

A Study on Mathematical Analysis of Gastric Ulcer Patients using Statistics

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Abstract: Gastric ulcer was mathematically analyzed using t-Test method in the statistics of gastric ulcer patients at Tamil Nadu Government Hospital, Vedharanyam, Nagapattinam (Dt.) in 2020-2021.

Keywords: Data analysis, Statistics.

1. Introduction

The most important word quality of the word quality is Statistical quality of the word is statistical quality control. Quality control is a powerful manufacturing technique for effectively detecting defects or non-compliance with standards in materials, processes, machinery or finishing materials. The main purpose of Statistical Quality Control (S.Q.C) is to develop statistical technique that will help us in sorting out assignments.

- T-test definition
- Independent of t-test for two samples

A. T-test definition

A t-test is a type of statistical test that is used to compare the means of two groups. T-test is a type of para-metric method. A t-test is a type of inferential statistics used to determine if there is a significant difference between the means of two groups, which may be related in certain features.

T-test has three types: They are

- One sample t-test.
- Two sample t-test.
- Paired t-test.

B. Independent of t-test for two samples

The independent t-test also called the Two-Sample t-test, independent. Samples t-test or student t-test is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups.

2. Gastric Ulcer Overview

A. Gastric ulcer

A sore that develops on the lining of the esophagus, stomach or small intestine. Ulcers occur when stomach acid damages the lining of the digestive tract. Common causes include the

bacteria H.

Pylori and anti-inflammatory pain relievers including a aspirin.

1) Symptoms of gastric ulcer

Gastric ulcer general symptoms include:

- Dull pain in the stomach.
- Weight loss.
- Not wanting to eat because of pain.
- Nausea or vomiting.
- Bloating.
- Feeling easily full.
- Heartburn, which is a burning sensation in the chest.

2) Classification of gastric ulcer

- Type I true gastric ulcer.
- Type II combined gastric and duodenal ulcers.
- Type III suprapyloric and pyloric ulcers.
- Type IV multiple ulcers of the stomach.
- Type V secondary gastric ulcer

3) Treatment for gastric ulcer

Usually, a course of medical treatment is prescribed. At first, If Helicobacter pylori infection is the cause, combinations of antibiotics and other drugs are recommended only if such treatment should prove ineffective is surgery recommended.

Medical Treatment:

Before the advent of antiulcer medications, clients with gastric ulcers were usually advised to take antacids every 2 hours, alternating with milk and cream. Diet does require some modification; however, some experts recommend only three regular meals with no snaking because food, including milk, stimulates gastric section.

Surgical Treatment:

When surgery is necessary, the ulcer is removed and the remaining gastro in testinal tract is sutured together. Anastomosis is the surgical connection between tubular structures. Following gastric surgery, parenteral and tube feeding are used singly or in combination. If a tube feeding is used, the tube must be inserted beyond the area resected.

4) Prevention

Avoid alcohol use caution with aspirin and or NSAIDS. Don't ignore your ulcer symptoms, protect yourself from infections by washing hands regularly and consuming foods

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that have been cooked thoroughly.

3) *T-test calculation for Male patients*

3. Gastric ulcer Patients Details

A. *Gastric ulcer details*

The details of the gastric ulcer patient at the Government Hospital in vedharanyam for the year 2020-2021 were collected from the Gastric ulcer Division Medical Officer at the hospital.

Table 1
Gastric ulcer patient's details

Months	Male	Female
January	35	30
February	40	32
March	35	42
April	37	40
May	42	39
June	45	38
July	36	47
August	34	46
September	47	35
October	39	42
November	40	42
December	46	39

B. *Application of t-test I gastric ulcer*

1) *Male patient details*

The table 2 presents the male patients details.

2) *Female patient details*

The table 3 presents the female patients details.

$$\bar{X}_i = \sum \frac{X_i}{n}$$

$$\begin{aligned} \bar{X}_1 &= \sum \frac{X_1}{n} \\ &= \frac{106}{12} \end{aligned}$$

$$\bar{X}_1 = 39.66$$

$$\begin{aligned} \sigma_1^2 &= \frac{\sum (X_1 - \bar{X}_1)^2}{n - 1} \\ &= \frac{224.6672}{12-1} \\ &= \frac{224.6672}{11} \end{aligned}$$

$$\sigma_1^2 = 20.4243$$

$$\sigma_1 = \sqrt{20.4243}$$

$$= 4.5193$$

Table 2
T-test for Male patients

Month	Male X1	\bar{X}_1	$\sum (X_1 - \bar{X}_1)$	$\sum (X_1 - \bar{X}_1)^2$
January	35	39.66	-4.66	21.7156
February	40	39.66	0.34	0.1156
March	35	39.66	-4.66	21.7156
April	37	39.66	-2.66	7.0756
May	42	39.66	2.34	5.4756
June	45	39.66	5.34	28.5156
July	36	39.66	-3.66	13.3956
August	34	39.66	-5.66	32.0356
September	47	39.66	7.34	53.8756
October	39	39.66	-0.66	0.4356
November	40	39.66	0.34	0.1156
December	46	39.66	6.34	40.1956
$\sum X_1 = 476$			$\sum (X_1 - \bar{X}_1) = 0.08$	$\sum (X_1 - \bar{X}_1)^2 = 224.6672$

