A Correlational Study on Taste Alterations and Quality of Life Among Cancer Patients

Darsana S. Wilson[1] Chitra C. Nair[1] Christy Johns[1] Christy Mathew[1] Dani Joseph[1] Precilla DSilva[1]

[1]Department of Obstetrics and Gynecological Nursing, Father Muller College of Nursing, Mangaluru, Karnataka, India

Address for correspondence Precilla DSilva, MSc, Department of Obstetrics and Gynecological Nursing, Father Muller College of Nursing, Father Muller Road, Dakshina Kannada, Mangaluru, Karnataka 575002, India (e-mail: precilladsilva25@fathermuller.in).

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Abstract

Introduction One of the major problems faced by the world today is cancer. Cancer is an abnormal growth of cells. Chemotherapy, surgery, and radiation therapy are the treatment regimen for cancer. Prolonged use of chemotherapy drugs can cause different side effects such as alopecia, weight loss, sexual dysfunction, mood swings, and the most important one is taste alterations. The aim of the study is to determine the taste alterations (TAs) and quality of life (QOL) among cancer patients who have undergone three cycles of chemotherapy.

Methods The approach used is descriptive survey design. The sample comprised 62 cancer patients selected by convenient sampling. The tool used was baseline proforma, University of Washington Quality of Life (UW-QOL) questionnaire version 4.1, chemotherapy-induced taste alteration scale (CiTAS).

Results The majority of the patients belonged to the age group of 41 to 50 years (37.09%) among whom 40% were females. The majority of the patients were not diagnosed with any other disease (91.9%). Around 80.6% of patients reported to have sore mouth, out of whom 45.2% maintained oral care by brushing teeth. The most commonly seen type of tumor was head and neck (37.1%) whereas the tumor type genitourinary was the least seen (3.2%). The majority of the patients had stage II cancer (53.2%) and about 62% of them did not have metastasis. There is significant association with selected demographic variables and QOL (sore mouth, oral care, and tumor type). There is also a significant association with selected demographic variable and TAs, (oral care and tumor type) and there is a negative correlation between TAs and QOL.

Conclusion Identification of the severity of TA helps in providing alternative measures to improve the taste buds which may help in improving the QOL.

Keywords
- cancer patients
- QOL
- TAs

Introduction

One of the challenging conditions faced by the world today is cancer. Cancer is an abnormal growth of cells and it is also called malignancy. World health statistics from 2015 say that cancer is the fifth leading cause of death. According to cancer statistics of India, in 2018 the number of people living with the disease was around 2.25 million per year and cancer-related death was around 7,84,821.[1] The major cause of cancer is gene mutations which happen because of

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smoking, radiation, viruses, cancer-causing chemicals, obesity, and so forth. The symptoms include fatigue, lump thickening, weight changes, skin changes, changes in the bowel or bladder patterns, and so forth.[2]

The treatment regimens for cancer are surgery, radiation therapy, and chemotherapy. Chemotherapy is the use of certain drugs or chemicals that inhibit the growth of cancer cells by destroying them and it often shortened to "chemo."[3] Prolonged use of chemo drugs can cause different side effects such as alopecia, weight loss, sexual dysfunction, mood swings, and the most important one is taste alterations. Chemo drugs make changes in the receptors of mouth and alter the senses of taste. This may affect the weight of the patients by decreasing appetite and lead to disparity of the nutritional status of an individual.[4]

Cancer may also distract an individual's quality of life (QOL). According to World Health Organization, QOL is defined as "The individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals." In cancer patients QOL decreases due to the symptoms of cancer and the side effects of chemo drugs. It mainly disturbs the emotional balance of a person and may lead to anxiety and depression. The QOL of cancer patients can be improved by using different techniques such as complementary medicines, exercise, massage therapy, physical and occupational therapy, and so forth.[5] Taste dysfunctions in patients impacts QOL and impairs oral intake, which may have broader implications consisting of weight loss and nutritional compromise.

