

CORRELATION BETWEEN THE LEVELS OF SALIVARY α -AMYLASE ACTIVITY AND XEROSTOMIA IN HEAD AND NECK CANCER PATIENTS UNDERGOING RADIATION THERAPY

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Introduction

- One main toxicity induced by radiotherapy to HNSCC patients are the destruction of salivary glands, especially the parotid gland.
- The destruction of salivary glands causes xerostomia among patients which is commonly termed as “dry mouth”.
- In this study, the levels of α -amylase, which is a major enzyme found in saliva, are correlated with the degree of xerostomia among patients undergoing radiotherapy.

Objectives

1. To measure and compare the enzymatic activity of salivary α -amylase at Day 0, Day 21, and Day 42.
2. To determine the degree of xerostomia among HNSCC undergoing radiotherapy.
3. To correlate the mean parotid dose and mean salivary α -amylase activity
4. To determine whether salivary α -amylase is an effective marker for toxicity

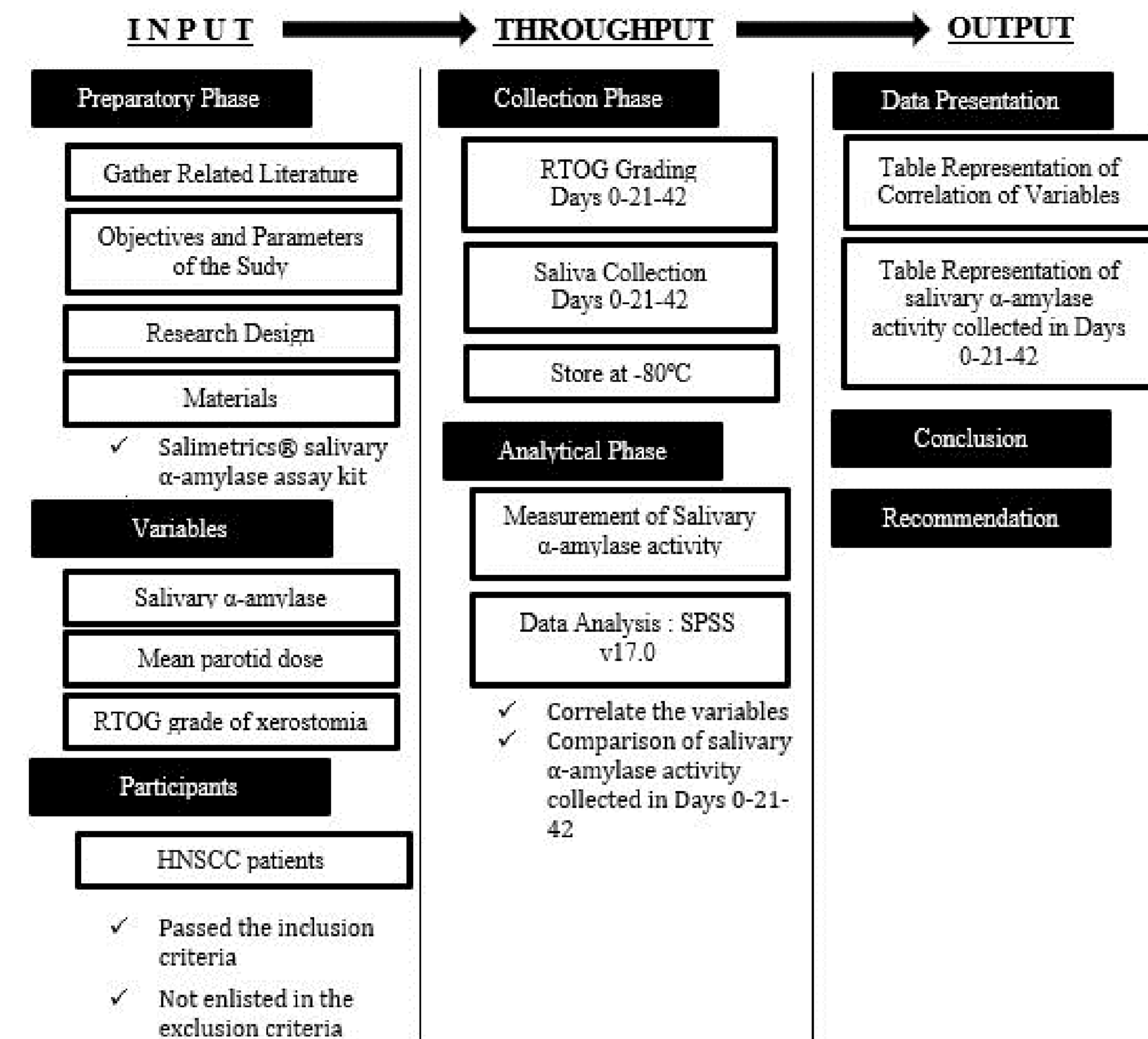
Methods

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- INCLUSION**
1. Biopsy proven malignancy of the head and neck, stage I-IVB
 2. Early and advance head and neck cancer patients treated with concurrent chemoradiotherapy
 3. Early stage head and neck cancer patients treated with radiation therapy alone
 4. Cleared by the dentist

