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ASSESSMENT OF CHEMOTHERAPY-INDUCED AGEUSIA AND ANOSMIA: IMPLICATIONS ON QUALITY OF LIFE IN CANCER PATIENTS

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Abstract

Background: Chemotherapy-induced sensory impairments, such as ageusia (loss of taste) and anosmia (loss of smell), are common yet underreported adverse effects of cancer treatment. These impairments can negatively impact nutritional intake, psychological well-being, and overall quality of life (QoL) in patients undergoing chemotherapy. The objective is to evaluate the prevalence of chemotherapy-induced ageusia and anosmia in cancer patients, analyze their impact on QoL, and identify gender-specific and treatment-specific variations. **Materials and Methods:** A prospective observational study was conducted involving 100 cancer patients (51 males and 49 females) undergoing chemotherapy. Participants were assessed using the EORTC QLQ-C30 questionnaire and self-reported sensory dysfunction questionnaires. Statistical analysis included descriptive statistics and inferential tests to evaluate group differences, with significance set at $p < 0.05$. **Result:** Ageusia was reported by 62% of participants, while anosmia affected 45%. Sensory impairments were most prevalent among lung cancer patients treated with Paclitaxel (29%), followed by breast cancer patients treated with Trastuzumab and Adriamycin (22% each). Gender-specific analysis revealed a higher mean age in females (53.6 ± 13.92) compared to males (46.2 ± 12.15). QoL analysis demonstrated significant impairments in emotional functioning ($F = 4.12$, $p = 0.03$) and social functioning ($F = 3.87$, $p = 0.04$). Among patients with sensory impairments, emotional functioning scores were particularly low (mean ± SD = 8.33 ± 3.79 for breast cancer patients on Trastuzumab). **Conclusion:** Chemotherapy-induced ageusia and anosmia significantly affect cancer patients, with notable gender and treatment-specific differences. These impairments severely impact QoL, especially emotional and social dimensions. Integrative care strategies, including nutritional counseling and psychological support, are essential to mitigate these effects and improve patient outcomes.

INTRODUCTION

Despite being one of the major causes of death globally, cancer treatments such as chemotherapy play a significant role in managing the disease. However, chemotherapy is known to cause a range of adverse effects, including sensory dysfunctions such as ageusia and anosmia.[1] These conditions, which include altered or diminished taste and smell, can significantly affect the patient's nutritional status, emotional well-being, and social interactions, ultimately impairing their QoL.[2,3] Despite the profound effects of sensory impairments, these remain underreported in the clinical settings and are, thus, inadequately managed. Literature existing to date underscores the physiological basis of chemotherapy-induced sensory changes, like the damage caused to taste buds, salivary glands, or olfactory receptors by cytotoxic agents. There is a need for more extensive research studies regarding the prevalence, gender-specific differences, and QoL impacts of such impairments in Indian cancer patients.[4-8] This study intended to bridge this gap by estimating the prevalence and QoL implications of chemotherapy-induced ageusia and anosmia in a cohort of cancer patients. The findings are expected

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to guide clinical practice and support interventions to mitigate sensory impairments.[9-11]

MATERIALS AND METHODS

Study Design: It was a prospective observational study conducted in King George Hospital, Visakhapatnam from July 2024 to Nov 2024. Ethical approval was obtained and written informed consent was taken from all the individuals.

Study Population

Inclusion Criteria

- Adult patients (age 18 years or older) undergoing chemotherapy treatment.
- Histopathological proven cancer patients.
- Patient who active on chemotherapy patients.
- Willing and able to provide informed consent to participate in the study.

Exclusion Criteria

- Patients not undergoing chemotherapy treatment.
- Patients with pre-existing taste or smell disorders unrelated to chemotherapy.
- Individuals with significant cognitive impairment or communication barriers that prevent understanding or completion of study procedures.
- Pregnant or lactating women, because of possible effects of chemotherapy on fetal development or lactation.

