

ASSESSMENT OF SYMPTOMS USING REVISED EDMONTON SYMPTOM ASSESSMENT SCALE (ESAS-r) IN CANCER PATIENT UNDERGOING CHEMOTHERAPY

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ABSTRACT

Background:

Cancer patients receiving chemotherapy experience a high and fluctuating symptom burden. The Revised Edmonton Symptom Assessment Scale (ESAS-r) enables rapid, patient-reported evaluation of key symptoms in routine care. This study assessed symptom severity and patterns among in-patients undergoing chemotherapy in the Department of Medical Oncology to inform supportive care.

Methods:

A prospective, descriptive study was conducted in the Medical Oncology ward at Mahatma Gandhi Medical College and Research Institute over 6 months (January–June 2025). Adults ($n = 160$) on chemotherapy were enrolled. ESAS-r (0–10) was administered once during admission, alongside demographic and clinical data (cancer type, treatment intent: curative vs palliative, regimen). Descriptive statistics were used; group comparisons (e.g., sex, regimen, intent) were explored with appropriate tests at $p < 0.05$.

Results:

Of 160 patients, 101 were females and 59 males. Curative chemotherapy accounted for 87 patients, with the remainder on palliative intent. The most frequent and burdensome ESAS-r symptoms were tiredness, lack of appetite, pain, drowsiness, and nausea, followed by shortness of breath, anxiety, and depression. Symptom severity tended to be higher with multi-agent regimens; women reported more nausea and anorexia, while men showed slightly higher pain/fatigue. Overall, ESAS-r captured clinically actionable symptom profiles suitable for bedside decision-making.

Conclusion:

Routine use of ESAS-r in oncology in-patients is feasible, fast, and informative, highlighting substantial, multidimensional symptom burden during chemotherapy. Integrating structured ESAS-r screening into daily rounds can trigger timely supportive care interventions and improve patient comfort and quality of life. Future work should evaluate serial ESAS-r tracking and outcomes across disease sites and treatment intents.

Keywords:

ESAS-r; chemotherapy; symptom burden; supportive care; Medical Oncology; patient-reported outcomes; palliative/curative intent

INTRODUCTION

Cancer is a condition characterized by uncontrolled and abnormal growth of cells. In a healthy individual, cells follow a regulated cycle of growth, division, and programmed cell death. In malignancy, this process is disrupted, leading to excessive proliferation and survival of abnormal cells. Cancers are classified based on the tissue or cell type from which they originate. Carcinomas are the most common type of cancer, arising from epithelial cells that line internal organs and body surfaces (1). Variants include basal cell carcinoma, which is particularly prevalent in skin. Sarcomas develop in connective tissues, including bone, cartilage, fat, blood vessels, lymphatic vessels, tendons and ligaments. Leukemias originate in the hematopoietic

(blood-forming) tissues of the bone marrow. Unlike solid tumors, leukemia leads to the accumulation of abnormal white blood cells that displace normal blood cells, impairing and normal haematopoiesis (2).

Lymphomas arise from lymphocytes, a type of immune cell. Abnormal lymphocytes accumulate in lymph nodes, lymphatic vessels, and other organs, disrupting normal immune function. Multiple myeloma affects plasma cells, a specialized type of immune cell. Abnormal plasma cells, known as myeloma cells, accumulate in the bone marrow, forming tumors throughout the skeletal system and impairing normal blood cell production. These classifications are important for understanding cancer biology, guiding diagnosis, and tailoring appropriate treatment strategies (3).

Not all tissue alterations indicate cancer, but some precancerous changes warrant attention due to their potential progression to malignancy if left untreated. Key examples include: Hyperplasia is characterized by an increased number of cells within a tissue. Despite this proliferation, the cells maintain normal structure and organization under microscopic examination (4). Dysplasia represents a more advanced abnormality. Cells are not only increased in number but also exhibit structural and functional irregularities, with disrupted tissue architecture. The degree of dysplasia correlates with a higher risk of progression to cancer. Carcinoma in situ, often termed stage 0 cancer, involves abnormal cells that remain confined to their site of origin and do not invade surrounding tissues. Although not technically malignant, it represents a critical precancerous stage that may progress to invasive cancer if untreated. Recognizing these precancerous conditions is essential for early intervention and cancer prevention (5,6).

Cancer can present with a wide range of symptoms that vary depending on the affected tissue or organ. While these signs are not specific to malignancy, they warrant timely medical evaluation: Changes in Bowel or Bladder Habits: Persistent diarrhea, constipation, frequent urination, or other unexplained changes. Non-Healing Sores: Wounds or ulcers that fail to heal within the expected timeframe. Unusual Bleeding or Discharge, Thickening or Lumps, Wart or Mole Changes: Alterations in size, shape, or color of existing moles or warts (7). Patients experiencing any of these signs should seek prompt medical evaluation. A healthcare professional can conduct a thorough history, physical examination, and appropriate diagnostic tests. If cancer is suspected, referral to a specialist oncologist is recommended for definitive diagnosis and treatment planning (8).