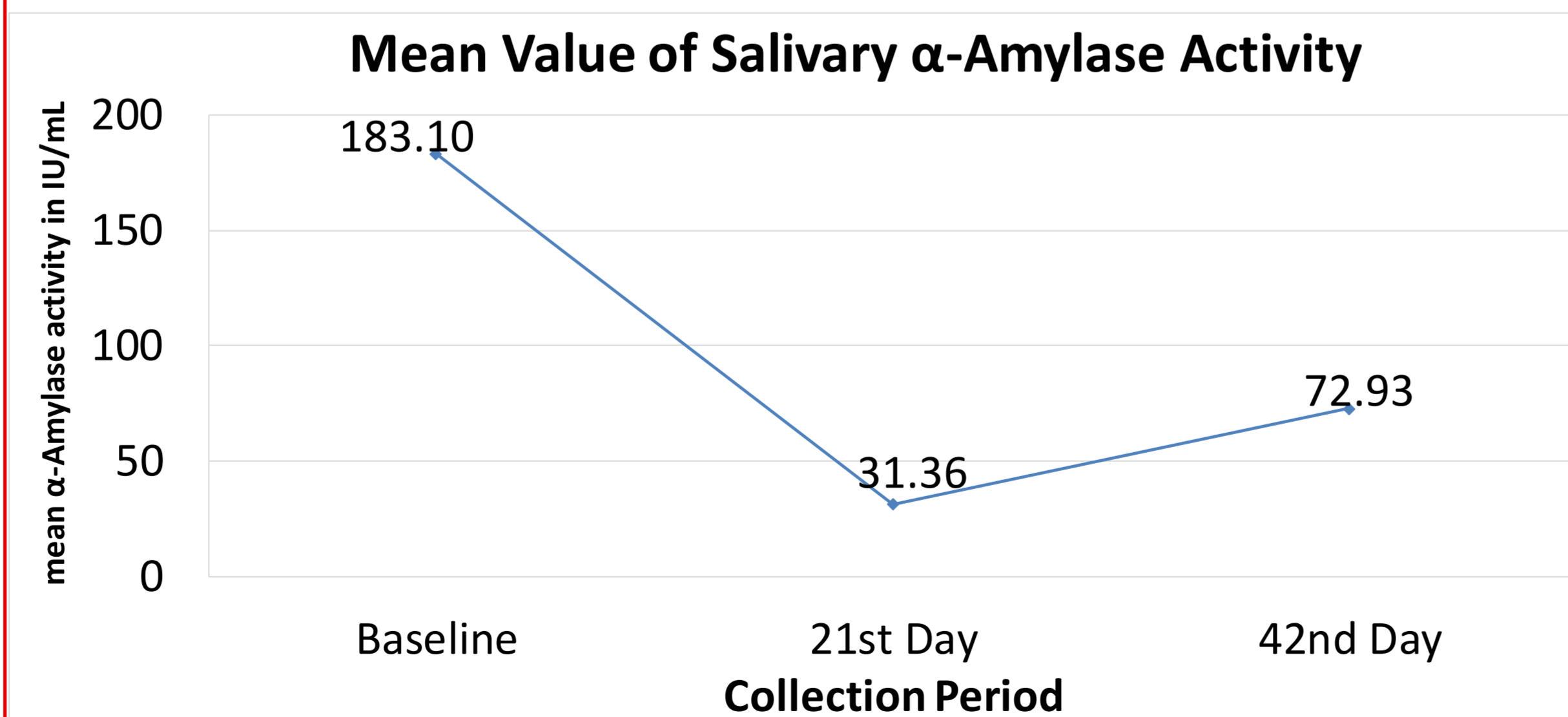
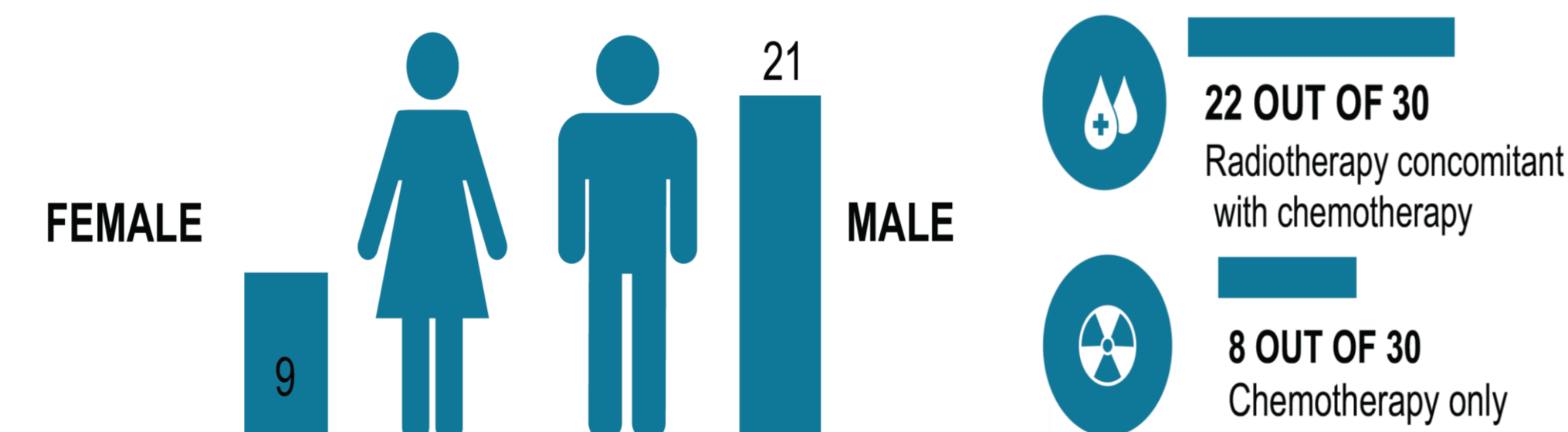
- EXCLUSION**
1. Had xerostomia prior to treatment
 2. History of salivary gland disease
 3. Blood contamination
 4. Recurrent HNC patients
 5. Metastatic disease
 6. Elevated hepatic and renal enzymes prior to treatment
 7. History of disease of pancreas or hepatobiliary tract

