Health Statistics Analytical Report

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Date

Statistical Methods

To answer the objectives of the study, several statistical techniques were used. Both descriptive statistics and inferential statistics were used in the study. Descriptive statistics were used to describe the characteristics of the sample at the baseline exam. Frequency distribution tables were used to describe data that was measured on a categorical scale. To test the association between different categorical variables, the chi-square test of association was used. Furthermore, one-way ANOVA was used to test the difference between two continuous variables. Lastly, a regression model was created to predict the systolic blood pressure at baseline based on several independent variables. A follow-up regression model was also created to include more predictors of systolic blood pressure at baseline.

Results and Analysis

Descriptive Statistics at Baseline Exam

Table 1 shows the descriptive statistics at the baseline exam.

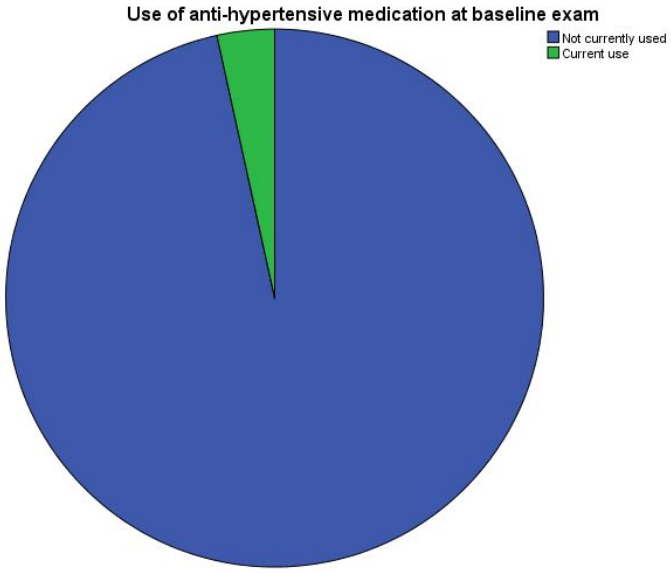
The number of respondents who participated in the study was 1326. The mean age at the baseline exam was 50.41, the minimum age 34, and the maximum age 69. Furthermore, the mean serum total cholesterol at the baseline exam was 237.95, the minimum and maximum serum cholesterol at baseline were 133 and 600, respectively. The mean of the systolic blood pressure at the baseline exam was also measured as being 133.350, the minimum 83.5, and the maximum 295.

The diastolic blood pressure at the baseline exam was also measured, and the mean was 83.34, with the minimum and maximum being 48 and 140, respectively. It was also found that the mean number of cigarettes smoked each day at the baseline exam was 8.6, with the maximum number

of cigarettes smoked each day being 60. The body mass index of the respondents was measured at the baseline exam and the mean was 25.89, with the maximum and minimum being 51.28 and 15.96, respectively. The mean casual serum glucose at the baseline exam was 82.07, the minimum 40, while the maximum was 394.

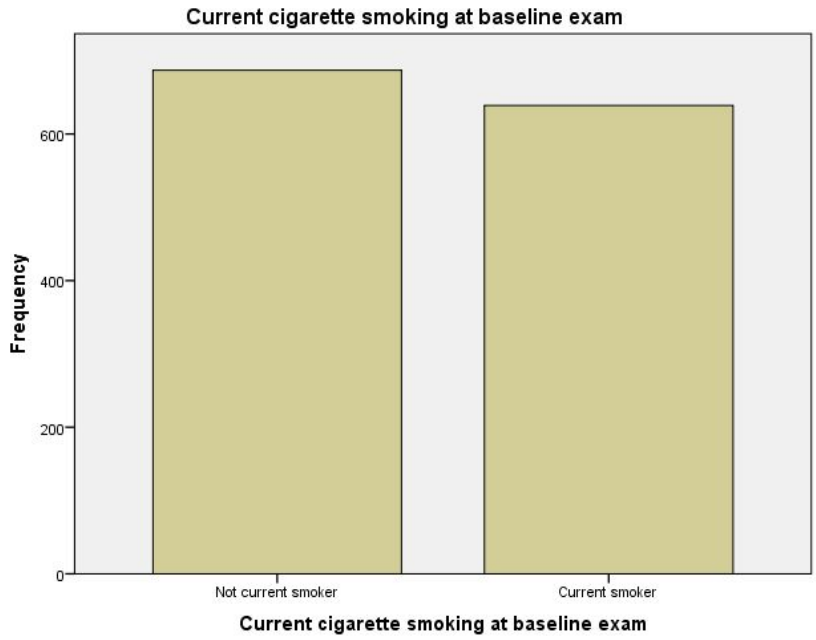
Frequency Distribution tables at the baseline exam

Figure 1: Use of antihypertensive medication at the baseline exam



The results in Figure 1 show that most (1257) respondents at the baseline exam do not currently use anti-hypertensive medication. Only 45 respondents were found to be currently using anti-hypertensive medication.