Accurate cancer diagnosis relies on a combination of laboratory, imaging, and molecular techniques, and selecting a hospital with expertise in these methods is crucial for effective care. Biopsy remains the gold standard, involving the collection of tissue from suspicious areas for microscopic examination by pathologists to confirm the presence of cancer cells. Histopathological studies further analyse tissue architecture and cellular abnormalities, providing critical insights into the nature of malignancy. Imaging techniques are essential for detecting and localizing tumors (9,10). Radiography, such as X-rays, helps identify abnormal masses, while computed tomography (CT) provides detailed cross-sectional images of solid organs and bones. Magnetic resonance imaging (MRI) offers high-resolution images, particularly useful for assessing soft tissue involvement. In recent years, molecular biology techniques have enhanced cancer detection by identifying genetic mutations and molecular markers associated with malignancy, allowing for more precise characterization of tumors. Staging is a pivotal step in guiding treatment and prognosis (11,12). The TNM classification—

representing Tumor size, Nodal involvement, and Metastasis—remains the most widely used system. Cancer is typically categorized into four stages: Stage I indicates a small, localized tumor with no spread; Stage II represents localized growth without distant involvement; Stage III involves larger tumors and possible regional lymph node or adjacent tissue involvement; and Stage IV indicates distant metastasis. Accurate staging enables clinicians to tailor treatment strategies and provide patients with an informed prognosis (13,14).

METHODS AND METHODOLOGY

From January to June 2025, a six-month prospective, descriptive observational study was carried out in the Department of Medical Oncology in Mahatma Gandhi Medical College and Research Institute's, Puducherry, India. A total of 160 adult in-patients undergoing chemotherapy were recruited. Inclusion criteria were: age ≥ 18 years, confirmed cancer diagnosis, and ability to communicate and provide consent. Patients who were critically ill, had impaired cognition, or declined consent were excluded.

Symptom burden and overall well-being were evaluated using the Edmonton Symptom Assessment System–Revised (ESAS-r), a validated patient-reported tool designed to measure the severity of nine common symptoms experienced by cancer patients: pain, tiredness, drowsiness, nausea, loss of appetite, shortness of breath, depression, anxiety, and overall well-being. In addition, an optional tenth symptom—constipation—was included in this study. Each symptom was rated on an 11-point numerical scale (0 = no symptom, 10 = worst possible severity).

The ESAS-r questionnaire was administered once during the patient's chemotherapy admission. Data collection was conducted using a pen-and-paper format, with patients randomly assigned to minimize administration bias. Brief guidance was provided to each participant to ensure correct interpretation of items and accurate scoring.

Clinical information, including demographic details, cancer type, disease stage, treatment regimen, and time since diagnosis, was extracted from medical records. Descriptive statistics (frequency distributions, means, standard deviations, medians, and ranges) were used to summarize baseline characteristics. Symptom scores were analyzed using univariate statistics, while between-group comparisons were performed using analysis of covariance adjusting for age, sex, cancer type, and mode of questionnaire administration. Where applicable, mixed linear models were employed to assess within-subject variations in symptoms.

The psychometric properties of ESAS-r, including internal consistency and construct validity, were also examined in this population to confirm reliability and applicability. This comprehensive approach enabled a nuanced understanding of the symptom burden in chemotherapy patients, thereby supporting the development of patient-centered supportive care strategies in the Indian oncology setting.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences SPSS software. Descriptive statistics were used to summarize sociodemographic and clinical characteristics. Continuous variables were expressed as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequencies and percentages. Associations between categorical variables (e.g., sex, treatment intent, regimen type) and ESAS-r symptom scores were examined using the Chi-square test or Fisher's exact

test where applicable. Comparisons of continuous variables (e.g., mean symptom scores) between groups were performed using the independent Student's t-test or one-way ANOVA. A p-value of < 0.05 was considered statistically significant.

RESULT

In this study, out of 160 patients, 1 patient was in the age group of 18–25 years, 54 patients were in the 25–45 years group, 57 patients were in the 46–65 years group, and the remaining 48 patients were aged >65 years. Both male and female patients were included, with 59 males and 101 females.

