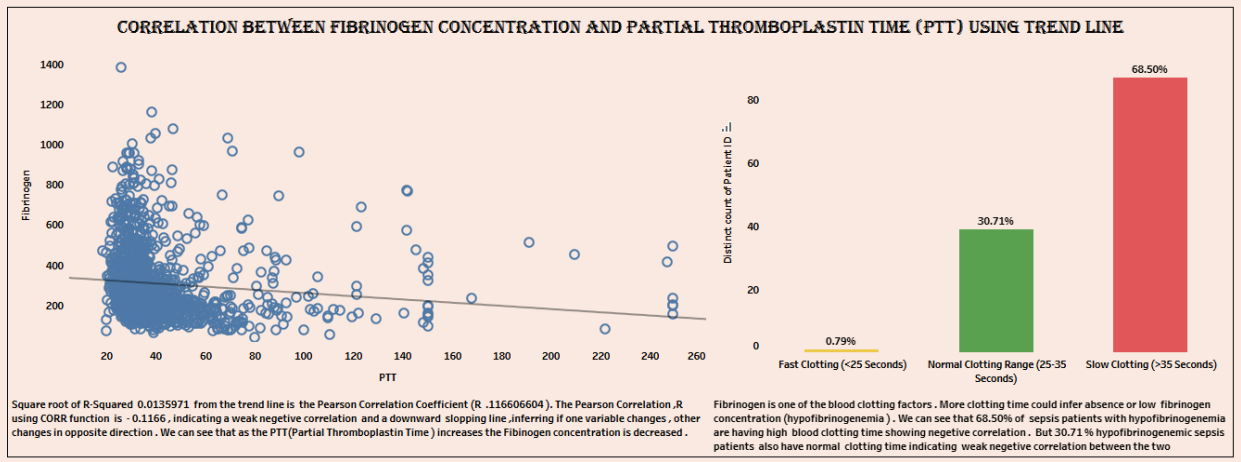
Correlation Between Fibrinogen Concentration and Partial Thromboplastin Time (PTT) using trend line



Sepsis is a life-threatening condition caused by the body's response to infection, leading to widespread inflammation, organ failure, and death. Data analysis helps identify early indicators, predict outcomes, and optimize resource allocation, improving patient care and reducing ICU overcrowding**.**

PTT, Fibrinogen Correlation Using Trend line

Correlation Analysis is Performed to Understand if there is any significant relationship between glucose levels and troponin, as both are affected by sepsis and determine if an increase in one marker could predict changes in the other, helping to identify at-risk patients.

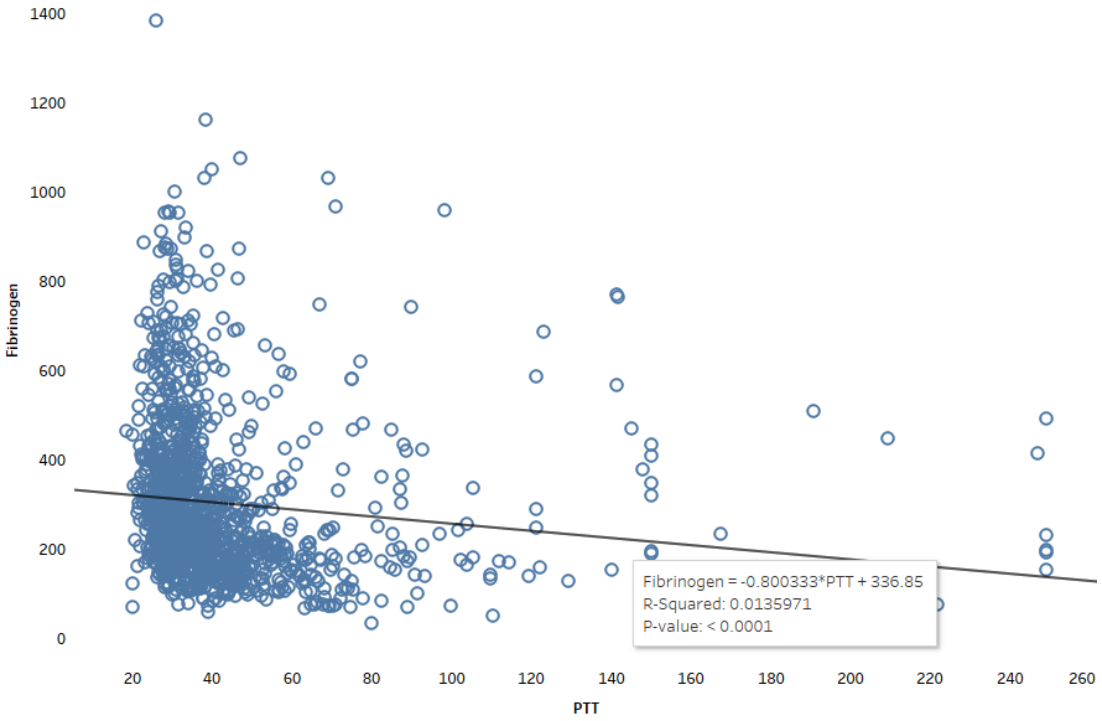
Tool Used: Tableau

🔗 **Click the link to view full dashboard:**

https://public.tableau.com/app/profile/shanmuga.priya7085/viz/PTTFibrinogenCorrelationUsingTrendline/CorrelationDashboard?publish=yes

Analysis Question:

Can Partial Thromboplastin Time (PTT) be used as a reliable predictor or indicator of fibrinogen concentration in sepsis patients to support clinical decision-making or early intervention?