30 Head and Neck Cancer Patients (April 2018 to November 2018)



Results

DEMOGRAPHICS



Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	
Day	Greenhouse-Geisser	368918.228	1.202	306996.160	166.283	0.000

- There is a significant decrease in amylase concentration in patients during their course of radiotherapy session.

PAIRWISE COMPARISON FOR α -AMYLASE CONCENTRATIONS PER COLLECTION PERIOD

I	J	MEAN DIFFERENCE (I-J)	Std Error	SIGNIFICANCE	95% CONFIDENCE INTERVAL FOR DIFFERENCE	
					LOWER BOUND	UPPER BOUND
DAY 0	DAY 21	151.741	9.819	0.000	126.792	176.690
	DAY 42	110.177	10.544	0.000	83.386	136.967
DAY 21	DAY 0	-151.741	9.819	0.000	-176.690	-126.792
	DAY 42	-41.564	3.779	0.000	-51.167	-31.962
DAY 42	DAY 0	-110.177	10.544	0.000	-136.967	-83.386
	DAY 21	41.564	3.779	0.000	31.962	51.167

- This indicates that the salivary α -amylase activity decreases as radiotherapy progresses but when it reaches the Day 42 the levels would slightly elevate but not equal to or greater than its baseline, the Day 0.

AMYLASE CONCENTRATION LEVELS AND RTOG GRADING OF XEROSTOMIA

RTOG	B	Std. Error	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
							Lower Bound	Upper Bound
1	Intercept	-2.920	2.508	1.356	1	.244		
	AMYLASE	-.036	.017	4.207	1	.040	.965	.933
2	Intercept	-3.232	2.572	1.579	1	.209		
	AMYLASE	-.040	.018	4.631	1	.031	.961	.927
Radiotherapy Period		2.928	1.117	6.867	1	.009	18.682	2.092
Radiotherapy Period		3.151	1.175	7.198	1	.007	23.367	2.338

PEARSON CORRELATION RESULTS FOR MEAN α -AMYLASE AND MEAN PAROTID DOSE

Variables	MPD	
MAA	Pearson Correlation	-0.966**
	Sig. (2-tailed)	.000
	B	-.021
	Sum of Squares and Cross-products	-695494.832
	Covariance	-23982.580
	N	30

- The result of the Pearson correlation is -0.966.
- Hence, there is a strong negative correlation between the two variables. This means that as one increases the dose of radiation given to the patients, the levels of amylase decrease by 0.021 U/mL as reflected by the Bvalue.

Conclusions

- In comparison to the baseline, there was a decrease in the levels of salivary α -amylase on the Day 21. The posttreatment levels of salivary α -amylase on the Day 42 measured to be greater than that of the Day 21 but with high variations from each other.
- As the radiotherapy continues, the probability of having a RTOG Grade of 1 and 2 is greater than having a RTOG Grade of 0.
- The levels of salivary α -amylase and the mean parotid dose showed an inverse relationship that as the dose administered to the patients increases, the levels of salivary α -amylase decreases.
- Based on the study conducted and the established relationship between the variables, the quantitation of salivary α -amylase is an effective predictive marker for radiation induced salivary gland toxicity in HNSCC patients.

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