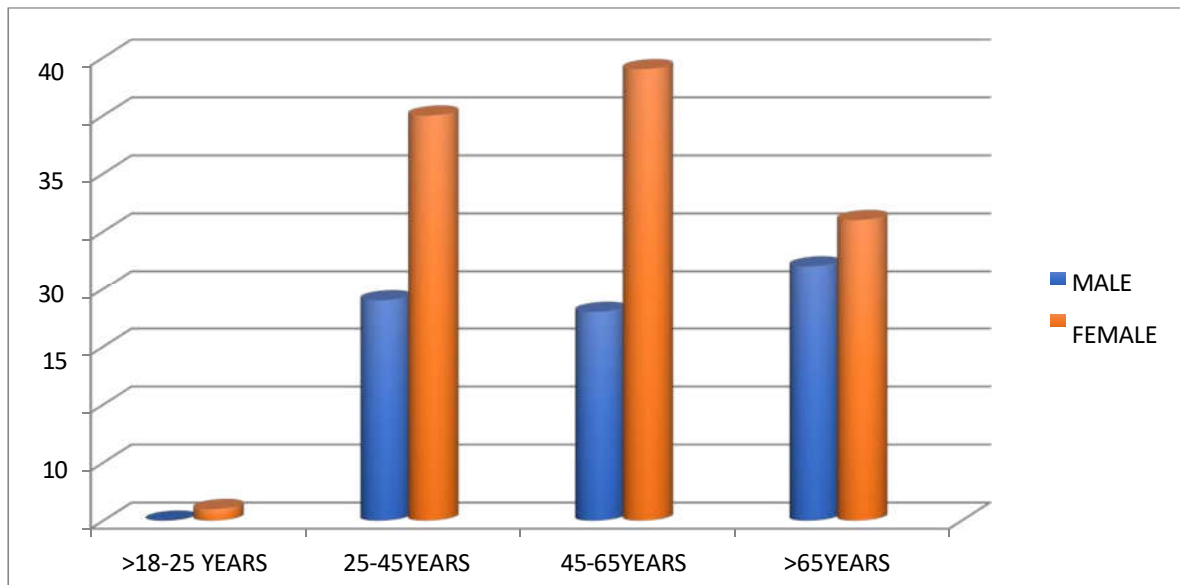


Fig 1: Incidence of Age and Gender Distribution

Of the 160 patients included in the study, 87 patients (54.3%) received curative chemotherapy, while 73 patients (45.6%) were on palliative chemotherapy, accounting for the total study population.

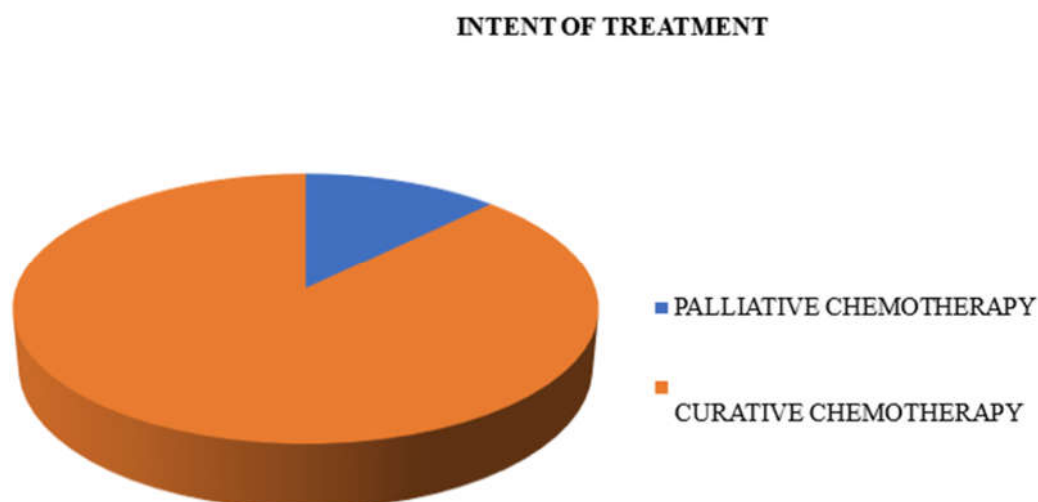


Fig 2: Incidence according to Intent of Treatment

The mean scores of the symptom scale are presented in that the mean scores were as follows: pain – 87.3, tiredness – 67.4, drowsiness – 54.8, nausea – 69.9, lack of appetite – 36.8, dyspnea – 30.1, depression – 29.7, anxiety – 32.4, and overall wellbeing – 67.8. Among these, pain had the highest mean score, whereas dyspnea had the lowest mean score.

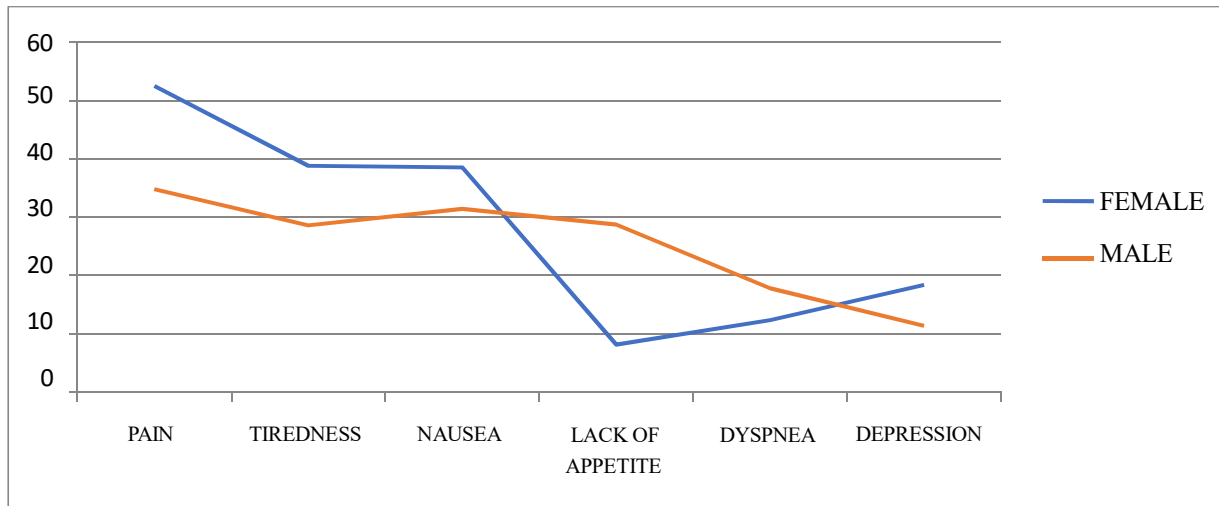


Fig 3: Distribution of symptom assessment scale score

In this study, out of 160 patients, 14 males and 29 females experienced mild pain, 19 males and 42 females reported moderate pain, and 26 males and 30 females experienced severe pain.

