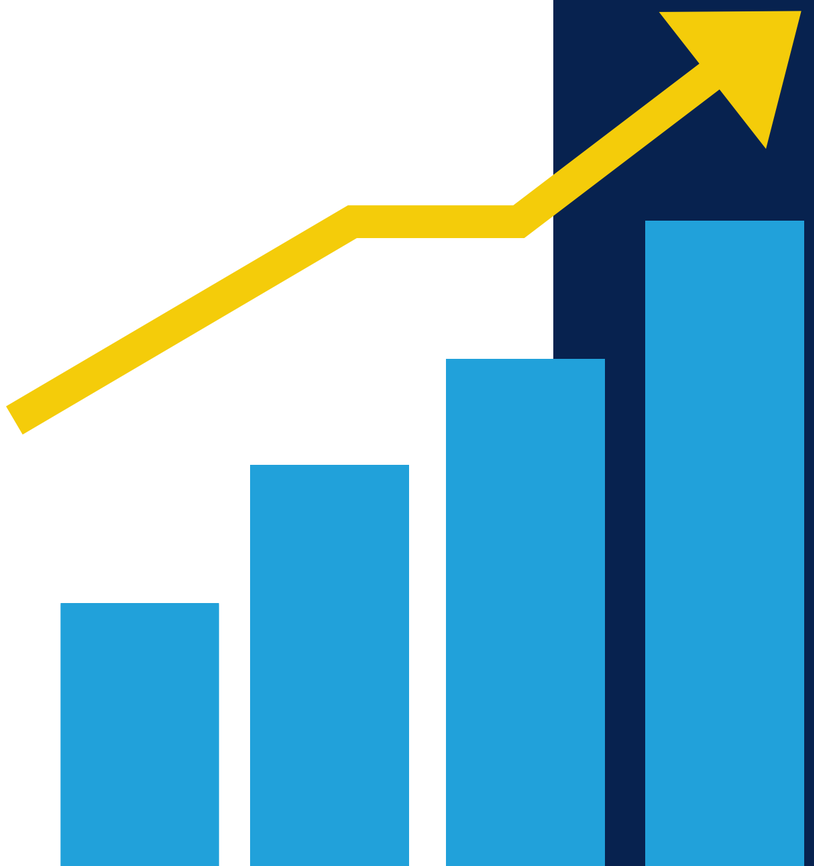

THE INFLUENCE OF GENDER ON FACTORS OF LIVER DISEASE

Auranissa Efrida Putri / 2006571192

auranissaefrida@gmail.com

Problem Overview

The data used is UCI Heart Disease Data, where a multivariate analysis test will be carried out to see whether there is an effect of one or more independent variables on the dependent variable.

MANOVA

Condition :

1. The dependent variables must be associated with each other
2. Each cell has the same variance or covariance
3. Dependent Variable is normally distributed

MANOVA

Box's Test of Equality of Covariance Matrices[a]

Box's M	35.644
F	5.863
df1	6
df2	231774.589
Sig.	.000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
thalch	.072	299	.001	.977	299	.000
trestbps	.102	299	.000	.966	299	.000
chol	.056	299	.024	.945	299	.000

a. Lilliefors Significance Correction

Dependent Variabel and Fixed Factor

Dependent Variabel :

1. Sex (Female and Male)

Fixed Factor :

1. Resting Blood Pressure
2. Serum Cholesterol
3. Maximum Heart Rate Achieved

Tingkat Signifikansi :

0.05 (biasanya dipakai oleh peneliti)

Hipotesis

H0 : there are no mean differences between average resting blood pressure, serum cholesterol, and maximum heart rate achieved in women and men

H1 : there are mean differences between average resting blood pressure, serum cholesterol, and maximum heart rate achieved in women and men

Analysis with SPSS

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.991	10461.490[b]	3.000	295.000	.000	.991
	Wilks' Lambda	.009	10461.490[b]	3.000	295.000	.000	.991
	Hotelling's Trace	106.388	10461.490[b]	3.000	295.000	.000	.991
	Roy's Largest Root	106.388	10461.490[b]	3.000	295.000	.000	.991
SexAuto	Pillai's Trace	.042	4.260[b]	3.000	295.000	.006	.042
	Wilks' Lambda	.958	4.260[b]	3.000	295.000	.006	.042
	Hotelling's Trace	.043	4.260[b]	3.000	295.000	.006	.042
	Roy's Largest Root	.043	4.260[b]	3.000	295.000	.006	.042

a. Design: Intercept + SexAuto

b. Exact statistic

F; 0.05;1;596 = 3.84

Analysis with R : attached in file

F TEST

Decision :

Reject H0.

there are **mean differences** between average resting blood pressure, serum cholesterol, and maximum heart rate achieved in women and men

Standard :

3.84

Result :

4.260

WILKS TEST

Decision :

Reject H0.

there are **mean differences** between average resting blood pressure, serum cholesterol, and maximum heart rate achieved in women and men

→

Standard :

0.987

Result :

0.9469246

because vh = 1, the s is equal to 1, according to (Wiley Series in Probability and Statistics) Alvin C. Rencher, William F. Christensen(auth.) - Methods of Multivariate Analysis, Third Edition (2012), all four test statistic is equal.

Pillai's TEST

Decision :

Reject H0.

there are **mean differences** between average resting blood pressure, serum cholesterol, and maximum heart rate achieved in women and men

→

Standard :

We reject H_0 for $V^{(s)} \geq V_\alpha^{(s)}$.

Result :

0.04152505

Lawley's TEST

Decision :

Reject H0.

there are **mean differences** between average resting blood pressure, serum cholesterol, and maximum heart rate achieved in women and men

Standard :

We reject H_0 for large values of the test statistic.

Result :

0.04332409

Roy's TEST

Decision :

Reject H0.

there are **differences** in average resting blood pressure, serum cholesterol, and maximum heart rate achieved **between** women and men.

Standard :

We reject $H_0: \mu_1 = \mu_2 = \cdots = \mu_k$ if $\theta \geq \theta_{\alpha,s,m,N}$.

Result :

0.04332409

Recommendation

1. There is a difference min. for 2 means among the existing variables.
2. This also shows a significant test result, where average resting blood pressure, serum cholesterol, and maximum heart rate achieved have an effect on existing gender differences.
3. Therefore, further tests can be carried out with the ANOVA F-test for each variable.

Conclusion

There is a significant effect on gender differences with factors that cause liver disease, to find out which factors are more specific than the three variables, the ANOVA F-test can be done.

Credit

https://www.kaggle.com/redwankarimsony/heart-disease-data

http://www.bilsonsimamora.com/manova/

https://deepnote.com/project/Multivariat-1-in-R-b6PORfXXTK-C9DGR9a0eEg/%2FMultivariat_1_in_R.ipynb

https://colab.research.google.com/drive/19ZYmXxq9o8_jR_GL3GYy4VLfZQOe55zx?usp=sharing