

Assessing Oral Cancer Awareness among Undergraduate Student in Higher Education Institution using Multiple Linear Regression

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Abstract: Oral cancer a highly morbid disease which has become a serious public health concern in most countries such as Germany, India and Indonesia and can cause death. Oral cancer is a disease that can occur in the surrounding of the mouth, oral cavity and oropharynx. The aim of this study was to identify the awareness of oral cancer among students in UiTM Kota Bharu, Kelantan. Four variables were investigated in the study including socio- demographic profile, knowledge of signs or symptoms of oral cancer, knowledge of risk factors of oral cancer and student's habits. Stratified Random Sampling was used to select the respondents. Pearson's correlation coefficient was used to analyze the signification relationship between dependent variable and independent variable. Multiple linear regression used to analyze the factors influence significantly to the awareness of oral cancer. Demographic analysis used to analyze the socio-demographic data. It was found that all three variables, (knowledge of signs or symptoms of oral cancer, knowledge of risk factors of oral cancer and habits) are significant effect to the awareness of oral cancer among students in UiTM Kota Bharu, Kelantan.

Keywords: oral cancer, awareness, signs or symptoms, risk factors, students' habits

1 Introduction

Oral cancer a highly morbid disease which has become a serious public health concern [1]. Oral cancers develop mainly in the lip, oral cavity, nasopharynx and pharynx [2]. It is one of the most common cancer globally and it is estimated to have an annual incidence of approximately 300,000 cases worldwide. Cancer of the lips and oral cavity were collectively estimated at 354,864 new cases with death reaching 177,384 worldwide in 2018 [1]. Oral cancer is a multi-factorial disease linked with several potential causative agents and risk factors including alcohol, betel quid, candidiasis, dental trauma, consumptions of tobacco, human papilloma virus, dietary defiance, and syphilis [3 -5]. Patient's lack of knowledge in understanding oral cancer has caused a delay in treatments. There is moderate awareness of oral cancer among dental patients in Malaysia [6]. There are many studies conducted on oral cancer knowledge and awareness among dental and medical students are well documented across various countries but few studies have been carried out among students from public universities [8-9].

In reviewing the literature on student's awareness, there are three main factors being highlighted which are knowledge of signs or symptoms of oral cancer, knowledge of risk factor of oral cancer and respondents' habit [8-12]. Gunjal [9] conducted a study to access the current level of knowledge regarding oral cancer among dental and medical students in a Malaysia private university. Chi-square test was used to analyse the different in oral cancer awareness between medical and dental students. The results show that dental students had a higher level of knowledge of oral cancer than medical students. Study done by Abllah [10] shows the awareness level of the respondents are low and not significantly influence by socio-demographic factor.

The results of the study done by Bhagavathula [8] demonstrated that lack of awareness about risk factors among undergraduate dental students regarding oral cancer. Al Dubai [11] assess the level of

knowledge of oral cancer and its associated factors among university students in Malaysia and observed that inadequate knowledge about its risk and factors among the students. Jayasinghe [12] has found that 52.1% of undergraduate medical students have knowledge about risk factors of oral cancer. The knowledge about the risk factors were not satisfactory. Alaizari [13] has done a study from 800 private and public dental practitioners using a descriptive analysis with cross-sectional study design. The result shows that the respondents have inadequate knowledge of risk factors about oral cancer.

Ghani [14] done a cross-sectional survey with 438 respondents were selected for the study and the result were analysed using multiple logistic regression and chi-square test. Most of the respondents agreed that smoking is the risk habit of oral cancer and half of the number aware that another risk habit is uncontrolled consumptions of alcohol. A study done by Musa [15] shows that the smokers in this study had low awareness and knowledge on oral cancer compared to the non-smoker. Alshami [16] designed the study to estimate awareness degree of Iraqi about oral cancer. The questionnaire consisted basic information of the respondents, respondent's habit and the degree of oral cancer awareness. The result shows the degrees of awareness about oral cancer of Iraqi patients was low. From the previous study we can conclude that the knowledge about the awareness of oral is important as it is one of the most serious cancer and can cause death. Thus, the aim of this study is to assess undergraduate students' awareness of oral cancer towards the factors affecting the oral cancer in Universiti Teknologi Mara students. This study is anticipated to help in effectively increasing the level of knowledge about oral cancer education among university students. Health Ministry can build up a program about oral cancer to the community.