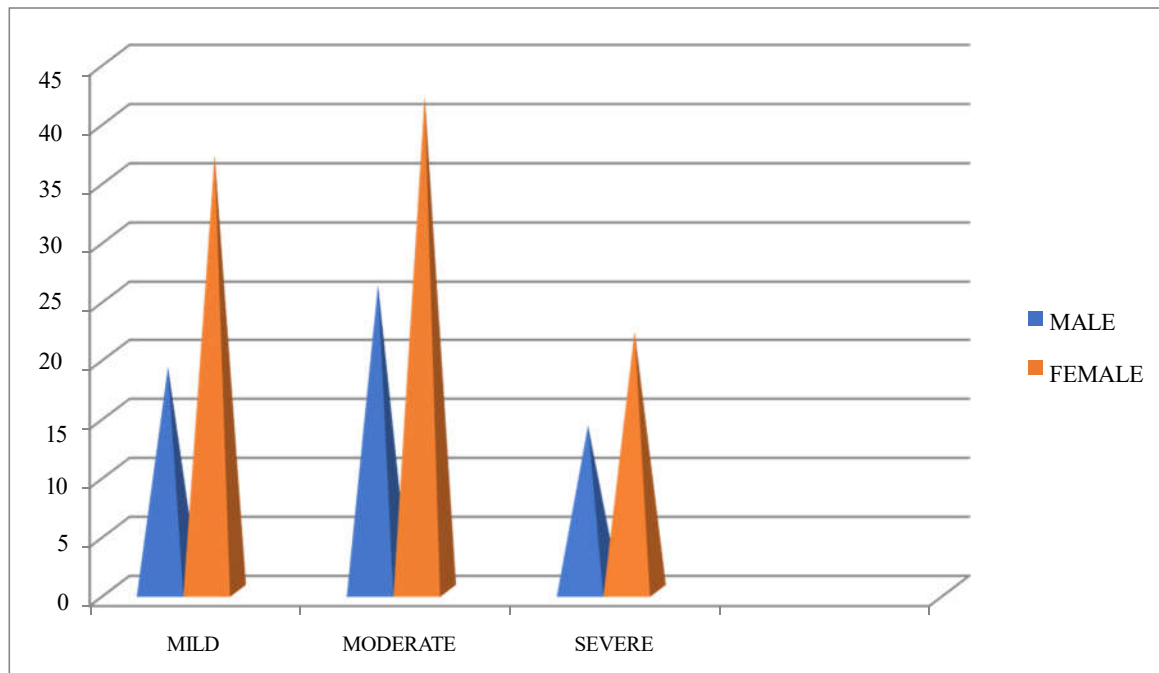


Fig 4: Frequency of Pain based on Gender

In this study, out of 160 patients, 23 males and 38 females experienced mild tiredness, 19 males and 34 females reported moderate tiredness, and 17 males and 29 females experienced severe tiredness.

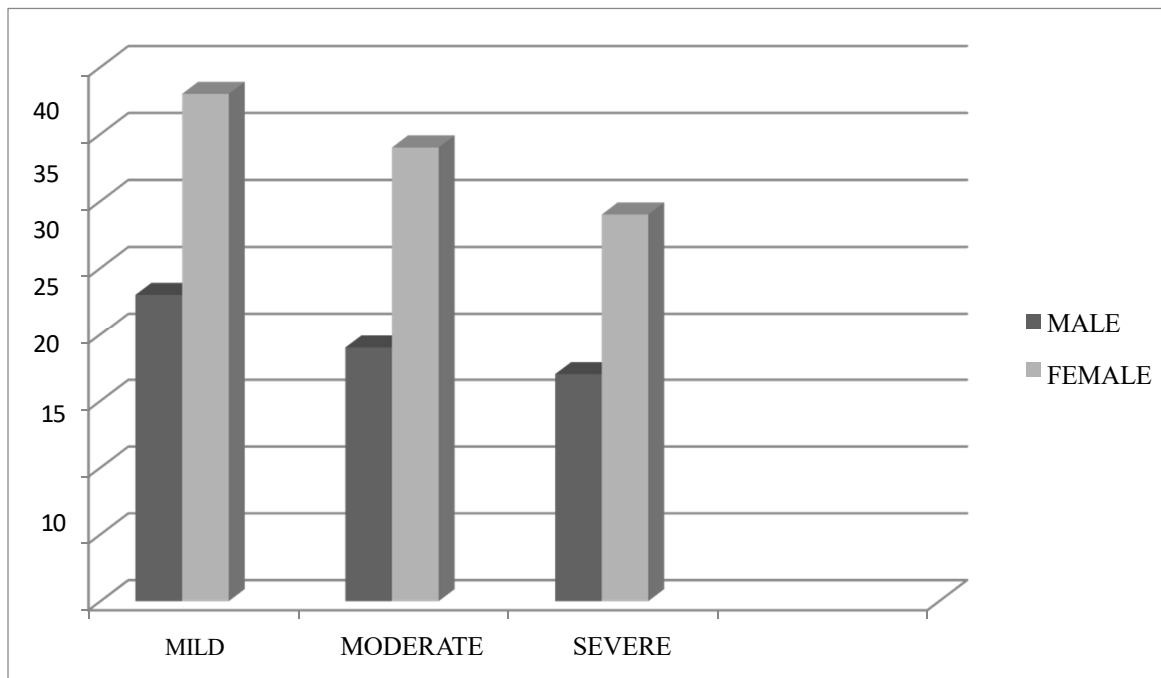


Fig 5: Frequency of tiredness based on Gender

In this study, out of 160 patients, 26 males and 47 females experienced mild drowsiness, 23 males and 39 females reported moderate drowsiness, and 10 males and 15 females experienced severe drowsiness.

