk of developing emotional stress after diagnosis and during surgical treatment [8]. This emotional stress can be best understood and managed through the method of CBT because

patients with HNSCC may suffer variable degrees of functional and cognitive impairment at the time of before surgery that are related to speaking, swallowing, breathing, taste, and smell, as well as facial disfigurement, thinking of death, fear of recurrence, fear of social living and quality of life during treatment and in the illness course, which leads to a higher risk of having emotional distress [22, 23]. In this study, we focused on reducing the emotional distress through the use of CBT with Head and Neck Cancer patients (HNC) who are

underging surgical treatment.

In a study by Grpper et al. [24], it was observed that cancer patients presented with clinically relevant cancer-related distress, the results of which were similar to our study because in our study we also found that patients with cancer disease were suffering more from disease related stress, like post-surgery how the quality of life will be and whether cancer will be back, and most of patients were so stressed about the facial image after surgery.

Fisch [23] clarifies in his study that depression in the general medical population was also reduced by psychotherapy. The unique complexity and constraints of cancer care may often make clinical decisions more challenging. The same result we also found in our study as CBT is psychotherapy, and through CBT head neck cancer patient surgery related stress also reduced before the surgery with the help of three counseling sessions. Therefore, the result of our study suggests that stress management is very important before cancer surgery.

Distress, if screened early, and handled with a suitable intervention, can be controlled. The level of distress was significantly lower (P-value < 0.001) than the baseline level when CBT was administered to distressed cancer patients in a study conducted by Tregnago et al. [25]. As we know psychological help in terms of the numerous stresses encountered after cancer diagnosis till the treatment ends or over a lifetime, the findings from our study are also similar to this result, which validates that CBT is a legitimate method to help curb cancer-related distress in patients because our study results provided positive preliminary support for the feasibility and effectiveness of CBT among cancer patients in a medical care setting, who were prepared for the surgery was reduced from 60% to 34% in our study. Palapattu et al. [26], reported that there was no statistically significant association between gender and age with the difference in distress scores which is in congruence with our study findings. It has also been observed that there may be several factors contributing to this distress.

A study conducted by Sun et al. [27] found that there was a statistically significant association between the distress score and variables such as stages of cancer and age. In our study as well, the association of age and stages of cancer with the difference of score was found to be statistically not significant (0.06 and 0.05) because in this study the mean age was 54.74 which shows that most of the early stage cancer was diagnosed after 35 to 40 years. As a small sample size in this study, we estimate that head and neck cancer will occur after 40 to 45 age because the main cause of head and neck cancer is tobacco use. Sometime most people starts using tobacco in adolescent or adulthood, and after using tobacco for a longer time, they may have risk of head and neck cancer, in this study, we failed to show in the final regression model. The same study also found that there was no statistically significant association between distress score and variables like marital status, education, occupation, religion, and monthly family income. The findings of our study also suggest the same, except for monthly family income, past medical history, and psychiatric history being statistically significantly associated with distress level.

Sun et al. [27] in their metaanalyses found that the efficacy of CBT for treating depression in breast cancer was only short term. The main finding of our study shows the same; patientswho undergoes surgery have more stress regarding cancer surgery,and in this study short term CBT puts a high impact on the psychological, physiological, and social change of the patients life and makes them stress free before surgery.

We think that the impact of CBT before surgery is important question warrants further research with large sample size.

CONCLUSION

Outstandingly, a dearth of literature originates from the Indian subcontinent examining cancer-related distress. This suggests that the currently estimated prevalence rates of psychological distress in cancer patients could be miscalculated. Including psychological screening in cancer care can benefit patients, ensuring comprehensive cancer care. This study validates that CBT is an effective counseling method that can help patients cope with and manage cancer-related distress. This study also gave a clear view that cancer disease and surgery related stress can be managed by short term CBT sessions and also give the new idea that if we continue with a follow up strategy and give counseling to the same cancer patients they may improve their quality of life as well as in psychological, physiological, social, and emotional aspects. This unwraps opportunities to create further evidence for the presence of cancer-related distress and many more relevant interventions that can help in early screening and cater to the psychological needs of cancer patients to reduce their emotional stress through their cancer diagnosis and treatment journey.

ETHICAL DECLARATIONS

Acknoweldgements

Ethics Approval and Consent to Participate

The study was approved by the Institutional Ethical Committee of IMS & SUM Hospital, Letter no: Ref. no. DMR/IMSSH/SOA/180338. Informed consent from every patient was obtained.

Consent for Publication

Not applicable (no individual personal data included).

Availability of Data and Material

Data generated during this study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that there is no conflict of interest.

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Authors' Contributions

Mohanty D and Bhattacharyya P: Data collection and drafting of the article; Rout T and Kar D: Interpretation of data; and Agrawala S and Mishra SN: Concept and design and final approval of the version to be published. All authors agreed to the final version of the manuscript.

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