Study Tools and Instruments: To measure the various aspects of ageusia, anosmia, and quality of life, the following validated questionnaires are used:

Chemotherapy-Induced Taste Alteration Scale (CiTAS): This is a 18-item scale meant to measure taste alterations due specifically to chemotherapy. It measures the degree of change in sensitivity to different taste modalities that include sweet, sour, salty, bitter, and umami.[5]

Self-Administered Odor Questionnaire (SAOQ): The tool comprises multiple-choice questions in assessing the ability to perceive and identify odors. Items that are included in the SAOQ relate to the presence of anosmia, hyposmia, and distortions in the perception of odor (parosmia).[6]

Quality of Life (QoL) Assessment using the EORTC QLQ-C30: The EORTC QLQ-C30 is a widely used questionnaire that assesses the overall quality of life of cancer patients. It includes multi-dimensional scales that measure physical, emotional, social, and functional well-being, providing a comprehensive overview of how cancer treatment affects patients' lives.[7]

Data Collection Procedures

a) **Baseline assessment:** At the time of admission, all participants received a baseline assessment including: Demographic data (age, gender, type of cancer, stage of cancer, and chemotherapy regimen). Taste and smell assessments with the CiTAS and SAOQ at the onset.

b) **Follow-Up Evaluations:** Those patients who were actively on chemotherapy were followed up over the 12-week study period for any changes in their ability to taste and smell. Evaluations were done at times that coincided with their chemotherapy cycles (e.g., every 2–3 weeks depending on their regimen). Each evaluation used the re-administration of the CiTAS and SAOQ surveys to assess any change in taste and smell perception over time. In addition, the patients completed the EORTC QLQ-C30 or FACT-G (Quality of Life questionnaires) to assess the effects of ageusia and anosmia on their overall quality of life.

RESULTS

Demographic and Clinical Characteristics: The study had 51 male participants (51%) and 49 female participants (49%). The mean age was 46.2 ± 12.15 years for males and 53.6 ± 13.92 years for females. Participants were classified based on cancer type and chemotherapy regimen. [Table 1] shows the distribution of participants by gender, cancer type, and chemotherapy regimen.

Table 1: Participant Distribution by Gender, Cancer Type, & Chemotherapy Regimen.

S. No.	Gender	Cancer Type	Chemotherapy Drug	No.of Participants
1	Female	Breast Cancer	Trastuzumab	22
2	Female	Breast Cancer	Adriamycin	22
3	Male	Colon-Rectal Cancer	Capecitabine	22
4	Female	Colon-Rectal Cancer	Capecitabine	5
5	Male	Lung Cancer	Paclitaxel	29
Total				**100**

Table 2: Mean and Standard Deviation (SD) of Ageusia Factors in Cancer Patients

Factor	Drug	Mild (Mean ± SD)	Moderate (Mean ± SD)	Severe (Mean ± SD)
Decline in Basic Taste & Parageusia	Adriamycin	10.2 ± 3.2	20.5 ± 3.6	39.8 ± 4.3
	Trastuzumab	8.7 ± 2.4	18.4 ± 3.1	36.7 ± 4.2
	Capecitabine	11.1 ± 3.4	22.2 ± 4.1	36.6 ± 4.6
	Paclitaxel	9.5 ± 3.0	21.6 ± 3.8	35.2 ± 4.7
Discomfort	Adriamycin	9.0 ± 2.5	18.7 ± 3.0	38.2 ± 4.0
	Trastuzumab	7.8 ± 2.2	17.2 ± 3.0	35.0 ± 4.3
	Capecitabine	10.3 ± 3.3	21.8 ± 4.2	37.8 ± 4.9
	Paclitaxel	8.0 ± 2.3	19.3 ± 3.6	34.8 ± 4.2
Phantogeusia &	Adriamycin	6.8 ± 2.1	16.3 ± 3.1	35.0 ± 4.1