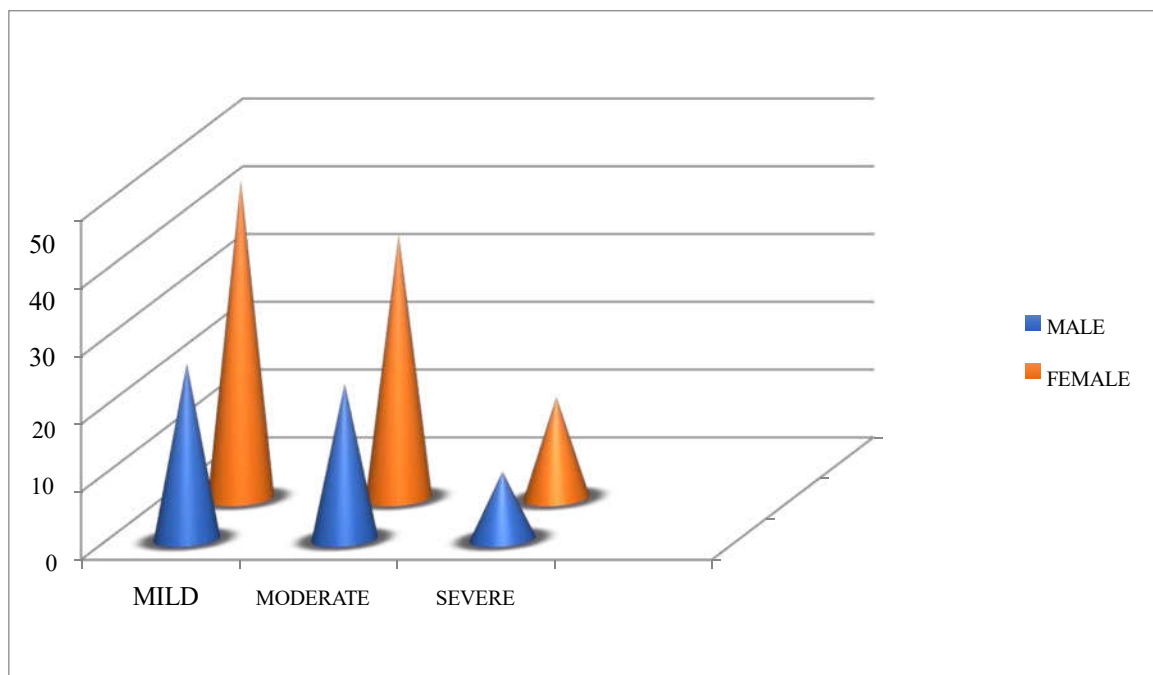


Fig 6: Frequency of drowsiness based on Gender

In this study, out of 160 patients, 23 males and 36 females experienced mild nausea, 20 males and 44 females reported moderate nausea, and 16 males and 21 females experienced severe nausea.

