International Journal of Research in Engineering, Science and Management
Volume 5, Issue 3, March 2022
https://www.ijresm.com | ISSN (Online): 2581-5792

A Study on Mathematical Analysis of Anemia Patients Using Statistics

P. Sathana[1*], S. Suganthi[2]
[1]*Student, Department of Mathematics, STET Women's College (Autonomous), Mannargudi, India*
[2]*Assistant Professor, Department of Mathematics, STET Women's College (Autonomous), Mannargudi, India*

***Abstract*: Anemia disease was analysed mathematically using t-test method in statistics of Government Hospital, Mannargudi, Thiruvarur (dt.), Tamil Nadu Patients during the year 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. Anemia Overview

A. Anemia

Anemia results from a lack of red blood cells or dysfunctional red blood cells in the body. This leads to reduced oxygen flow to the body's organ.

A condition in which the blood doesn't have enough healthy red blood cells.

1) Symptoms of anemia

- Fatigue
- Weakness
- Dizziness or light-headedness
- Headache
- Pale or yellowish skin
- Shortness of breath
- Craving or chewing ice (pica)
- Chest pain
- Cold hands and feet

2) Classification of anemia

- Iron deficiency anaemia
- Vitamin deficiency anaemia
- Anaemia of inflammation
- Aplastic anaemia
- Haemolytic anaemia
- Sickle cell anaemia

3) Symptoms of Severe anemia

- A rapid heartbeat
- Low blood pressure
- Difficulty concentration

4) Treatment for anemia

Treatment depends on the underlying diagnosis. Iron supplements can be used for iron deficiency. If you are anemic during your pregnancy, you may need to start taking an Iron supplement and/or folic acid supplement in addition to your prenatal vitamins. Your doctor may also suggest that you add more foods that are high in iron and folic acid to your diet.

5) Prevention

During pregnancy, you need 27 milligram of iron a day. good nutrition also can prevent iron deficiency anemia during pregnancy. Dietary sources of iron include lean red meat, poultry and fish. Other options include iron-fortified breakfast cereals, prune juice, dried beans and peas.

3. Anemia Patients Details

A. Anemia details

The details of the anemic patient at the Government Hospital

*Corresponding author: psathana47@gmail.com

in Mannargudi for the year 2021-2022 were collected from the Diabetes Division Medical Officer at the hospital.

Table 1
Anemia patient's details

Month	Female	Age Limit	
		18-28	28-38
January	06	05	01
February	11	07	04
March	06	02	04
April	08	05	03
May	12	03	09
June	07	05	02
July	06	04	02
August	07	06	01
September	07	03	04
October	06	03	03
November	06	06	-
December	09	07	02

B. Application of t-test in anemia

1) Patient details (18-28)

The table 2 shows the patient (18-28) details.

2) Patient details (28-38)

The table 3 shows the patient (28-38) details.

3) T-test calculation for 18-28 age patients

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

$$\bar{X}_1 = \sum \frac{X_1}{n}$$

$$= \frac{56}{12}$$

$$\bar{X}_1 = 4.67$$

$$\sigma_1^2 = \frac{\sum (X_1 - \bar{X}_1)^2}{n-1}$$

$$= \frac{30.68}{12-1}$$

$$= \mathbf{\frac{30.68}{11}}$$

$$\sigma_1^2 = 2.79$$

$$\sigma_1 = \sqrt{2.79}$$

$$= 1.67$$

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

$$t_1 = \frac{4.67}{1.67 \times \frac{\sqrt{12}}{12}}$$

$$= \frac{4.67}{1.67 \times 0.2887}$$

Table 2
T-test for 18-28 (age) patients

Month	18-28 (age) X1	$\bar{X}_1$	$\sum (X_1 - \bar{X}_1)$	$\sum (X_1 - \bar{X}_1)^2$
January	05	4.67	0.33	0.11
February	07	4.67	2.33	5.43
March	02	4.67	-2.67	7.13
April	05	4.67	0.33	0.11
May	03	4.67	-1.67	2.79
June	05	4.67	0.33	0.11
July	04	4.67	-0.67	0.45
August	06	4.67	1.33	1.77
September	03	4.67	-1.67	2.79
October	03	4.67	-1.67	2.79
November	06	4.67	1.33	1.77
December	07	4.67	2.33	5.43
	$\sum X_1$ =56		$\sum (X_1 - \bar{X}_1)$ =-0.04	$\sum (X_1 - \bar{X}_1)^2 = 30.68$