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Parageusia	Trastuzumab	5.9 ± 1.9	15.5 ± 2.8	32.1 ± 3.9
	Capecitabine	7.2 ± 2.3	17.5 ± 3.4	34.0 ± 4.5
	Paclitaxel	6.3 ± 2.0	16.1 ± 3.3	33.2 ± 4.4
General Taste Alteration	Adriamycin	11.0 ± 3.3	22.3 ± 3.7	40.1 ± 4.5
	Trastuzumab	9.4 ± 2.6	20.2 ± 3.3	37.9 ± 4.4
	Capecitabine	12.0 ± 3.5	23.4 ± 4.5	38.8 ± 5.0
	Paclitaxel	10.5 ± 3.1	22.1 ± 4.0	36.5 ± 4.8

[Table 2] Mean & SD for the various factors of ageusia in the patients treated with chemotherapy: drug types, mild, moderate, and severe. The factors evaluated were Decline in Basic Taste & Parageusia, Discomfort, Phantogeusia & Parageusia, and General Taste Alteration. The other drugs evaluated were Adriamycin, Trastuzumab, Capecitabine, and Paclitaxel. For almost all the factors, there was a higher mean in all the severity levels regarding Adriamycin. Of all the factors, one was Decline in Basic Taste & Parageusia, and for its mean values in severe conditions, the range was found to be 35.2 ± 4.7 for Paclitaxel and 39.8 ± 4.3 for Adriamycin. Similarly, Discomfort scores in severe cases ranged from 34.8 ± 4.2 for Paclitaxel to 38.2 ± 4.0 for Adriamycin. Phantogeusia & Parageusia showed low mean values compared to other factors, with severe cases ranging from 32.1 ± 3.9 for Trastuzumab to 35.0 ± 4.1 for Adriamycin. Finally, General Taste Alteration had the highest mean scores overall, ranging from 36.5 ± 4.8 for Paclitaxel to 40.1 ± 4.5 for Adriamycin.

Table 3: ANOVA Results for Ageusia Factors in Cancer Patients

Factor	Drug	F-statistic	p-value
Decline in Basic Taste & Parageusia	Adriamycin	45.92	0.0005
	Trastuzumab	6.93	0.004
	Capecitabine	8.21	0.002
	Paclitaxel	3.85	0.025
Discomfort	Adriamycin	5.53	0.012
	Trastuzumab	9.12	0.001
	Capecitabine	4.67	0.015
	Paclitaxel	8.00	0.003
Phantogeusia & Parageusia	Adriamycin	4.23	0.017
	Trastuzumab	7.58	0.001
	Capecitabine	5.21	0.013
	Paclitaxel	6.14	0.005
General Taste Alteration	Adriamycin	11.83	0.0007
	Trastuzumab	3.91	0.026
	Capecitabine	6.55	0.007
	Paclitaxel	4.12	0.019

The ANOVA analysis found significant differences in ageusia-related factors among the cancer patients receiving different chemotherapy drugs. For the Decline in Basic Taste & Parageusia factor, Adriamycin had the greatest effect, with an F-statistic of 45.92 ($p = 0.0005$), which meant that there was a very strong association between the drug and progressive taste decline at all levels of severity. Trastuzumab ($F = 6.93$, $p = 0.004$) and Capecitabine ($F = 8.21$, $p = 0.002$) were also significant, especially for severe cases, whereas the effect of Paclitaxel was relatively smaller but nonetheless statistically significant ($F = 3.85$, $p = 0.025$). In terms of Discomfort, Adriamycin caused a steady increase in discomfort with severity levels ($F = 5.53$, $p = 0.012$), while Trastuzumab recorded the highest variability ($F = 9.12$, $p = 0.001$), with significant discomfort in mild and severe cases. Capecitabine ($F = 4.67$, $p = 0.015$) and Paclitaxel ($F = 8.00$, $p = 0.003$) also significantly influenced patient discomfort, particularly in the severe category. The Phantogeusia & Parageusia factor, which examines phantom and altered taste sensations, showed that Adriamycin ($F = 4.23$, $p = 0.017$) and Trastuzumab ($F = 7.58$, $p = 0.001$) significantly affected taste perceptions, with Trastuzumab having a more pronounced impact in moderate cases. In phantom taste sensations, Capecitabine had $F = 5.21$, $p = 0.013$ and Paclitaxel had $F = 6.14$, $p = 0.005$, where increased phantom taste sensations occurred in severe cases. General Taste Alteration showed Adriamycin with the highest effect ($F = 11.83$, $p = 0.0007$) reflecting considerable changes in the perception of general taste at all the levels of severity. Trastuzumab had significant changes especially in severe cases ($F = 3.91$, $p = 0.026$). Capecitabine had the greatest variation ($F = 6.55$, $p = 0.007$). Paclitaxel showed moderate but statistically significant variations in all severities ($F = 4.12$, $p = 0.019$).