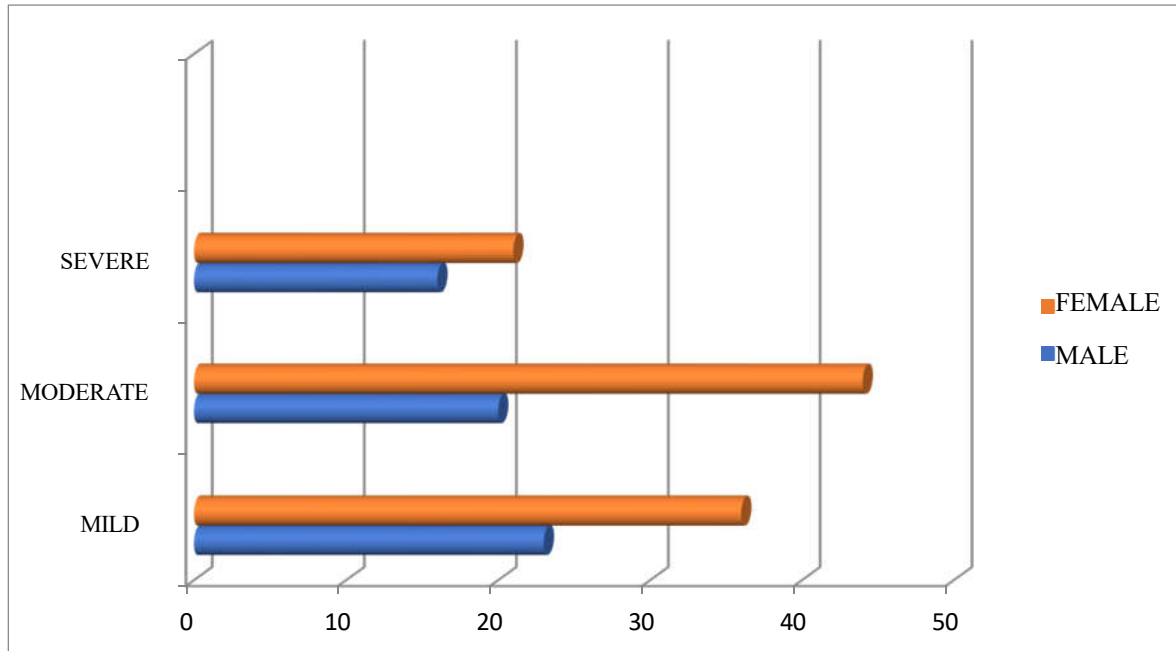


Fig 7: Frequency of nausea based on Gender

In this study, out of 160 patients, 21 males and 54 females experienced mild loss of appetite, 26 males and 34 females reported moderate loss of appetite, and 12 males and 13 females experienced severe loss of appetite.

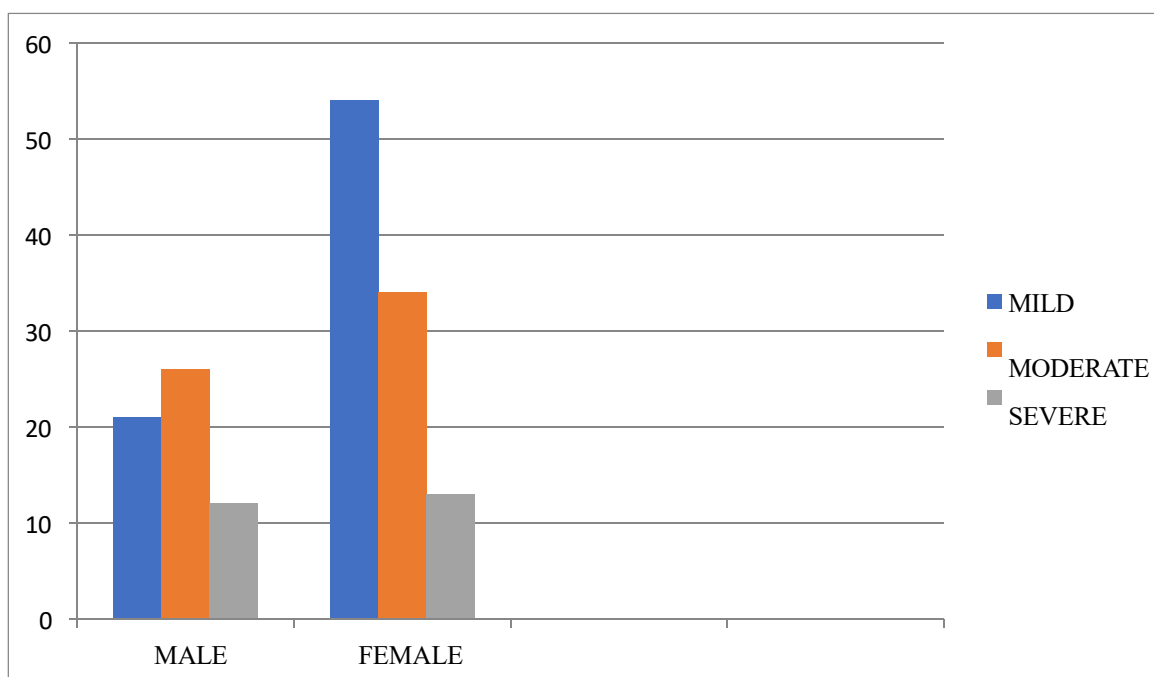


Fig 8: Frequency of appetite based on Gender

In this study, out of 160 patients, 14 males and 45 females experienced mild shortness of breath, 24 males and 43 females reported moderate shortness of breath, and 21 males and 13 females experienced severe shortness of breath.