Figure 2: Current cigarette smoking at the baseline exam



The results in Table 2 show that 51.8% of the respondents were not smokers at the baseline exam. On the other hand, 48.2% of the respondents were smokers at the baseline exam.

The association between smoking cigarettes at the baseline exam and the participants' sex

A chi-square test was conducted to determine the association between smoking cigarettes at baseline exam and participants' sex. Results show that $\chi(1) = 40.276, p = .000$, which demonstrates that there is a statistically significant association between sex and smoking cigarettes at the baseline exam; that is, both males and females are current smokers.

The association between smoking cigarettes at the baseline exam and the education level of the participants

A chi-square test was carried out to determine the association between smoking cigarettes at the baseline exam and the education level of the participant. Results show that that $\chi(3) =$

12.222, $p = .007$, or that there is a statistically significant association between the education level of the participant and their smoking of cigarettes.

The difference in body mass index at baseline between participants of different education levels.

One-way ANOVA was carried out to determine the difference in body mass index at baseline between participants of different education levels**.** The ANOVA results show whether there is a statistical difference in the body mass index between participants at different education levels. From the Table, the significant value is 0.000, less than 0.05, which shows that there is a statistically significant difference between the means of the body mass indices at different education levels.

Difference between systolic blood pressure for participants who have a body mass index of less than 30 and greater than or equal to 30

A one-sample t-test was run to determine whether the systolic blood pressure was significantly different for participants who have a body mass index of less than 30 and greater than or equal to 30. Systolic blood pressure scores were normally distributed and there were no outliers in the data. From the results, the p-value is less than 0.05, which implies that there is a statistically significant difference in the systolic blood pressure of these participants.

Regression model

A regression model was run to predict systolic blood pressure based on the body mass index, age, and serum total cholesterol at baseline exam. The results are presented in this section.

From the regression results, R is 0.486, which indicates a relatively good level of prediction. Furthermore, the value of R squared is 0.237, which shows that 23.7% of the variable systolic blood pressure at baseline can be explained by age, body mass index, and serum total cholesterol.

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	37.956	4.812	7.887	.000
Serum total cholesterol at baseline exam (mmg/dL)	.065	.012	5.279	.000
Age at baseline exam (years)	.754	.064	11.784	.000
Body Mass Index at baseline exam (kg/m^2)	1.614	.135	11.983	.000

The regression equation is given by:

$$Systolic\ blood\ pressure = 37.95 + 0.065 Serum\ total + 0.754\ Age + 1.614\ BMI$$

From the regression equation, it is evident that body mass index is the best predictor of systolic blood pressure. An increase in the serum total by one unit leads to a corresponding increase in systolic blood pressure at baseline by 0.065 when all factors are held constant. An increase in the age by one year leads to a corresponding increase in systolic blood pressure at baseline by 0.754 when all factors are held constant. Furthermore, an increase in the body mass index by one unit leads to a corresponding increase in systolic blood pressure at baseline by 1.614 when all factors are held constant.

A follow-up regression model was made to include other predictors including sex, cigarette smoking, and antihypertensive medication use. Sex and cigarette smoking were found to be non-significant and as such were removed from the regression model. The regression model is as shown in Table 2.

	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	43.266	4.732	9.143	.000
Serum total cholesterol at baseline exam (mmg/dL)	.059	.012	4.873	.000
Age at baseline exam (years)	.678	.063	10.745	.000
Body Mass Index at baseline exam (kg/m^2)	1.582	.132	11.973	.000
Use of antihypertensive medication at baseline exam	25.301	2.931	8.632	.000

From the regression model, it is evident that the use of antihypertensive medication at baseline is the best predictor of systolic blood pressure. An increase in the serum total by one unit leads to a corresponding increase in systolic blood pressure at baseline by 0.059 when all factors are held constant. On the other hand, an increase in the age by one year leads to a corresponding increase in systolic blood pressure at baseline by 0.678 when all factors are held constant. Moreover, an increase in the body mass index by one unit leads to a corresponding increase in systolic blood pressure at baseline by 1.528 when all factors are held constant. Finally, an increase in the use of antihypertensive medication at baseline by one unit leads to a corresponding increase in systolic blood pressure at baseline by 25.301 when all factors are held constant.