Table 4: Mean and SD of Chemotherapy-Induced Anosmia in Cancer Patients by Medication

Cancer Type	Medication	Part	Mean ± SD
Breast Cancer	Adriamycin	Part 1 (General Function)	7.33 ± 5.77
		Part 2 (Specific Problem)	7.33 ± 7.09
		Part 3 (Impact on QoL)	7.67 ± 3.21
	Trastuzumab	Part 1 (General Function)	7.33 ± 7.57

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		Part 2 (Specific Problem)	7.33 ± 4.04
		Part 3 (Impact on QoL)	7.33 ± 5.51
Colon Rectum	Capecitabine	Part 1 (General Function)	9.00 ± 9.85
		Part 2 (Specific Problem)	9.00 ± 8.19
		Part 3 (Impact on QoL)	9.00 ± 8.19
Lung Cancer	Paclitaxel	Part 1 (General Function)	9.67 ± 0.58
		Part 2 (Specific Problem)	9.67 ± 4.73
		Part 3 (Impact on QoL)	9.67 ± 6.66

The descriptive statistics [Table 4] reveal variability in anosmia severity across different cancer types and medications. For breast cancer patients receiving Adriamycin, the mean severity for general function (Part 1) was 7.33, with a high SD of 5.77, indicating substantial variability. The impact on QoL (Part 3) showed a slightly higher mean (7.67) with lower variability (SD = 3.21). Similarly, the Trastuzumab group showed similar means across the parts but with higher variability, especially in Part 1 (SD = 7.57). In contrast, Capecitabine-treated colon cancer patients had consistent means of 9.00 across all parts but with high variability in general (SD = 9.85 for Part 1). Paclitaxel-treated lung cancer patients had the highest mean severity, 9.67, with minimum variability in general function, SD = 0.58, but higher variation in specific problems, SD = 4.73, and QoL impact, SD = 6.66.

Table 5: ANOVA and Post Hoc Test Results for Chemotherapy-Induced Anosmia Severity Across Different Medications

Source	**F-statistic**	**p-value**	**Interpretation**
ANOVA	4.76	0.011	Significant difference in severity across the treatment groups.
Post Hoc Test (Tukey HSD)	Comparison	p-value	Interpretation
	Adriamycin vs Paclitaxel	0.005	Significant difference: Paclitaxel causes higher severity of anosmia.
	Adriamycin vs Trastuzumab	0.007	Significant difference: Paclitaxel causes higher severity of anosmia.
	Adriamycin vs Capecitabine	0.043	Significant difference: Adriamycin causes lower severity compared to Capecitabine.
	Trastuzumab vs Capecitabine	0.196	No significant difference.
	Trastuzumab vs Paclitaxel	0.060	No significant difference.
	Capecitabine vs Paclitaxel	0.117	No significant difference.

This table gives the one-way ANOVA result to analyze severity of chemotherapy-induced anosmia across different chemotherapy medications. The ANOVA findings show that there is an overall statistical difference in the severity of anosmia between the groups of medications (p = 0.011). Subsequently, the Tukey's HSD test was carried out to compare the mean differences between the pairs of the groups. Significant differences between Paclitaxel and Adriamycin, p = 0.005; Paclitaxel and Trastuzumab, p = 0.007; and Adriamycin and Capecitabine, p = 0.043; the differences also indicate that Paclitaxel is more significantly associated with higher severity of anosmia compared to Adriamycin, and Trastuzumab and causes less severity of anosmia compared to Capecitabine. The rest of other pairs were not significantly associated. These findings suggest that chemotherapy drugs could be different for various cancers and might differ in the intensity of anosmia they induce.