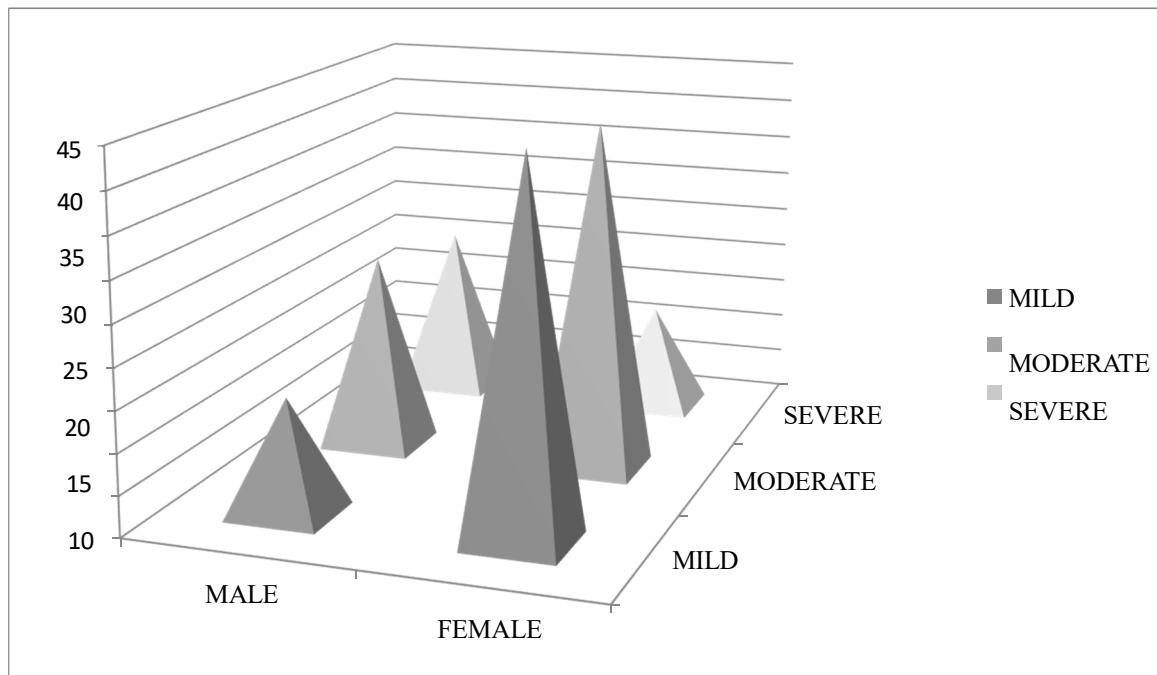


Fig 9: Frequency of shortness of breath based on Gender

In this study, out of 160 patients, 15 males and 19 females experienced mild depression, 25 males and 39 females reported moderate depression, and 19 males and 43 females experienced severe depression.

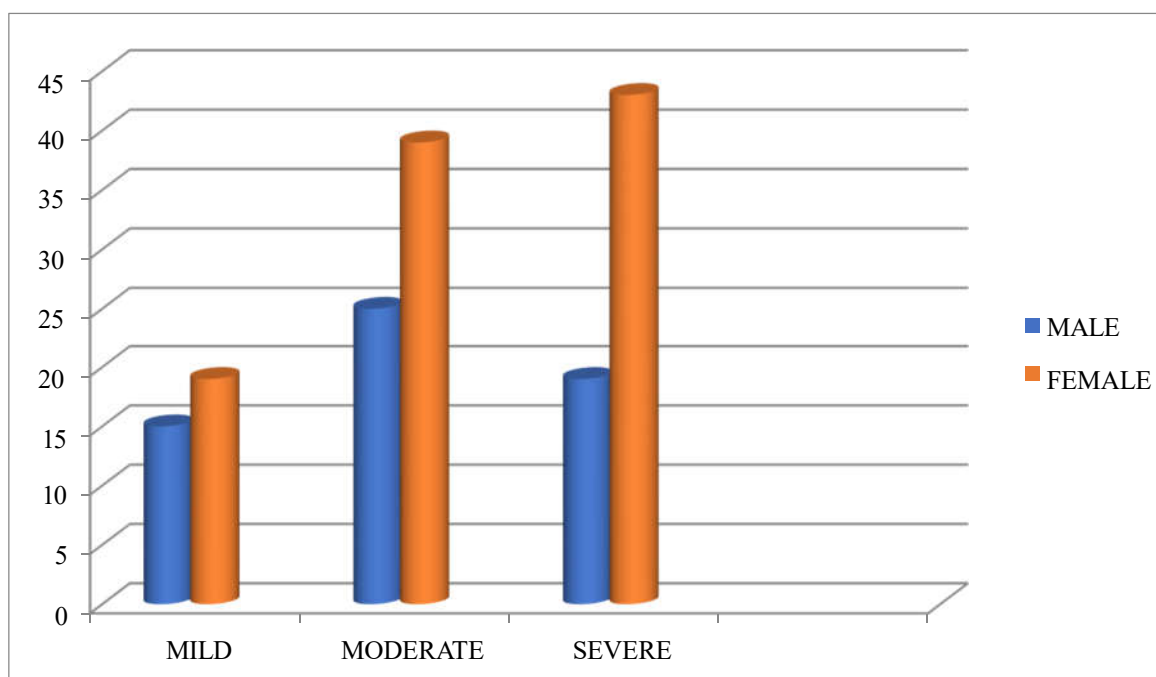


Fig 10: Frequency of depression based on Gender

In this study, out of 160 patients, 15 males and 25 females experienced mild anxiety, 28 males and 45 females reported moderate anxiety, and 16 males and 31 females experienced severe anxiety.

