Chemotherapy and Cancer Related Fatigue: A Prospective Study in Rural Cancer Survivors of Malwa Region of Punjab

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ABSTRACT

The objective of this no interventional, 7 months observational study was to analyze the prevalence of cancer-related fatigue (CRF) in cancer patient populations who were receiving chemotherapy and those who were not receiving chemotherapy. This was an observational study. Based on the inclusion and exclusion criteria, 60 subjects (24 male and 36 females) diagnosed with cancer enrolled for the study, which was further allotted into group A (n=30) which was receiving chemotherapy and group B (n=30) which was not receiving chemotherapy. The data collection was performed by administering the validated Fatigue symptoms Inventory (FSI) scale after obtaining the informed consent. The mean age of Group A and B is 49 years and Group B 51 years, respectively. The mean FSI score of the group receiving chemotherapy was 35.70\(^{±}17.14\), whereas the mean FSI score of a group not receiving chemotherapy was 19.50\(^{±}16.05\). An Independent t-test was applied and the independent t value came out to be 2.18. An equal variance t-test reveals, statistically indicating a significant difference in FSI scores in groups receiving chemotherapy and not receiving chemotherapy (p=0.042). From the results, we concluded that Cancer-related fatigue is highly prevalent in patients who are receiving chemotherapy than those who are not receiving chemotherapy. The underlying causes of CRF are poorly understood and further research is warranted in order to assess CRF before and after treatment and develop effective, patient-centred management strategies and to improve quality of life.

INTRODUCTION

With a population of over 1 billion people, India being the second most populated country in the world. Being considered a developing country, India is dealing with the burden of non-communicable diseases \(\text{(Sharma, 2015)}\). Globally, non-communicable diseases are considered a chief public health problem. Developed countries are also being affected by this problem \(\text{(Singh et al., 2017)}\). Cancer is a non-communicable disease and is considered the \text{second most common cause of death} in India after cardiovascular disease. Due to less awareness and late detection of cancer, it is increasing rapidly in Indian population.
National Cancer Institute, Cancer is defined as a disease in which abnormal cells divide rapidly and are able to occupy other tissues. The blood and lymphatic system are considered as the major transporters of cancer cells from one part to the other part. It affects individuals from different sexes, ages and races (Kumar et al., 2018). In 2016 as per the Indian Council of Medical Research (ICMR), India has diagnosed 14 lakh cancer patients and this number is expected to increase. There are more than 100 types of cancers; and it can affect any part of the body. Breast, cervical, oral cavity, lung and colorectal are among the top cancers in men and women. These cancers account for 47.2 percent of all cancers and early detection, screening, and prevention help significantly reduce the death rate (Bray et al., 2018; Saranath and Khanna, 2014).

Chemotherapy is one of the principal modes of the treatment of cancer patients (Sak, 2012). Drugs which are used in chemotherapy kill cancer cells (cytotoxic drug) or limit the growth of cancer cells (cytostatic drugs). Generally, the combination of radiotherapy and surgery is given along with chemotherapy. Chemotherapy can be given before surgery to reduce the size of a tumour, or it can be given after surgery for killing the remaining abnormal cells (Hofman et al., 2007). Constant fatigue is the ongoing common frequent symptom which is being described by patients following cancer treatment. Cancer-related fatigue (CRF) is a distressing, continual and personal sense of physical, emotional, and/or cognitive fatigue or tiredness. Fatigue caused by cancer is different from the fatigue that most people experience in usual daily life. As compared to classic fatigue in normal persons, CRF is inconsistent with physical exertion level which is not relieved even by rest or sleep (Banipal et al., 2017). It has been found and documented that fatigue occurs in 30%-70% of all patients during the cancer journey and it may continue even after the treatment is over. CRF affects the overall quality of life of patients by impacting their physical, functional, and cognitive domains. The foundation of CRF is multifactorial, with shifting degrees of contribution from biological cancer factors, cancer treatment, immune system deregulations, secondary anaemia, opioid medications, anorexia, poor sleep quality and cognitive dysfunction (Yeo and Cannaday, 2015).

Therefore, the current study is aimed to determine the incidence of fatigue among cancer patients who are receiving and who are not receiving chemotherapy.

MATERIALS AND METHODS

This descriptive cross-sectional study has been conducted in the Day Care Ward of Guru Gobind Singh Medical College and Hospital, Baba Farid University of Health Sciences Faridkot, Punjab. The sample size was calculated by G-Power software. The calculated sample size was 60. The study included both males and females of age group between 30-60 who were diagnosed with cancer. Subjects with co-morbid conditions, systemic cardiovascular or neurological disorders, cancer of the brain, receiving radiotherapy, history of fractures, disability, the complication of cancer-related surgery and history of psychiatric illness or being treated with psychotropic drugs were excluded from the study.