Table 3
T-test for Female patients

Month	Female X2	\bar{X}_2	$\sum (X_2 - \bar{X}_2)$	$\sum (X_2 - \bar{X}_2)^2$
January	30	39.33	-9.33	87.0489
February	32	39.33	-7.33	53.7289
March	42	39.33	2.67	7.1289
April	40	39.33	0.67	0.4489
May	39	39.33	-0.33	0.1089
June	38	39.33	-1.33	1.7689
July	47	39.33	7.67	58.8289
August	46	39.33	6.67	44.4889
September	35	39.33	-4.33	18.7489
October	42	39.33	2.67	7.1289
November	42	39.33	2.67	7.1289
December	39	39.33	-0.33	0.1089
$\sum X_2 = 142$			$\sum (X_2 - \bar{X}_2) = 0.04$	$\sum (X_2 - \bar{X}_2)^2 = 286.6668$

$$t_1 = \frac{\bar{X}_1}{\sigma_1 \times \frac{\sqrt{n_1}}{n}}$$

$$t_1 = \frac{39.66}{4.5193 \times \frac{\sqrt{12}}{12}}$$

$$= \frac{39.66}{4.5193 \times 0.2887}$$

$$= \frac{39.66}{1.3047}$$

$$t_1 = 30.3978$$

4) T-test calculation for Female patients

$$\bar{X}_i = \sum \frac{X_i}{n}$$

$$\bar{X}_2 = \sum \frac{X_2}{n}$$

$$= \frac{472}{12}$$

$$\bar{X}_2 = 39.33$$

$$\sigma_2^2 = \frac{\sum (X_2 - \bar{X}_2)^2}{n - 1}$$

$$= \frac{286.6668}{12 - 1}$$

$$= \frac{286.6668}{11}$$

$$\sigma_2^2 = 26.0606$$

$$\sigma_2 = \sqrt{26.0606}$$

$$= 5.1050$$

$$t_2 = \frac{\bar{X}_2}{\sigma_2 \times \frac{\sqrt{n_2}}{n}}$$

$$t_2 = \frac{39.33}{5.1050 \times \frac{\sqrt{12}}{12}}$$

$$= \frac{39.33}{5.1050 \times 0.2887}$$

$$= \frac{39.33}{1.4738}$$

$$t_2 = 26.6861$$

4. Patients Details and T-test using Graphs

A. Patient details using bar graph

1) Patient details –Gastric ulcer

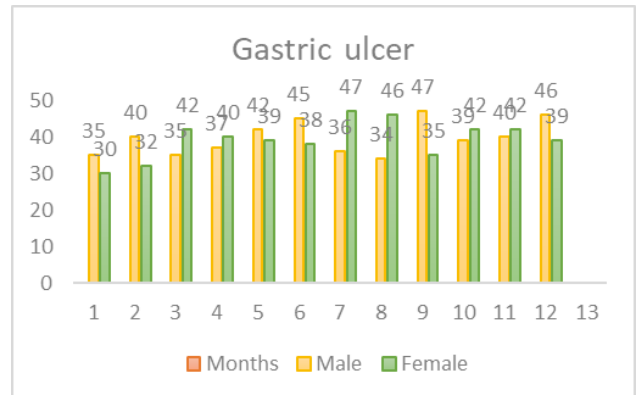


Fig. 1. Total Gastric ulcer patients' details using graph

2) Patient details – Gastric ulcer (Male)

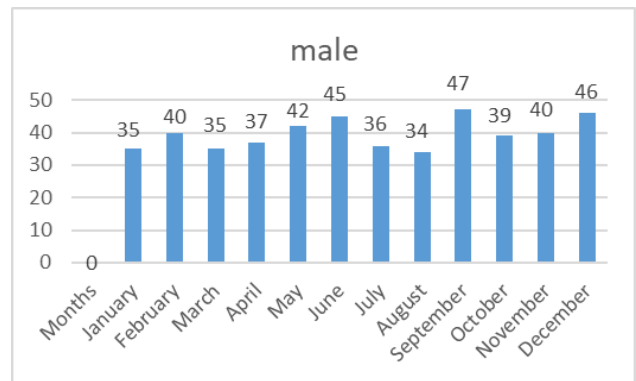


Fig. 2. Total Male Diabetes patient details using graph

3) Patient details – Gastric ulcer (Female)