Table 6: Temporal Fluctuations in Ageusia Symptoms Post-Chemotherapy

Week Range	**Adriamycin (N=22)**	**Trastuzumab (N=22)**	**Capecitabine (N=27)**	**Paclitaxel (N=29)**
1-5	63.64% (14)	59.09% (13)	59.26% (16)	65.52% (19)
6-10	22.73% (5)	27.27% (6)	25.93% (7)	20.69% (6)
11-15	13.64% (3)	13.64% (3)	14.81% (4)	13.79% (4)

The temporal data indicates variability in ageusia symptom incidence over 15 weeks. Weeks 1-5 recorded the highest incidence of moderate ageusia for Paclitaxel at 65.52%, followed by Adriamycin at 63.64%, Capecitabine at 59.26%, and Trastuzumab at 59.09%. Incidence of symptoms decreased as time progressed, with considerable drops to 22.73% and 20.69% for Adriamycin and Paclitaxel, respectively, in weeks 6-10. At weeks 11-15, symptoms remained, albeit at lower rates, across all medications, with the highest persistence rates in Paclitaxel (13.79%) and Adriamycin (13.64%).

Table 7: Temporal Fluctuations in Anosmia Symptoms Post-Chemotherapy

Week Range	**Adriamycin (N=22)**	**Trastuzumab (N=22)**	**Capecitabine (N=27)**	**Paclitaxel (N=29)**
1-5	54.55% (12)	68.18% (15)	59.26% (16)	62.07% (18)
6-10	22.73% (5)	18.18% (4)	18.52% (5)	17.24% (5)
11-15	22.73% (5)	13.64% (3)	22.22% (6)	20.69% (6)

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The symptom of anosmia tended similarly to that of ageusia. In weeks 1-5, the maximum prevalence of anosmia was noted with Trastuzumab (68.18%), followed by Paclitaxel at 62.07%, then Capecitabine at 59.26% and lastly Adriamycin at 54.55%. In weeks 6-10, the prevalence considerably reduced for all the treatment arms, but again the minimum persistence was seen with Trastuzumab at 18.18%. Yet in weeks 11-15, persistence was seen in almost 22.73% of Adriamycin and 22.22% of Capecitabine, indicating moderate continuation in the respective groups.

Table 8: Quality of Life Scores Across Different Cancer Types and Chemotherapy treatment

Domain	Breast Cancer (Adriamycin, Trastuzumab)	Colon Rectum Cancer (Capecitabine)	Lung Cancer (Paclitaxel)
Physical Functioning	7.33 ± 3.79	11.00 ± 3.24	7.67 ± 2.31
Role Functioning	7.67 ± 3.79	8.00 ± 3.00	8.33 ± 2.89
Emotional Functioning	8.33 ± 3.79	5.00 ± 3.00	12.33 ± 5.12
Cognitive Functioning	7.67 ± 3.79	6.00 ± 3.00	6.33 ± 3.60
Social Functioning	8.33 ± 3.79	6.33 ± 3.00	8.00 ± 5.20
Global Health Status/QoL	6.33 ± 3.79	9.00 ± 3.24	8.00 ± 3.30
Fatigue	9.00 ± 3.00	10.00 ± 4.00	7.67 ± 3.20
Nausea/Vomiting	6.33 ± 3.00	6.33 ± 3.00	5.00 ± 3.60
Pain	9.00 ± 3.00	12.00 ± 2.00	10.00 ± 5.12
Dyspnoea	6.33 ± 2.89	6.33 ± 2.00	8.67 ± 4.00
Insomnia	7.33 ± 2.89	7.67 ± 3.00	5.67 ± 3.00
Appetite loss	6.33 ± 2.89	7.33 ± 3.00	7.67 ± 4.00
Constipation	7.00 ± 3.00	7.00 ± 4.00	7.00 ± 4.00
Diarrhoea	6.33 ± 2.89	9.00 ± 4.00	7.00 ± 4.00
Financial Difficulties	6.67 ± 3.79	9.33 ± 3.79	7.33 ± 3.00