The patients were divided into two groups (A and B). Group A (n=30) who received chemotherapy in the Day Care Ward of Guru Gobind Singh Medical College and Hospital were assessed as per exclusion and inclusion criteria, and group B (n=30) was not received chemotherapy. All the patients were assessed for demographic profile and detailed medical/surgical history was taken through individual interviews as well as medical records. Informed consent and the procedure was explained to the patients prior to the study. All the subjects were assessed for cancer-related fatigue using the scale named fatigue symptom inventory (FSI) scale. FSI is a brief self-report measure; the scale was required between 5 and 10 min for completion. The FSI is a reliable and valid instrument to assess fatigue level in cancer patients (Hann et al., 2000).

Description Of The Scale

FSI is a 14-item self-report measure designed to assess the severity, frequency, and daily pattern of fatigue as well as its perceived interference with quality of life. Severity is measured on separate 11-point scales (0=not at all fatigued; 10=as fatigued as I could be) that assess most, least, and average fatigue in the past week as well as current fatigue. Frequency is measured as the number of days in the past week (0-7) that respondents felt fatigued as we average they felt fatigued (0=none of the day; 10=the entire day). Perceived interference is measured on separate 11-point scales (0=no interference; 10=extreme interference) that assess the degree to which fatigue in the past week was judged to interfere with a general level of activity, ability to bathe and dress, normal work activity, ability to concentrate, relations with others, enjoyment of life, and mood. These interference ratings can be summed to obtain a total perceived interference score. The final item provides qualitative information about possible diurnal variation in the daily
### Table 1: Demographic Characteristics of the Sample (n = 60)

|                | Total sample (n=60) | Group A (n=30) | Group B (n=30) |
|----------------|---------------------|----------------|----------------|
| Male           | 14                  | 10             |                |
| Female         | 16                  | 20             |                |
| Mean age       | 49                  | 51             |                |

### Table 2: Distribution of total sample on FSI among cancer patients at a different level.

| Variables (FSI) Components | Score | Total | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------------------|-------|-------|---|---|---|---|---|---|---|---|---|---|----|
| Most Fatigued              | %     | 60    | 0 | 6 | 6 | 7 | 4 | 2 | 6 | 10| 11 | 8 | 0  |
| %                          | 10    | 10    | 10.0 | 11.7 | 6.7 | 3.3 | 10 | 16.7 | 18.3 | 13.3 | 0 | 100% |
| Least Fatigued             | %     | 60    | 0 | 3 | 5 | 7 | 7 | 5 | 7 | 11 | 7 | 7 | 1  |
| %                          | 5.0   | 8.3   | 11.7 | 11.7 | 8.3 | 11.7 | 18.3 | 11.7 | 11.7 | 1.6 | 100% |
| Average Fatigued           | %     | 60    | 0 | 6 | 6 | 6 | 5 | 7 | 3 | 12 | 8 | 9 | 0  |
| %                          | 6.7   | 10.0  | 10 | 8.3 | 11.7 | 5.0 | 20 | 13.3 | 15 | 0  | 100% |
| Current level of Fatigue   | %     | 60    | 0 | 0 | 5 | 7 | 4 | 6 | 9 | 6 | 8 | 15 | 0  |
| %                          | 0     | 6.7   | 10 | 15.0 | 13.3 | 25.0 | 0 | 100% |
| General level of activity  | %     | 60    | 0 | 0 | 0 | 8 | 6 | 6 | 4 | 14 | 12 | 10 | 0  |
| %                          | 0     | 5.0   | 10 | 11.7 | 6.7 | 10 | 23.3 | 20.0 | 16.7 | 0  | 100% |
| Ability to bath and dress | %     | 60    | 0 | 0 | 0 | 2 | 10 | 7 | 12 | 14 | 13 | 2  | 0  |
| %                          | 0     | 6.7   | 10 | 11.7 | 5.0 | 20.0 | 3.3 | 100% |
| Normal work activity       | %     | 60    | 0 | 0 | 0 | 7 | 9 | 8 | 3 | 5 | 13 | 12 | 3  |
| %                          | 0     | 6.7   | 10 | 15.0 | 5.0 | 21.7 | 20.0 | 5.0 | 100% |
| Ability to concentrate     | %     | 60    | 0 | 0 | 0 | 4 | 12 | 6 | 8 | 14 | 13 | 3  | 0  |
| %                          | 0     | 6.7   | 10 | 13.3 | 5.0 | 23.3 | 21.7 | 5.0 | 100% |
| Relations with other        | %     | 60    | 0 | 0 | 0 | 6 | 7 | 10 | 8 | 15 | 9 | 2  | 0  |
| %                          | 0     | 6.7   | 10 | 13.3 | 8.3 | 11.7 | 25.0 | 15.0 | 3.3 | 0  | 100% |
| Enjoyment of life           | %     | 60    | 0 | 0 | 0 | 3 | 10 | 9 | 3 | 11 | 16 | 12 | 0  |
| %                          | 0     | 6.7   | 10 | 16.7 | 6.7 | 15.0 | 36.7 | 10.0 | 1.6 | 0  | 100% |
| Mood                       | %     | 60    | 0 | 0 | 0 | 2 | 10 | 9 | 11 | 16 | 12 | 0  | 0  |
| %                          | 0     | 6.7   | 10 | 16.7 | 15.0 | 18.3 | 26.7 | 20.0 | 0  | 100% |

### Table 3: Comparison of the mean value for fatigue symptom inventory among cancer patients.

|                | FSI Mean | SD  | SEM | t value | p-value |
|----------------|----------|-----|-----|---------|---------|
| Group A        | 35.70    | 17.14 | 5.42 | 2.18    | 0.042(S) |
| Group B        | 19.50    | 16.05 | 5.08 |         |         |

*p<0.05* = Significant
experience of fatigue.