Regression line (Trend line)

A trend line, also known as a regression line or line of best fit, is a straight line that best represents the relationship between two variables in a scatterplot. It shows the general pattern or direction in which the data points are moving. It's commonly used in regression analysis to model the relationship between an independent variable (often denoted as x) and a dependent variable (often denoted as y).

Fibrinogen concentration is a dependent variable. It is directly influenced by sepsis, as changes in fibrinogen levels respond to the presence or severity of the condition.

Partial Thromboplastin Time (PTT) is an independent variable though potentially influenced by sepsis but can also be affected by other factors, making its relationship with sepsis less direct.

R-square:

R-square value, also known as the coefficient of determination, represents the proportion of the variance in the dependent variable that is predictable from the independent variable. In a scatterplot, variance helps visualize the spread or dispersion of data points along both the horizontal (x-axis) and vertical (y-axis) axes. R-square value ranges from 0 to 1:

- R-square value =1

The trend line perfectly fits the data, meaning all data points lie exactly on the line.

o R-square value =0

The trend line does not explain any of the variance in the dependent variable, meaning it does not fit the data at all.

Relationship between Trendline and R-square:

R-square value provides a measure of how well the trend line (or regression line) represents the data points. i.e. It tells us how close the data is to the trendline (line of best fit or regression line). scatter plot of the data points with the trend line plotted over it helps visualize the fit. The closer the data points are to the trend line, the higher the R-square value. The higher the R-squared, the better the model fits our data.

Pearson correlation coefficient (r):

The Pearson correlation coefficient (often represented as r) is a measure of the linear relationship between two variables. i.e. this formula quantifies the linear relationship between two variables X and Y, with r indicating the strength and direction of this relationship. It ranges from -1 to 1,

where:

· A positive correlation indicates that as values of x increase, values of y also increase.

· A negative correlation indicates the opposite—as values of x increase, values of y decrease.

Relation between r and R-square:

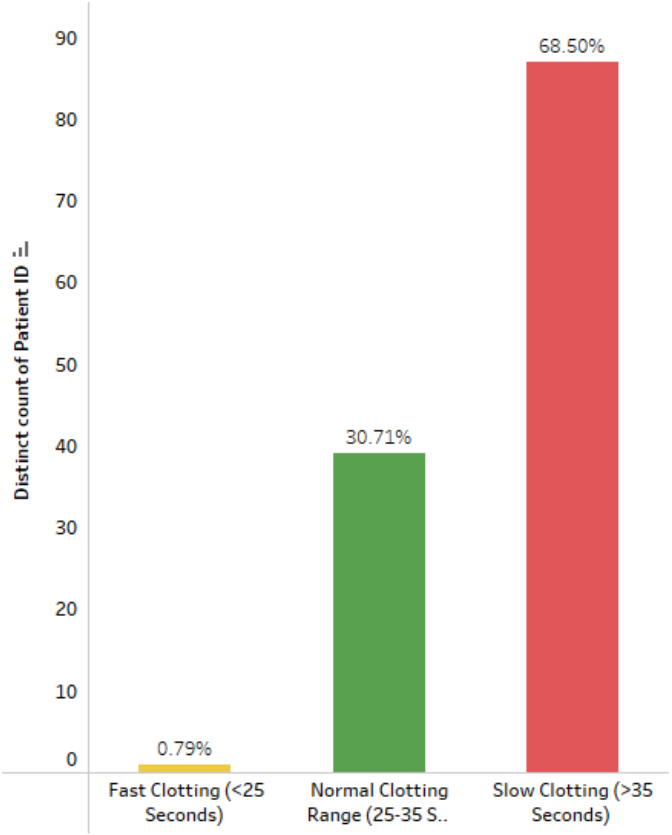
When dealing with simple linear regression with one independent variable, the R-square value is the square of the Pearson correlation coefficient r.

We can simply square the Pearson correlation coefficient r to get the R-square value.

R-Square from the trend line is 0.0135971. It indicates that approximately 1.36% of the variance in the dependent variable (Fibrinogen concentration) can be explained by the independent variable (PTT).

The square root of R-Square is the Pearson Correlation Coefficient (r)= 0.116606604

The Pearson Correlation Coefficient (r) using CORR function is - 0.1166, indicating a weak negative correlation and a downward slopping line, inferring if one variable changes, other changes in opposite direction. And we can see that as the PTT (Partial Thromboplastin Time) increases the Fibrinogen concentration decreases.



Fibrinogen is one of the blood clotting factors. More clotting time could infer absence or low fibrinogen concentration (hypofibrinogenemia). We can see that 68.50% of sepsis patients with hypofibrinogenemia are having high blood clotting time showing negative correlation. But 30.71 % of hypofibrinogenemic sepsis patients also have normal clotting time indicating weak negative correlation between the two biomarkers.

Monitoring PTT levels in sepsis patients could provide some insight into their Fibrinogen status. However, given the weak correlation, Fibrinogen concentration should be assessed using additional clinical parameters and laboratory tests to obtain a comprehensive understanding of the patient's coagulation status.