Table 3
T-test for 28-38 (age) patients

Months	(28-38) age X2	$\bar{X}_2$	$\sum (X_2 - \bar{X}_2)$	$\sum (X_2 - \bar{X}_2)^2$
January	01	2.92	-1.92	3.69
February	04	2.92	1.08	1.17
March	04	2.92	1.08	1.17
April	03	2.92	0.08	0.01
May	09	2.92	6.08	36.97
June	02	2.92	-0.92	0.85
July	02	2.92	-0.92	0.85
August	01	2.92	-1.92	3.69
September	04	2.92	1.08	1.17
October	03	2.92	0.08	0.01
November	00	2.92	-2.92	8.53
December	02	2.92	-0.92	0.85
	$\sum X_2 = 35$		$\sum (X_2 - \bar{X}_2) = -0.04$	$\sum (X_2 - \bar{X}_2)^2 = 58.96$

$$= \frac{4.67}{0.48}$$

$$t_1 = 9.73$$

4) T-test calculation for female patients

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

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

$$= \frac{35}{12}$$

$$\bar{X}_2 = 2.92$$

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

$$= \frac{58.96}{12-1}$$

$$= \frac{\mathbf{58.96}}{\mathbf{11}}$$

$$\sigma_2^2 = 5.36$$

$$\sigma_2 = \sqrt{5.36}$$

$$= 2.32$$

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

$$t_2 = \frac{2.92}{2.32 \times \frac{\sqrt{12}}{12}}$$

$$= \frac{2.92}{2.32 \times 0.2887}$$

$$= \frac{2.92}{0.67}$$

$$t_2 = 4.36$$

4. Patients Details and T-test Using Graphs

A. Patient details using bar graph

1) Patient details – Anemia

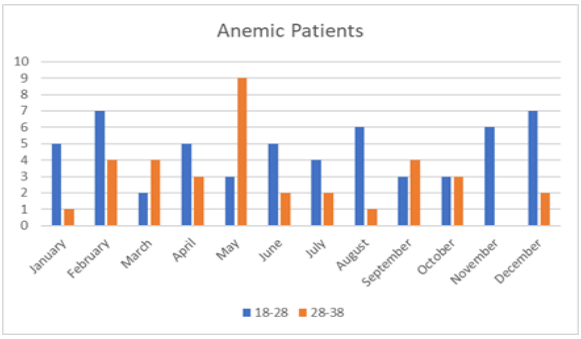


Fig. 1. Total anemic patients details using graph

2) Patient details – Anemia (18-28)

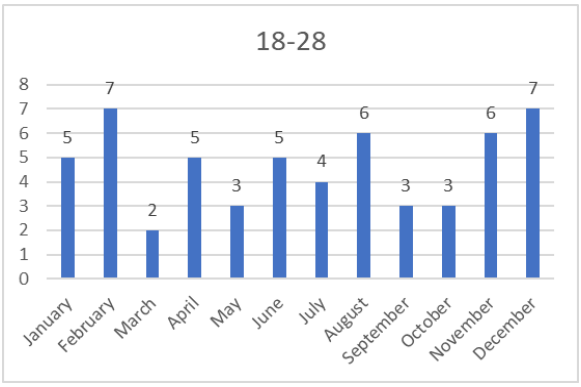


Fig. 2. Total anemic patient (18-28) age details using graph

3) Patient details – Anemia (28-38)

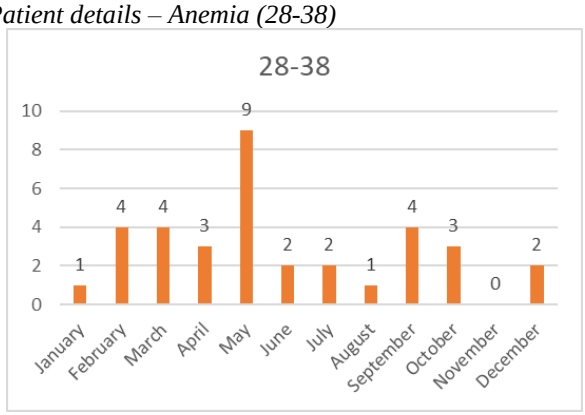


Fig. 3. Total anemic patient (28-38) age details using graph

B. Patient details using Line graph

1) Patient details – Anemia

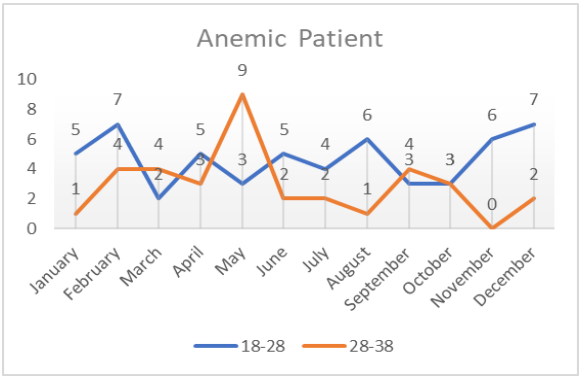


Fig. 4. Total anemic patient details using graph

2) Patient details – 18-28 (age)

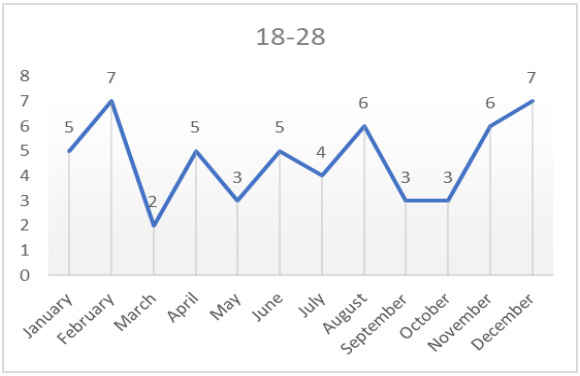


Fig. 5. Total anemic patient (18-28) age details using graph

3) Patient details – 28-38 (age)