Scoring

Items use an 11-point, Likert-type scale that ranges from one fatigue-related extreme to another (lower points on the scale denote less acute problems with fatigue). A global score can be obtained for items 1–13. Question 14 is meant to provide qualitative data only.

RESULTS AND DISCUSSION

Statistical analysis of collected data was analysed using the SPSS 20 for window version (SPSS Inc, Chicago, 2, USA) For Windows 7 Professional. The descriptive statistics were mean and standard deviation (SD) for continuous data and percentage of counts. The level of significance was set at p<0.05. An Independent t-test was used to compare the values in both Groups.

Figure 1 showing the graphical representation of different types of cancer among the total sample. Out of 60, the highest frequency (24) was of breast cancer patients, whereas the patients suffering from endometrium cancer are on a second higher level which is (10). The third higher level was adrenal cancer which is (7). The oral and oesophagus cancer level patients were the same in number which was (5) for both. The blood cancer, Hodgkin Lymphoma and lung cancer patients had a number of 4, 2 and 3, respectively, as showing in a graph.

Table 1 showing the demographic characteristics of the sample. The total number of sample is 30 (n=30) in Group A, in which 14 patients were male and 16 were female. The mean age of the sample of Group A was 49. The other group was B, in which the total number of sample is again 30 (n=30), in which 10 patients were male and the other 20 were female and the mean age of this group is 51.

Table 2 shows the distribution of the total sample size (n=60) on the Fatigue Symptom Inventory Scale (FSI) amongst the cancer patients based on the scores given by them during the study period. 11 out of 60 patients felt most fatigued, with a score of 8/10. It was also found that 18.3% reported the least fatigued, with a score of 7 out of 10. However, a maximum of 20% of patients ranked their level of fatigue to an average level. 15/20 patients reported to be fatigued at the time of the questionnaire. Further, 6.7-23.3% of patients reported the interference of fatigue with their daily routine, with scores ranging from 3-9 out of 10. All the patients answered fatigue as an interference with the ability to bath and dress (score 3-9). Fatigue was also found to influence normal work activity, ability to concentrate, and relationship with others, as well as the enjoyment of life and mood.

Table 3 describes a comparison of mean scores of fatigue symptom inventory in patients receiving chemotherapy and not receiving chemotherapy. The mean FSI score of the group receiving chemotherapy was 35.70±17.14, whereas the mean FSI score of a group not receiving chemotherapy was 19.50±16.05. An Independent t-test was applied and the independent t value came out to be 2.18. An equal variance t-test reveals statistically indicating a significant difference in FSI scores in groups who are receiving chemotherapy and not receiving chemotherapy (p=0.042).

Fatigue is considered the most common symptom experienced by cancer patients. It has been seen that fatigue occurs in the majority of patients. The pathophysiology of CRF is adequately not clear. Studies have focused on understanding the factors that contribute to CRF, the treatment received, and a variety of chronic physical or psychological comorbid conditions (Wang, 2008). Some studies have stated that anemia and accumulation of end products from cell destruction causes fatigue (Turner et al., 2001; Demetri et al., 1998). It was seen that chemotherapy drugs that cross the blood-brain barrier might induce neurotoxicities which can produce fatigue (Smets et al., 1993).

Therefore, the present study is proposed to find the incidence of fatigue in cancer patients who were receiving chemotherapy and who were not receiving chemotherapy. A finding of the study indicates a statistically significant difference in the mean FSI scores in the group receiving chemotherapy and the group not yet receiving chemotherapy among the cancer patients.

Banipal et al. (2017) did a study on 126 cancer patients and it was found that 80% of the participants experienced fatigue during their course of treatment and females were affected more as compared to males. Patients who received
Chemotherapy drugs like vinblastine, dacarbazine, and cyclophosphamide had statistically higher scores of fatigue (Banipal et al., 2017). A study done by Donovan et al. postulated that in women with early-stage breast cancer, chemotherapy is related to more severe fatigue than radiotherapy, which is similar to our results (Donovan et al., 2004). No doubt cancer is the major detrimental problem which has far-reaching effects on a patient's physical, mental, emotional and social aspects. Side effects of cancer-related fatigue are worldwide known. Among all these side effects, CRF directly affects the functional status of the patient. Hence, the present study has clearly indicated that patients receiving chemotherapy are at a greater verge of affection of CRF in comparison to those who are not receiving chemotherapy.

CONCLUSIONS

From the results, it is concluded that fatigue which is related to cancer, is highly common in the patients who are receiving chemotherapy than those who are not receiving chemotherapy. The primary reason of CRF is not well known and further research is necessary in order to develop effective, patient-centred management strategies and to improve quality of life and other outcomes. Thus the effective interventions are required to ease CRF both during and after the treatment.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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