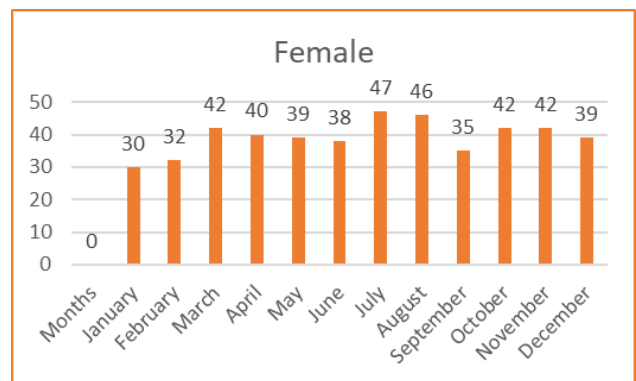


Fig. 3. Total Female Gastric ulcer patient details using graph

B. Patient details using line graph

1) Patient details – gastric ulcers

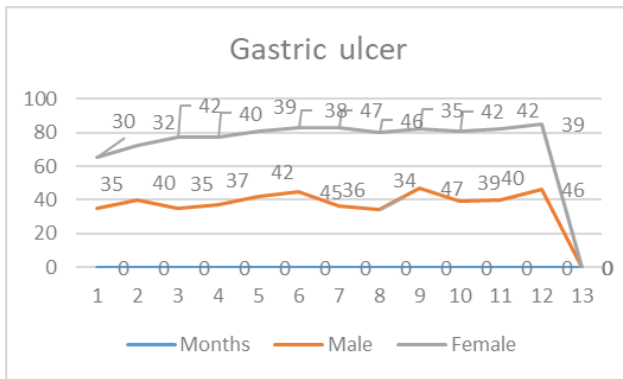


Fig. 4. Total Gastric ulcer patient details using graph

2) Patient details – Gastric ulcer (Male)

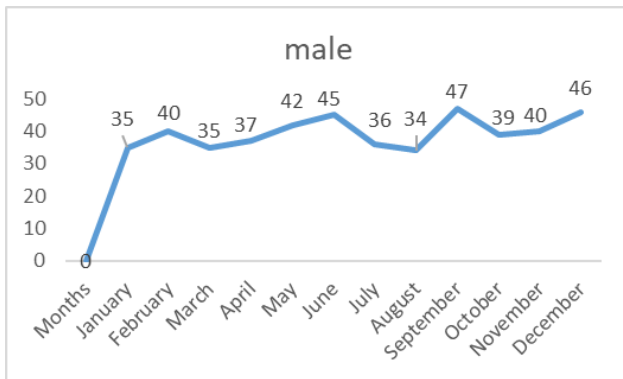


Fig. 5. Total Male gastric ulcer patient details using graph

3) Patient details – Gastric ulcer (Female)

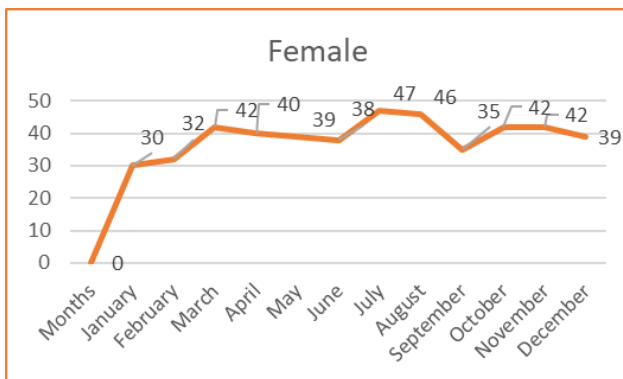


Fig. 6. Total Female gastric ulcer patients' details using graph

The [1], [2] says how to make t-test of two samples. [3] say how to find the mean value of two samples.[4], [5] say how to analyze the data using statistics. [6] say how to put a graph for our data using excel.

5. Conclusion

A. Result

According to the vedharanyam Government Hospital, the Center for Disease Control and Prevention has found that the

number of people suffering from gastric ulcer is gradually increasing by 2020-2021.

B. Reason

Gastric Ulcer is usually caused by Helicobacter pylori bacteria or non-steroidal anti-inflammatory drugs. These can break down the stomach's defence against the acid it produces to digest food, allowing the stomach lining to become damaged and an ulcer to form.

C. Conclusion

We conclude that there is a significant difference between the male and female sample averages of gastric ulcer.

Satisfactorily, in 2020 - 2021, we conclude that in the specific area where our survey was conducted, male patients are more likely to suffer from gastric ulcer.

GASTRIC ULCER PATIENT DETAILS (2020 – 2021)

The Gastric Ulcer Patients were collected from the Government Hospital at Agasthiyanpalli during the year 2020 – 2021 from the medical officer of the Gastric ward in the hospital.

Months	Male	Female
January	35	30
February	40	32
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

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Fig. 7. Gastric ulcer patient details (2020-2021)

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