Many research studies have shown that one of the factors contributing to QOL among cancer patients is taste alterations (TAs). Obtaining pleasure from food and the ability to maintain social eating habits may be impeded by food aversion and this may entail mood disturbances and decreased social functioning.[6]

The purpose of the study is thus to determine the TAs and QOL among cancer patients who have undergone three cycles of chemotherapy. Also an attempt is made to find out the correlation of QOL and taste alterations in cancer patients.

When the researchers were posted in oncology wards during their clinical posting they came across several patients complaining about TAs. Majority of the patients also verbalized their experiences with chemotherapy and its side effects, and how it is affecting their lifestyle. The researchers also searched databases such as PubMed, ResearchGate, and other journals that gave a thought to this statement. As the researchers were more interested in identifying the TAs and their relation to QOL, they decided to take up this study, and after finding the TAs, patients can be suggested to use alternative remedies to improve taste buds which may add to their QOL.

Materials and Methods

A descriptive research design was used for this study. Cancer patients between the age of 20 and 65 years who have completed more than three cycles of chemotherapy and who are visiting the outpatient department or day care unit, or those who are admitted in the selected Father Muller Medical College Hospital, Mangaluru, were selected as target population. A total of 62 patients were selected based on the convenient sampling. Sample size was calculated using following formula:

$$N = \frac{2\left(Z\pm + Z^{2}\right)^{2}}{C^{2}} + 3 \qquad N = \frac{2\left(1.96 + 0.80\right)^{2}}{0.559^{2}} + 3$$

$$C = 0.5 \times \ln\left[(1 + r) \div (1 - r)\right] \; r = 0.51,$$

where *N* is the required sample size, r is the obtained r value from previous literature and C is the obtained value using the mentioned formula.

Data collection instruments used were baseline proforma, University of Washington Quality of Life (UW-QOL) questionnaire version 4.1 (standardized tool and permission was obtained from the author), chemotherapy-induced taste alteration scale (CiTAS) (standardized tool and permission was obtained from the author). The tool was submitted to seven experts to establish the content validity. The reliability of the UW-QOL version 4 0.1, which was translated in Kannada, was calculated by Karl Pearson's correlation coefficient and was found to be 0.95, whereas the reliability of CiTAS was found to be 0.97, which indicated that both the tools are reliable.

A formal written permission was obtained from the hospital authority. Data were collected from June 17, 2019, to July 8, 2019. Prior to data collection, the investigators familiarized themselves and confidentiality was maintained. An informed written consent was obtained from all the patients. Average time taken by each patient to complete the tool was approximately 25 to 30 minutes.

Results

A master data sheet was prepared and the coded data was entered. SPSS version 16 was used to analyze coded data. The study results were organized as follows:

►**Table 1** shows that the majority of the patients belong to the age group of 41 to 50 years (37.09%) among whom 40% are females. The majority of the patients are not diagnosed with any other disease (91.9%). Around 80.6% of patients reported to have sore mouth, out of whom 45.2% maintained oral care by brushing teeth. The most commonly seen type of tumor was head and neck (37.1%), whereas genitourinary tumor type was the least seen (3.2%). Majority of the patients had stage II cancer (53.2%) and ~62% of them did not have metastasis.

Mean and Standard Deviation of QOL

The mean percentage obtained in ►**Table 2** indicates that majority of the cancer patients have good QOL (►**Tables 2– 5**; ►**Figs. 1** and **2**).