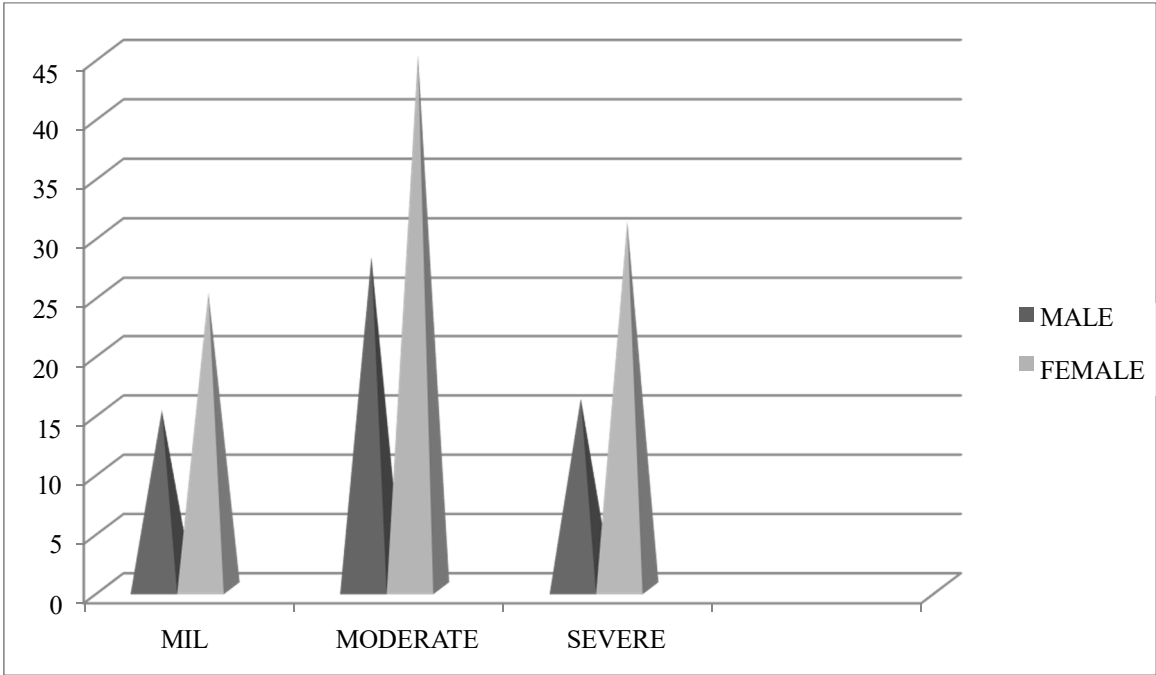


Fig 11: Frequency of anxiety based on Gender

DISCUSSION

This study evaluated the symptom burden in hospitalized cancer patients undergoing chemotherapy using the Revised Edmonton Symptom Assessment Scale (ESAS-r). The findings highlight that tiredness, pain, lack of appetite, and anxiety were the most frequently reported symptoms, consistent with results from previous oncology-based studies (McLay K et al., 2024; Zhan et al., 2024). Such symptoms not only compromise quality of life but may also interfere with treatment compliance, underscoring the importance of structured symptom monitoring (1).

The use of ESAS-r in this study proved effective in capturing real-time symptom severity. Importantly, symptom-specific interventions led to a reduction in intensity for pain, nausea, and fatigue, supporting the value of ongoing symptom surveillance. Similar observations have been reported in international studies, where routine use of ESAS has improved communication between patients and clinicians, enabling timely supportive care measures, Bruera et al., 2015. Lu Y, Chuang Y et al, (2024) study systematically evaluates existing evidence on the effectiveness of single-item scales in identifying fatigue among cancer patients. Through meta-analysis, it summarizes diagnostic accuracy, highlighting their potential as simple yet reliable tools for screening fatigue in clinical settings (3).

Zhan Z et al, (2024) explores the prevalence and characteristics of anxiety and depression among individuals diagnosed with nasopharyngeal carcinoma in an area where the disease is highly common. Using a cross-sectional design, the research applies network analysis to map the relationships among psychological symptoms, aiming to identify the most central and

influential symptoms within anxiety and depression clusters. These findings may help guide targeted mental health interventions and improve psychosocial support for patients in such high-risk populations (4). Pedersen M et al, (2024) reviewed evaluates the impact of various non-pharmacological strategies—such as physical exercise, psychological support, nutritional counseling, and complementary therapies—on symptom relief and overall quality of life in patients with hematological cancers. The study synthesizes evidence across multiple interventions, highlighting their role in reducing treatment-related side effects, improving emotional well-being, and enhancing daily functioning, thereby providing supportive care options alongside conventional treatments (2).

Royset I et al., (2022) reported that symptom severity was observed to be higher among patients receiving multi-agent chemotherapy and those with advanced-stage disease, aligning with prior evidence that more aggressive regimens and advanced disease contribute to cumulative symptom burden. Gender differences were also noted: female patients reported higher levels of anxiety and depression, while male patients reported greater pain and fatigue. These findings are comparable to earlier Indian and global studies that describe variations in symptom perception and reporting across sexes (5).

Overall, the study demonstrates that ESAS-r is a practical and reliable tool for evaluating symptom burden in Indian oncology in-patients. Its ease of administration and patient acceptability make it feasible for use in busy clinical settings. Integrating ESAS-r into routine oncology practice can help clinicians identify underreported symptoms, deliver targeted supportive care, and personalize treatment responses.

Future research should focus on serial assessments of ESAS-r across treatment cycles and correlate symptom trajectories with survival, quality of life, and treatment adherence outcomes. Broader multicenter studies will help validate these findings and support the integration of structured symptom assessment into standard oncology care pathways in India.

CONCLUSION

This study highlights the significant symptom burden experienced by cancer patients undergoing chemotherapy, with tiredness, pain, appetite loss, and anxiety emerging as the most prevalent concerns. The use of the Revised Edmonton Symptom Assessment Scale (ESAS-r) proved to be a simple, reliable, and patient-friendly tool for capturing real-time symptom severity and guiding supportive care interventions. Integrating ESAS-r into routine oncology practice can improve communication between patients and clinicians, facilitate early recognition of distressing symptoms, and enable timely, individualized management strategies. Such structured symptom monitoring has the potential to enhance patient comfort, treatment adherence, and overall quality of life. Future studies with serial ESAS-r assessments and larger, multicenter cohorts are warranted to confirm these findings and to evaluate the long-term benefits of systematic symptom assessment in oncology care.

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