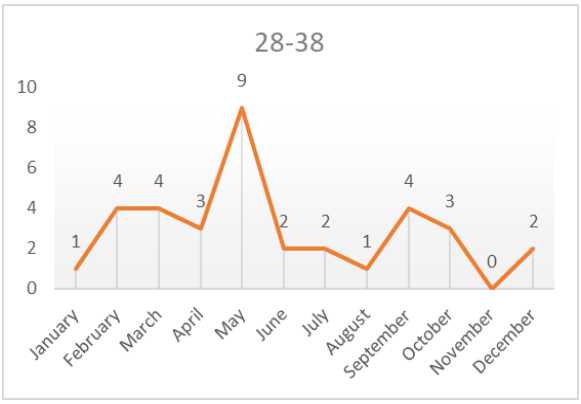


Fig. 6. Total anemia patients (28-38) age details using graph

The [1], [2] say 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 Mannargudi Government Hospital, the center for Disease Control and Prevention has found that the number of pregnant women suffering from Anemia disease is gradually rising, with approximately 5 in 10 people likely to develop Anemia in their lifetime leading to significant impact on health, workplace productivity and economic costs.

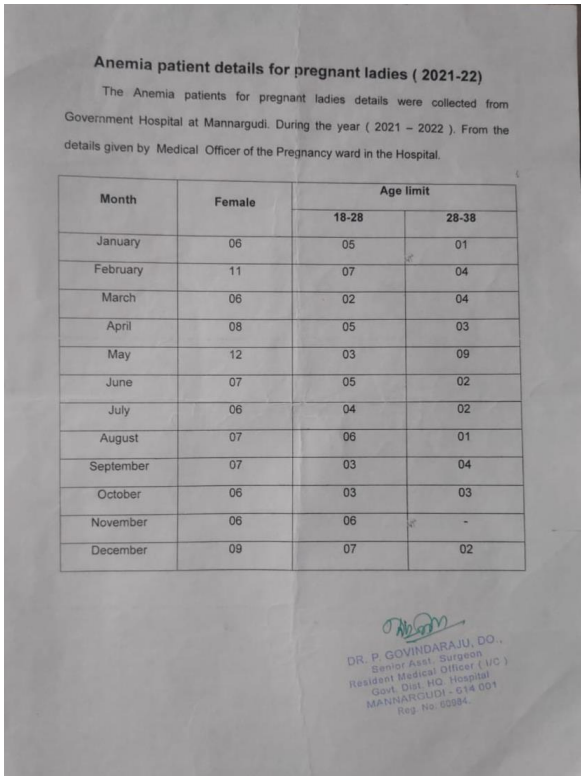
B. Reason

Iron deficiency is the most common cause of anemia in pregnancy. Folate-deficiency anemia. Folate is the vitamin found naturally in certain foods like green leafy vegetables A type of B vitamin, the body needs folate to produce new cells, including healthy red blood cells. During pregnancy, women need extra folate.

C. Conclusion

We conclude that there is a significant difference between the sample mean of (18-28) age and (28-38) age patients of Anemia.

In satisfied way we conclude that the (18-28) age women pregnancy patients are mostly affected by Anemia disease during the year 2021–2022 in the particular area where our survey undertaken.



Anemia patient details for pregnant ladies (2021-22)

The Anemia patients for pregnant ladies details were collected from Government Hospital at Mannargudi. During the year (2021 – 2022). From the details given by Medical Officer of the Pregnancy ward in the Hospital.

Month	Female	Age limit	
		18-28	28-38
January	06	05	01
February	11	07	04
March	06	02	04
April	08	05	03
May	12	03	09
June	07	05	02
July	06	04	02
August	07	06	01
September	07	03	04
October	06	03	03
November	06	06	-
December	09	07	02

DR. P. GOVINDARAJU, DO.,
Senior Asst. Surgeon
Resident Medical Officer (I/C)
Govt. Dist. HQ. Hospital
MANNARGUDI - 614 001
Reg. No: 62984.

Fig. 7. Anemia patient details for pregnant ladies (2021-22)

References

[1] Weisstein, Eric. "Student's t-Distribution". Mathworld. Wolfram.com.
[2] David, H. A.; Gunnie, Jason l., "The paired t-test under Artificial pairing". The American Statistician, 1997.
[3] Richard. J and Marx, "An introduction to Mathematical Statistical and its Application".
[4] Wilfrid Dixon, "Introduction to Statistical Analysis".
[5] Chris Olsen Up with Roxy Peck and Jay Devore, "Introduction to Statistics and Data Analysis".
[6] Joseph Schmuller, "Statistical Analysis using Excel", Teaching statistics through the use Excel, 2005.