SECI 2143-05 PROBABILITY & STATISTICAL DATA ANALYSIS

Project II – INFERENTIAL STATISTICS

Fast Food Consumption

&

Health Status of Students of a University in Sri Lanka

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SECTION 05

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Abstract **- Fast foods have gained popularity in Sri Lanka, especially among the youths and people who have busy lifestyles. University students who stay most of the time away from home tend to consider convenience, availability and style of eating as important factors in fulfilling their food and energy requirement. This situation may lead to have an imbalance in their nutrient status and to increase the risk of diet related non communicable diseases. This study identified the factors influencing fast food consumption among students in one of the state universities of Sri Lanka.**

I. Introduction

Obesity is a chronic disease and defined as abnormal or excessive fat accumulation that presents a risk to human health. World Health Organization (WHO) predicts that about 2.7 billion adults will be overweight and obese by 2025. Obesity rate in Sri Lanka has increased from 5% in 2008 to 6.8% in 2014 (WHO, 2014) resulting in an increase in government's health cost. Moreover, 75% of total deaths in the country are caused by diet related non communicable diseases (NCDs) (WHO, 2014) and nearly 1 in 5 people die prematurely from NCDs. Increase of body weight is directly linked with excessive calorie intake and lack of physical exercise. When the body mass index (BMI) is in between 25 and 29.9 kg/m2 they are considered as overweight or pre obese (WHO, 2004). People are obese when the BMI exceeds 30 kg/m2. There is a strong association between diet and risk of obesity, cardiovascular disease, and certain cancers (Trichopoulou et al., 2003). Fast food represents food which is quickly prepared and eaten outside the home. In South Asian countries particularly in Sri Lanka, "Rolls" (fish/ vegetable), "Cutlets" (fish/ vegetable/ egg), "Roti" (vegetable/egg/naan), "Wade", "Pastries", "Patties" and "Buns" (fish/ vegetable) are some prominent types of fast foods. Kearney (2010) showed that fast food contributes a great change in nutrition transition through the composition and structure of healthy traditional diets to westernized diet. Fast foods are convenient and economical for people with busy lifestyles but these foods are high in saturated fat, sugar, salt and energy (Wellard et al., 2012; Wilcox et al., 2013; Almiron-Roig et al., 2013; Roe et al., 2013).

Therefore, nutrition transition increases the intake of fat (particularly saturated fat), sugar, sodium, cholesterol and animal products while decreasing the consumption of fiber and unrefined cereals (Afolabi et al., 2013). Greater availability of fast food is positively associated with obesity (Dunn et al., 2012) and considered as one of the major determinant factors of obesity rates (Currie et al., 2010). Fast and convenient nature and lower price have made fast foods more popular and affordable particularly among people in their teens and twenties (Cotti and Teft, 2013, Seo et al., 2011).

II. Methodology

Inferential statistics, secondary data (frequency of fast food consumption) is obtained from websites (https://www.researchgate.net/publication/326035668_Fast_Food_Consumption_and_Health_Status_of_Students_of_a_University_in_Sri_Lanka). The target population was Students of a University in Sri Lanka. Variables such as gender, year and frequency are identified. Inferential statistics are carried out by using hypothesis testing two sample, correlation and regression. The nutrient compositions of mostly consumed fast foods were analysed and the current health status of the students was identified.

III. RESULTS AND DISCUSSION

Hypothesis Testing 2-Sample

This study identified the frequency of fast food consumption among students in one of the state universities of Sri Lanka. Two sample tests on this fast food consumption between gender from 1st year to 4th year.

Let μ_1 = sample proportion of male consuming fast food from 1st year to 4th year.
Let μ_2 = sample proportion of female consuming fast food from 1st year to 4th year.

$H_0 : \mu_1 - \mu_2 = 0$
$H_1 : \mu_1 \neq \mu_2$

Significance level, $\alpha = 0.05$

```
> male = c (16,25,27,10)
> female = c (27,40,45,15)
> n=4
> x.test2sample= function (male, female, var.male, var.female){
+   n.male=length(male)
+   n.female=length(female)
+   z=(mean(male)-mean(female))/(sqrt(var.male/n.male+var.female/n.female))
+   return(z)
+ }
> x.test2sample(male, female, var(male), var(female))
[1] -1.56445
> z=-18.93488
> alpha = 0.05
> z.alpha = qnorm(alpha, lower.tail=FALSE)
> z*pnorm(-abs(z))
[1] -5.571551e-79
>
```

Z-value for test statistic is obtained by using R. This is a two-tailed test, so the rejection area of P-value is the area to the left and right of the test statistic z = -1.56445. The P-Value for test statistic is < 0.0001. Since the P-value of 0.0001 is less than the (significance level of $\alpha = 0.05$), thus we do reject the null hypothesis. Hence, we can conclude that the sample proportion of the male and female students are not the same.