2 Research Material and design

Study Design and population

This is a cross sectional study. The questionnaire was distributed to 235 randomly selected students at Universiti Teknologi Mara (UiTM) Kota Bharu, Kelantan. The total number of students in UiTM Kota Bharu is 600 and 235 students were selected using stratified sampling technique. The population of this study are divided into strata which is non-overlapping groups. This study has five stratum which are CS241, BM240, BM242, BM249 and BM250. After that, the simple random sampling is use to select the respondents from each stratum. The numbers of samples are chosen by using Raosoft Sample Size Calculator which is 235 students as the sample size. The respondent's name list is generated from the sampling frame that had been numbered before. There are 130 students from CS241, 11 students from BM240, 65 students from BM242, 24 students from BM249 and 5 students from BM250 will be represent as the sample size for each stratum.

B Instruments and data collection

Data was collected by using a self-administrated questionnaire. The questionnaire consisted of Socio-demographic data included questions on age, gender, marital status, course and CGPA. Awareness of oral cancer was assessed by seven questions. Knowledge on the sign and symptoms of oral cancer was assessed by seven questions, eight questions on the risk and factors and five questions on students' habit. Each item from Section B until Section E was measured by using mean. The questionnaire was distributed in both English and Malay language. Summary for the questionnaire is shown in the Table 1 below:

Table 1: Summary of Section in Questionnaire

Section	Section	Number of items	Measurement
A	Demographic profile	5	Nominal
B	Awareness of oral cancer	7	Likert-Scale

C	Knowledge of signs or symptoms of oral cancer	7	Likert-Scale
D	Knowledge of risk factor	8	Likert-Scale
E	Students' Habits	5	Likert-Scale

3 Method of Data Analysis

A Multiple Linear Regression

The regression models used in this study is multiple linra regression. The parameter estimation of multiple linear regression is much complicated than the one-dimensional linear regression model. The introduction of the matrix simplifies the calculation and anaylsis $(y_i, x_{1i}, x_{2i}), i = 1, 2, \dots, n$, which is taken from the overall set of random samples. Montgomery [17] stated that regression analysis can explained how the value of the dependent variable changes when one of the independent variable varies, while the other independent variable are held constant. In this study, factors associated with the awareness of oral cancer (Y) were determined by using Multiple Linear Regression. The following independent variables were included for testing are knowledge on the sign and symptoms of oral cancer (x_1), knowledge on risk and factors contribute to oral cancer (x_2) and students' habits (x_3). Goodness -of-fit model was checked using coefficient of determination (R^2) and adjusted coefficient of determination (R^2_{adj}). In Multiple Linear Regression analysis, variable for inclusion in the model were selected by using backward elimination. Variables with a p-value less than 0.05 reported to be influenced with dependent variable which is awareness of oral cancer. The model is specified as : Awareness of oral cancer (y_i) = $\beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + e_{ij}$ where $\beta_0, \beta_1, \beta_2$ and β_3 are the regression coefficient which are estimated from the sample data. The error random is represent by e_{ij} .

B Pearson's Correlation

The relationship between awareness of oral cancer and knowledge on the sign and symptoms of oral cancer, knowledge on the risk and factors and students' habit was evaluated using Pearson's correlation. It measures the strength and the direction of the linear relationship between the dependent and independent variables and evaluates the degree of relationship of change that exists. The strength of relationship can be anywhere between -1 and +1. The stronger the correlation, the closer the correlation coefficient comes to ± 1 . If the coefficient is a positive number, the variables are directly related.

C Model Adequacy Checking

Model adequacy checking was done to check the assumption of regression model which are the dependent and independent variables must be linear relationship, no significant outlier, the error terms are normally distributed and have constant variance, and the independent variables are not correlated.

Normality plot, residual versus predicted plot and residual versus order were used to check both normality of error, homoscedasticity of error and independent assumptions. Variance Inflation Factor (VIF) and tolerance value were used to check multicollinearity.

4 Results

A Reliability Study

Table 2 shows the results of reliability test for each section by using the actual field work data for the questions in the questionnaire. All items in Section B – Section E are acceptable and said to be reliable and consistent since the the value of Cronbach’s Alpha is greater than 0.6.