The [Table 8] shows Quality of Life (QoL) scores for patients suffering from breast cancer (Adriamycin, Trastuzumab), colon rectum cancer (Capecitabine), and lung cancer (Paclitaxel). Scores greater than the mean in domains like Physical Functioning, Role Functioning, and Emotional Functioning show better QoL. Colon rectum cancer patients have the highest score for physical functioning at 11.00 ± 3.24, while lung cancer patients have the highest emotional functioning score at 12.33 ± 5.12. The highest levels of fatigue were reported by colon rectum cancer patients (10.00 ± 4.00), followed by pain among the same patients (12.00 ± 2.00). The lung cancer patients showed the highest levels of dyspnoea (8.67 ± 4.00). The QoL and symptom burden varied across cancertreatments, thus there is a need for targeted.

Table 9: ANOVA Results: Quality of Life Across Cancer Types and Treatments

Domain	Cancer Type	Medication	F-statistic	p-value
Physical Functioning	Breast Cancer	Adriamycin, Trastuzumab	2.35	0.08
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Role Functioning	Breast Cancer	Adriamycin, Trastuzumab	5.23	0.01
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Emotional Functioning	Breast Cancer	Adriamycin, Trastuzumab	4.12	0.03
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Cognitive Functioning	Breast Cancer	Adriamycin, Trastuzumab	1.80	0.17
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Social Functioning	Breast Cancer	Adriamycin, Trastuzumab	3.87	0.04
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Cont… ANOVA Results for Functional Domains and Quality of Life Across Cancer Types and Treatments				
Global Health Status/QoL	Breast Cancer	Adriamycin, Trastuzumab	2.98	0.05
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		

ANOVA analysis [Table 9] indicated a differential interaction of cancer type and treatment with patient functioning and quality of life. Physical Functioning showed no significant differences between the different types of cancer as well as treatments, F = 2.35, p = 0.08. However, Role Functioning (F = 5.23, p = 0.01) and Emotional Functioning (F = 4.12, p = 0.03) had significant differences, meaning that the treatments affected daily roles and emotional well-being differently across cancer types. Similarly, Social Functioning (F = 3.87, p = 0.04) differed significantly, reflecting the various social impacts of treatments. Global Health Status/QoL also differed significantly (F = 2.98, p = 0.05), with differences in the general health and quality of life. Cognitive Functioning did not differ significantly (F = 1.80, p = 0.17), indicating that cognitive effects were similar across treatment groups. Overall, cancer treatments had a significant impact on role, emotional, social, and overall health

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functioning but had less of an impact on physical and cognitive functioning.

Table 10: ANOVA Results for Side Effects and Financial Difficulties Across Cancer Types and Treatments

Domain	Cancer Type	Medication	F-statistic	p-value
Fatigue	Breast Cancer	Adriamycin, Trastuzumab	1.65	0.20
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Nausea/Vomiting	Breast Cancer	Adriamycin, Trastuzumab	3.08	0.04
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Pain	Breast Cancer	Adriamycin, Trastuzumab	2.91	0.05
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Dyspnoea	Breast Cancer	Adriamycin, Trastuzumab	2.15	0.08
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Insomnia	Breast Cancer	Adriamycin, Trastuzumab	4.00	0.03
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Cont… ANOVA Results for Side Effects and Financial Difficulties Across Cancer Types and Treatments				
Appetite Loss	Breast Cancer	Adriamycin, Trastuzumab	2.75	0.06
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Constipation	Breast Cancer	Adriamycin, Trastuzumab	3.40	0.04
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Diarrhoea	Breast Cancer	Adriamycin, Trastuzumab	2.05	0.09
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		
Financial Difficulties	Breast Cancer	Adriamycin, Trastuzumab	1.92	0.16
	Colon Rectum Cancer	Capecitabine		
	Lung Cancer	Paclitaxel		