Correlation

```
> male = c (16,25,27,10)
> female = c (27,40,45,15)
> cor(male,female)
[1] 0.9970174
> plot(female,male,xlim=c(0,50), ylim=c(0,30), xlab="Female",
 ylab="Male")
>
>
```

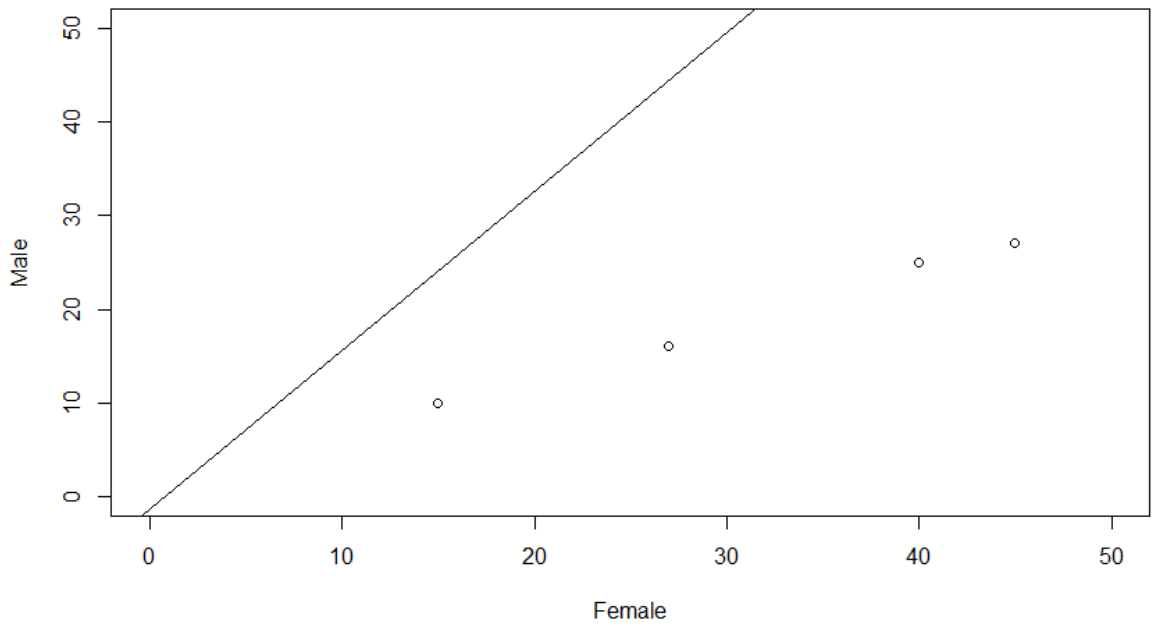
```
> male = c (16,25,27,10)
> female = c (27,40,45,15)
> cor(female,male)
[1] 0.9970174
> modal<-lm (female~male)
> modal

Call:
lm(formula = female ~ male)

Coefficients:
(Intercept)         male
     -1.317        1.696
```

Based on the computed correlation value (0.9970), we can conclude that, there is a moderate relationship between the number of students consuming fast food with respective to each year from 1st until 4th.

Female Students against Male Students fast food Consumption Correlation Graph (Scattered Plot)



Male correlation for fast food consumption is much higher compared to female and coefficients intercepts at (-1.317). It is relatively much higher with the graph gradient slanting more to male student's side.

Regression

```
> model <- lm(male~female)
> model

Call:
lm(formula = male ~ female)

Coefficients:
(Intercept)       female
     0.8884       0.5862

> summary(model)

Call:
lm(formula = male ~ female)

Residuals:
      1       2       3       4
-0.7156  0.6639 -0.2670  0.3187

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.88843    1.08559   0.818  0.49913
female       0.58619    0.03209  18.270  0.00298 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

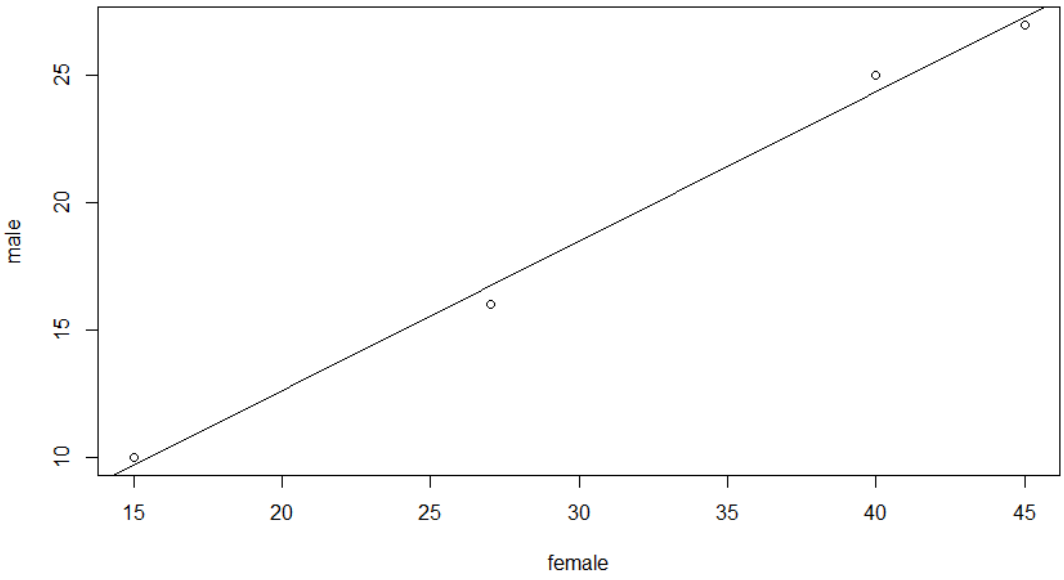
Residual standard error: 0.7502 on 2 degrees of freedom
Multiple R-squared:  0.994,     Adjusted R-squared:  0.9911
F-statistic: 333.8 on 1 and 2 DF,  p-value: 0.002983

> plot(female,male)
> abline(model)
>
>
```

