

Does Age Affect Total Cholesterol?

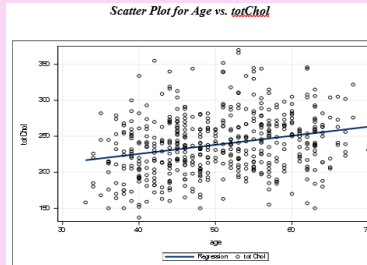
Introduction

At the age of 20, cholesterol levels can rise (Goldman & Biggers, 2020). Research shows that as people age, their serum cholesterol levels become higher (Yi, Ohrr, & Yi, 2019). Therefore we could assume that age affects serum cholesterol levels. However, it may not be safe to accept this. To determine the validity of this hypothesis, we will compare and analyze it. The null hypothesis is that there is no linear relationship between the two variables. The alternative hypothesis is that there is a linear relationship between the two variables.

Methods

This data includes a random sample of 500 participants from the Framingham heart study centered in Framingham, Massachusetts. Three statistical techniques through SAS studio were used to test the hypothesis's validity stated in the introduction. These statistical tests included a scatter plot, correlation analysis, and linear regression. The scatter plot analysis was used to show if a visual representation of a linear association between age (X) and total serum cholesterol (Y). The correlation analysis will show the strength and statistical significance of the relationship between both variables. Lastly, a regression analysis was performed to determine the regression line's values and prove or disprove our hypothesis, expressed in the introduction. Normality was assumed because there were more than 30 data points ($n > 30$).

Graphs/Tables



Correlation Analysis of Age Vs. Total Cholesterol

Simple Statistics						
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
totChol	500	238.51600	41.63783	119258	137.00000	370.00000
age	500	50.32800	8.46497	25164	33.00000	70.00000

Pearson Correlation Coefficients, N = 500 Prob > r under H0: Rho=0	
	age
totChol	0.25591 <.0001

Linear Regression Model of Age Vs. Total Cholesterol

Number of Observations Read	500
Number of Observations Used	500

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	56655	56655	34.90	<.0001
Error	498	808466	1623.42624		
Corrected Total	499	865121			

Root MSE	40.29176	R-Square	0.0655
Dependent Mean	238.51600	Adj R-Sq	0.0636
Coeff Var	16.89269		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	175.16528	10.87417	16.11	<.0001
age	1	1.25876	0.21308	5.91	<.0001

Key Findings/Conclusion/Concepts from Course

The scatter plot's visual representation shows that there is a positive linear relationship between the data points. However, the graph shows a weak positive linear relationship since R is close to zero $R = 0.25591$. $R^2 = 0.0655$ was also small, proving a small variation of older age(X) increasing cholesterol(Y). The value of the F statistic is 34.90, and the p-value is < 0.0001 . Therefore, we reject the null hypothesis of no relationship between total cholesterol and age. There is statistical evidence of a linear association between total cholesterol and age. The possible cause for this could be that most study participants were at least 35 and older; also, with older age, our bodies' LDL receptors, which remove LDL cholesterol from the blood, become less active over time, raising cholesterol levels. Concepts covered in the study include: performing a scatterplot analysis and calculate correlations among variables, fit a simple linear regression model and use it to make predictions, compute and interpret regression coefficients and calculate the coefficient of determination, understand how regression and correlation differ and when the use of each is appropriate, and use SAS to perform correlation analysis and fit a linear regression model.

Data Analysis performed by: ---- Instructor : : Dr. Hadiza Galadima

Data Sources: Goldman, R., & Biggers, A. (2020). The Recommended Cholesterol Levels by Age. Retrieved 2020, from <https://www.healthline.com/health/high-cholesterol/levels-by-age#next-steps>

Yi, S., Ohrr, H., & Yi, J. (2019). Total cholesterol and all-cause mortality by sex and age: A prospective cohort study among 12.8 million adults. *Scientific Reports*, 7;9(1), 1596-0. doi:10.1038/s41598-018-38461-y