Majority of the cancer patients experience mild to moderate type of TAs and that there is a correlation between TAs and QOL. This table also shows that the calculated *r*-value is −0.797 (►**Table 6**). This suggests there is a strong negative

Table 1 Frequency and percentage distribution of subjects according to their demographic variables

n = 62		
Variables	**Frequency**	**%**
Age (mean age 49.87 ± 9.82 y)		
≤30 y	2	3.2
31–40 y	9	14.5
41–50 y	23	37.09
51–60 y	20	32.2
61–70 y	8	12.9
Gender		
Male	22	35.5
Female	40	64.5
Marital status		
Single	5	8.1
Married	49	79.0
Divorced	2	3.2
Widowed	6	9.7
Diagnosed with another disease		
Yes	5	8.1
No	57	91.9
Receiving drugs other than chemotherapy		
Yes	4	6.5
No	58	93.5
Method of oral care		
Brushing teeth	28	45.2
Rinsing mouth with water	13	21.0
Mouthwash	15	24.2
Brushing teeth + mouthwash	6	9.7
Presence of sore mouth		
Yes	12	19.4
No	50	80.6
Tumor type		
Head and neck	23	37.1
Respiratory	3	4.8
Gastrointestinal	9	14.5
Reproductive	19	30.6
Genitourinary	2	3.2
Hematology	6	9.7
Staging of cancer		
I	1	1.6
II	33	53.2
III	23	37.1
IV	5	8.1
Presence of metastasis		
Yes	23	37.1
No	39	62

Table 2 Frequency and percentage distribution of quality of life (QOL) according to the grading

n = 62			
Grading QOL	**Range**	**Frequency**	**%**
Poor	0–465	3	4.8
Good	466–931	28	45.2
Very good	≥932	31	50.0

Note: Maximum score: 1,400.

Table 3 Mean, mean percentage, and standard deviation (SD) of quality of life (QOL)

n = 62		
Variable	**Mean ± SD**	**Mean %**
QOL	905.83 ± 266.53	69.67

Note: Maximum score: 1,400.

Table 4 Frequency and percentage distribution of taste alterations (TAs) according to the grading

n = 62			
Grading TAs	**Range**	**Frequency**	**%**
Mild	18–42	32	51.6
Moderate	43–67	10	16.1
Severe	4≥68	20	32.3

Note: Minimum score: 18; maximum score: 90.

Table 5 Mean, mean percentage, and standard deviation (SD) of taste alterations (TAs)

n = 62		
Variable	**Mean ± SD**	**Mean %**
TAs	47.98 ± 23.49	53.31

Note: Minimum score: 18; maximum score: 90.

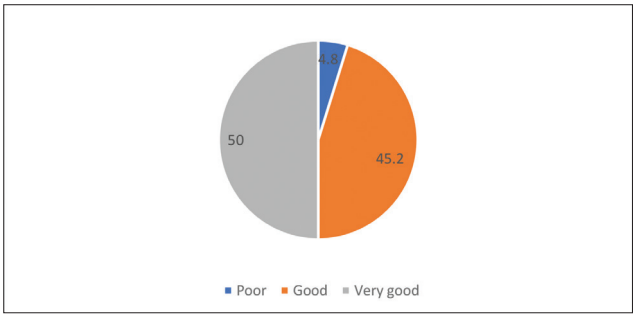

Fig. 1 Pie diagram showing grading of quality of life of cancer patients.

correlation with QOL and TAs and the *p*-value is 0.001 which is significant at 0.05 level of significance. Hence the null hypothesis is rejected and the research hypothesis is accepted (►**Fig. 3**).

Data presented in this table reveal that the *p*-value computed between the QOL and oral care (p = 0.001),

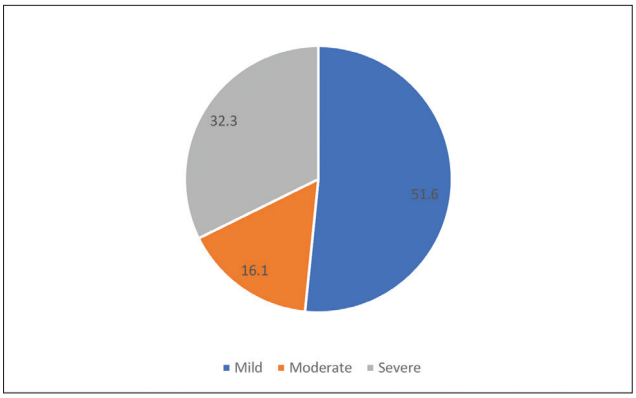

Fig. 2 Pie diagram showing grading of taste alterations of cancer patients.