The regression model involves 2 independent variable and it is called simple regression. The regression models are positive linear model which have straight-line relationships.

$\hat{Y}_{male} = 0.8884 + 0.5862x$

Female Students against Male Students fast food Consumption Regression Graph (Scattered Plot)



Based on the graphs generated, through regression analysis, we could predict that number of fast food consumption in both genders would gradually increase as they gradient line increasing toward upper right portion of the graph.

Bar Chart

```
> male = c (16,25,27,10)
> female = c (27,40,45,15)
> year = c (1,2,3,4)
> model <- lm(female~year)
> model

Call:
lm(formula = female ~ year)

Coefficients:
(Intercept)         year
       39.5         -3.1

> summary(model)

Call:
lm(formula = female ~ year)

Residuals:
    1     2     3     4
 -9.4   6.7  14.8 -12.1

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   39.500     19.340   2.042    0.178
year          -3.100      7.062  -0.439    0.704

Residual standard error: 15.79 on 2 degrees of freedom
Multiple R-squared:  0.08788,   Adjusted R-squared:  -0.3682
F-statistic: 0.1927 on 1 and 2 DF,  p-value: 0.7035

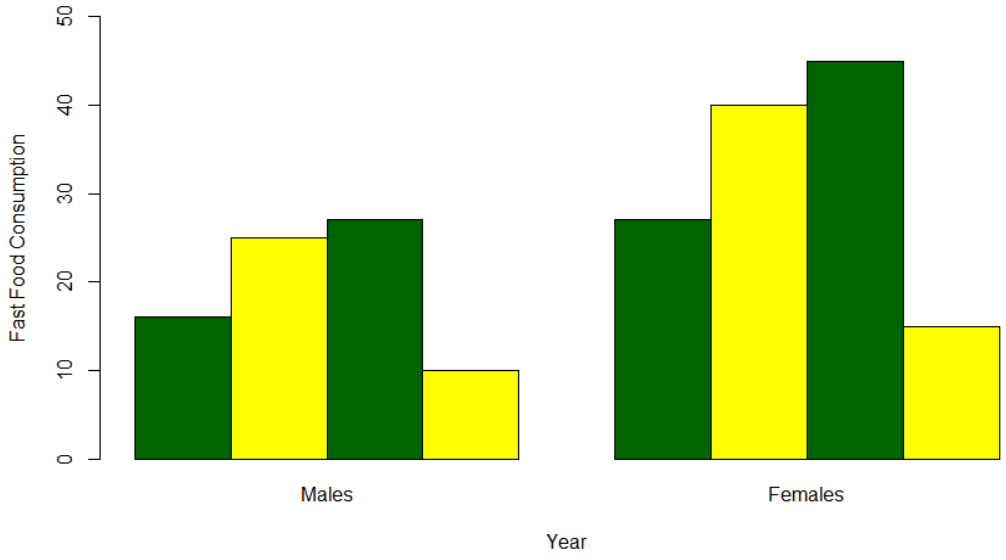
> plot(year,female)
> abline(model)
> plot(year,female,  xlim=c(1,4),   ylim=c(0,50), xlab="Years",   ylab="Female")
> abline(model)
> model <- lm(male~year)
> model

Call:
lm(formula = male ~ year)

Coefficients:
(Intercept)         year
       23.5         -1.6

> plot(year,male)
> abline(model)
> plot(year,male,  xlim=c(1,4),   ylim=c(0,30), xlab="Years",   ylab="Male")
> abline(model)
>
```

Bar Chart of Female Students and Male Students fast food Consumption



Based on the results gained from bar chart it can be seen that female student's fast food consumption is more compared to male students throughout each year. For both male and female students, fast food consumption increases by year gradually and dropped largely in their 4th year.

IV. Conclusion

Around 54% of the students consumed fast foods more than once a day. Price and taste were the major attributes that determined the selection of fast food. No differences were found between attitude towards fast food consumption and gender, frequency of fast food consumption and nutritional status and body mass index (BMI) and gender. Majority (70%) of the students in the faculty were healthy and having a normal BMI (20-21 kg/m2). Approximately, one quarter (26%) of females were underweight and only 65% of them were normal and healthy. Of the female respondents, 7% were overweight and 2% were obese. Among the male students, 79% were healthy with normal BMI. However, as 12% were overweight, there is a higher risk.

THANK YOU!