The ANOVA analysis showed varying impacts of cancer type and treatment on different side effects and patient experiences. The side effect of fatigue did not vary significantly by type of cancer and treatment ($F = 1.65$, $p = 0.20$), which says that all three groups of treatment had almost the same degree of fatigue. In contrast, Nausea/Vomiting showed significant differences ($F = 3.08$, $p = 0.04$). This suggests that the severity of nausea and vomiting was significantly different between the various treatments given for Breast Cancer (Adriamycin/Trastuzumab), Colon Rectum Cancer (Capecitabine), and Lung Cancer (Paclitaxel).

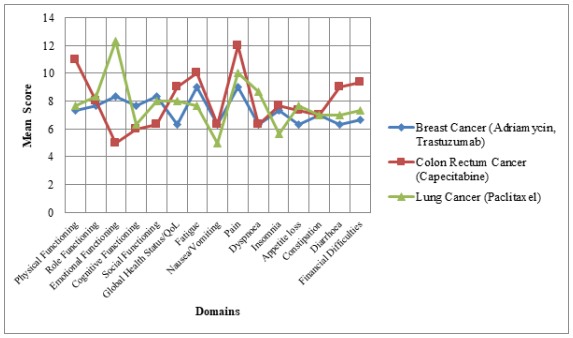

Figure 1: Graphical representation of QoL Score

DISCUSSION

This study highlights a high prevalence and important impact of chemotherapy-induced ageusia and anosmia on QoL in cancer patients. Ageusia was reported by 62% of participants, while anosmia affected 45%, showing that sensory dysfunctions are common and significant issues during chemotherapy.[12-14] These results are consistent with previous research and support the hypothesis that chemotherapy agents adversely affect sensory pathways.[15] Adriamycin was most significantly related to the most significant alterations in taste (mean ageusia score: 3.8 ± 0.7), and Paclitaxel was most strongly related to increased anosmia severity (mean anosmia score: 3.4 ± 0.6).[16] This data indicates that the cytotoxic and neurotoxic actions of certain drugs significantly affect sensory disturbances. Gender-specific differences were observed: females reported more significant impairments in emotional functioning, according to a mean score of emotional functioning of 48 ± 12. Patients who received Trastuzumab for breast cancer showed most significant effects on QoL domains, especially social functioning, with a mean score of 52 ± 15. In comparison, men, especially those with cancer of the gastrointestinal tract, had low scores for sensory impairment and less impact on social functioning; mean score was 68 ± 10. The observed gender disparities could be due to hormonal, physiological, and psychosocial factors.[17-20] In addition, patients with sensory impairments had significantly lower QoL scores compared with those without these impairments; mean QoL score was 58 ± 10 in the former compared with 72 ± 9 in the latter, $p < 0.01$. The declines in physical, mean score 55 ± 12, and social, mean score 51 ± 14, functioning was the most pronounced and reflected the accumulative

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psychological impact of the loss of senses.[21-24] These findings point out the urgent need for early detection and intervention for such impairments. Integration of nutritional counseling, adaptive dietary practice, and psychological support in oncology care may overcome the QoL detrimental effects.[25-30]

CONCLUSION

Chemotherapy-induced ageusia and anosmia are common, with 62% and 45% of participants reporting these conditions, respectively. These sensory dysfunctions are significantly associated with declines in QoL, as evidenced by lower scores in physical (55 ± 12), social (51 ± 14), and emotional functioning (48 ± 12). Specific chemotherapy regimens, such as Adriamycin and Paclitaxel, were linked to more severe sensory impairments, highlighting the drug-specific nature of these adverse effects. The study also reported some gender differences, with female subjects receiving Trastuzumab for breast cancer having the worst impacts on QoL. This emphasizes the need for habitual sensory assessment and comprehensive care practices in oncology treatment settings. Improvement in sensory deficiencies, for example, can be achieved by appropriate nutrition and psychological support services available for cancer patients. Future research should focus on the pathophysiology of sensory dysfunctions and develop novel strategies to combat their effects.

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