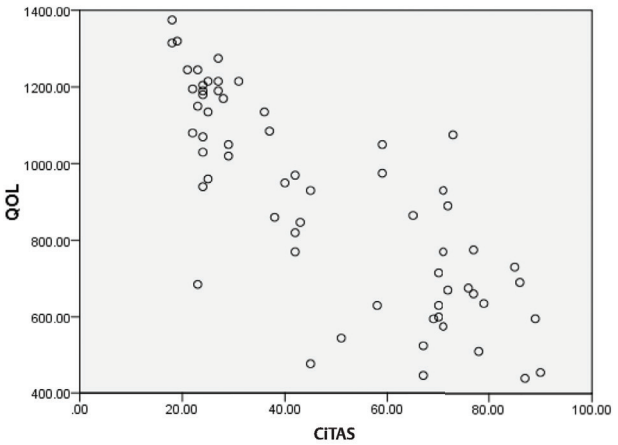

Fig. 3 Scatter plot showing correlation between taste alterations (TAs) and quality of life (QOL).

Table 6 Correlation between quality of life (QOL) and taste alterations (TAs)

n = 62		
Variable	***r*-Value**	***p*-Value**
QOL	−0.797	0.001
TAs		

sore mouth ($p = 0.013$), tumor type ($p = 0.001$) is <0.05 which is highly significant. Hence we accept the research hypothesis with regards to these three variables and conclude that there is significant association with selected demographic variables and QOL (►**Table 7**).

Table 7 Association of quality of life (QOL) and demographic variables

n = 62						
Variables	**Frequency**			χ^2	**df**	***p*-Value**
	Poor	**Good**	**Very good**			
Gender						
Male	2	10	10	1.416	2	
Female	1	18	21	(Fisher's exact)		0.574
Marital status						
Single	0	3	2	2.395	6	
Married	3	20	26	(Fisher's exact)		0.887
Divorced	0	1	1			
Widowed	0	4	2			
Diagnosed with another disease						
Yes	0	1	4	2.005	2	
No	3	27	27	(Fisher's exact)		0.502
Receiving drugs other than chemotherapy						
Yes	0	1	3	1.126	2	
No	3	27	28	(Fisher's exact)		0.685
Method of oral care						
Brushing teeth	0	6	22	20.824	6	
Rinsing mouth with water	2	8	3	(Fisher's exact)		0.001[a]
Mouthwash	1	11	3			
Brushing + mouthwash	0	3	3			

(*Continued*)

Table 7 (*Continued*)

n = 62						
Variables	**Frequency**			χ^2	**df**	***p*-Value**
	Poor	**Good**	**Very good**			
Presence of sore mouth						
Yes	2	8	2	9.133	2	
No	1	20	29	(Fisher's exact)		0.013[b]
Tumor type						
Head and neck	3	18	2	28.196	10	
Respiratory	0	0	3	(Fisher's exact)		0.001[a]
Gastrointestinal	0	3	6			
Reproductive	0	5	14			
Genitourinary	0	0	2			
Hematology	0	2	4			
Staging of cancer						
I	0	1	0	1.751	6	
II	2	15	16	(Fisher's exact)		0.988
III	1	10	12			
IV	0	2	3			
Presence of metastasis						
Yes	0	7	16	6.324	2	
No	3	3	21	(Fisher's exact)		0.055

[a]Indicates highly significant.
[b]Indicates significant.

Data presented in this table reveal that the *p*-value computed between TAs and oral care ($p = 0.001$), tumor type ($p = 0.001$) is < 0.05, which is highly significant. Hence we accept the research hypothesis with regards to these two variables and conclude that there is significant association with selected demographic variable and TAs (►**Table 8**).

Discussion

In the present study 64.5% of the patients were female and 35.5% were male and belonged to the age group of 20 to 65 years. Out of the 62 patients, 93.5% were using chemotherapy drugs. When compared with the severity of cancer, 53.3% of the patients had stage II cancer and 37.1% had stage III cancer. Metastasis was noted among 62.9% of subjects. In this study QOL among cancer patients was assessed using QOL grade. Fifty percent patients reported very good QOL, 45.2% reported good QOL, and 4.8% reported poor QOL.

An exploratory survey was conducted among 768 cancer patients, older than 30 years, from selected reputed cancer hospitals in Karnataka who were diagnosed with 3rd and 4th stages of cancer in head and neck, breast, cervix, gastrointestinal tract, and lung, and colorectal cancer, and had undergone chemotherapy, surgery, radiotherapy, or a combination of them. The result shows that QOL of majority of patients was influenced by their symptoms. Out of 768 cancer patients 82.3% showed low QOL scores.[7]

In the present study, *p*-value computed between the QOL and oral care ($p = 0.001$), sore mouth ($p = 0.013$), and tumor type ($p = 0.001$) is <0.05. Hence we accept the research hypothesis with regards to these three areas and conclude that there is significant association with the selected demographic variables and QOL.

An analytical cross-sectional study was conducted among 88 women with breast cancer and its association with demographic, social, and clinical data at King Abdullah Medical City, Mecca. The patients had mean global health score of 64.0 ± 27.7; the result shows that the most troubling symptoms were insomnia and fatigue, and the most distressing symptom was hair loss.[8]

Conclusion

Cancer is a group of diseases involving abnormal cell growth, which has a potential to invade or spread to other parts of the body. The symptoms vary according to the type of cancer. The treatment can be done by radiation therapy, chemotherapy, surgeries, or a combination of these. Taste alteration is one of the side effects usually seen in patients with cancer and its treatments. The physical impact of cancer and cancer treatments can also affect the quality of life of patients. This study concludes that there exists a strong negative correlation between taste alterations and quality of life.

Table 8 Association of taste alterations (TAs) and demographic variables

n = 62						
Variables	**Frequency**			χ^2	**df**	***p*-Value**
	Mild	**Moderate**	**Severe**			
Gender						
Male	7	5	10	5.350	2	
Female	25	5	10	(Fisher's exact)		0.073
Marital status						
Single	3	0	2	7.436	6	
Married	27	7	15	(Fisher's exact)		0.288
Divorced	1	0	1			
Widowed	1	3	2			
Diagnosed with another disease						
Yes	3	0	2	1.052	2	
No	29	10	18	(Fisher's exact)		0.847
Receiving drugs other than chemotherapy						
Yes	2	0	2	1.109	2	
No	30	10	18	(Fisher's exact)		0.644
Method of oral care						
Brushing teeth	23	3	2	29.755	6	
Rinsing mouth with water	3	2	8	(Fisher's exact)		0.001[a]
Mouthwash	2	3	10			
Brushing + mouthwash	4	2	0			
Presence of sore mouth						
Yes	4	3	5	2.098	2	
No	28	7	15	(Fisher's exact)		0.343
Tumor type						
Head and neck	0	6	17	45.225	10	
Respiratory	3	0	0	(Fisher's exact)		0.001[a]
Gastrointestinal	5	2	2			
Reproductive	17	2	0			
Genitourinary	2	0	0			
Hematology	5	0	1			
Staging of cancer						
I	0	1	0	8.737	6	
II	15	7	11	(Fisher's exact)		0.222
III	14	1	8			
IV	3	1	1			
Presence of metastasis						
Yes	16	3	4	5.004	2	
No	16	7	16	(Fisher's exact)		0.074

[a]Indicates highly significant.

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Conflict of Interest
None declared.

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