Table 2: Reliability for each Section in Actual Study

Section	Cronbach’s Alpha	Number of Item
B: Awareness of Oral Cancer	0.820	7
C: Knowledge of Sign or Symptoms of Oral Cancer	0.931	7
D: Knowledge of Risk Factor of Oral Cancer	0.859	8
E: Student’s Habits	0.811	5

B Socio-demographic characteristics

Table 3 showed sociodemographic of the respondents. Majority of the respondents were female (74.5%) with small percentages of males (25.5%). Most of the respondents were age 20 to 25 years old (98.7%) and the rest were above 25 years old (0.85%) and below 20 years old (0.43%). 98.7% of the respondents were still single and only 1.3% is married. About half of the respondent (55.7%) were from CS241, bm242 (26.4%), BM249 (10.6%), BM240 (5.1%) and BM250 (2.1%).

Table 3: Sociodemographic of students

Variables		Frequency (N)	Percentages (%)
Gender	Female	175	74.5
	Male	60	25.5
Marital Status	Married	3	1.3
	Single	233	98.7
Age	20 - 25 years old	232	98.7
	Above 25 years old	2	0.85
	Below 20 years old	1	0.43
Course	BM 240	12	5.1
	BM 242	62	26.4
	BM 249	25	10.6
	BM 250	5	2.1
	CS 241	131	55.7

C Results of Correlation Analysis

Table 4 shows that knowledge of sign or symptoms and knowledge of risk factor have a moderate positive relationship with an awareness of oral cancer with Pearson’s correlation coefficient of 0.676 and 0.597 respectively. The Pearson’s correlations for students’ habits is 0.415, this indicates that there exists a weak positive relationship between these two variables. All the independent variables

which are knowledge of signs or symptoms of oral cancer, knowledge of risk factor and students' habits have significant positive relationship with awareness of oral cancer with p-value 0.0000 less than 0.05. This means increase in knowledge of sign or symptoms, knowledge of risk factors and students' habit were increase the awareness of the student.

Table 4: Pearson Correlation between general awareness and independent variables.

Variables	Correlation Coefficient (r)	p-value
Awareness of oral cancer * Knowledge of sign or symptoms	0.676	0.0000
Awareness of oral cancer * Knowledge of risk factors	0.597	0.0000
Awareness of oral cancer * Students' habit	0.415	0.0000

D Results of Multiple Linear Regression Model

i. Model Adequacy checking

Normality Assumption

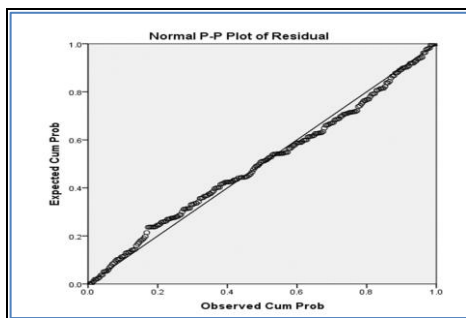


Figure 1: Normality Plot of residual

Homogeneity Assumption

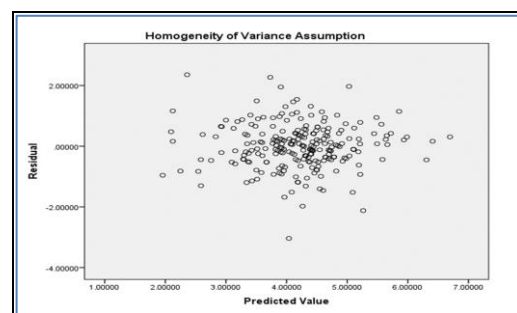


Figure 2: Residual versus predicted plot

Independent Assumption

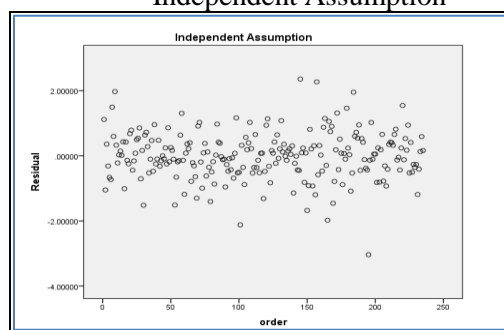


Figure 3: Residual versus order

Figure 1 shows that P-P plot of residual, since most of the points are scattered roughly along the line, therefore it can be concluded that the normality assumption of error is satisfied. Scatterplot of residual versus predicted in Figure 2 shows no pattern of increasing or decreasing in any circumstances. Thus, it is shows that homoscedasticity of error variance assumption is satisfied. Lastly Figure 3 shows no obvious pattern and are randomly scattered. Therefore, the independence assumption is satisfied.

ii. Goodness of Fit of the Model

Table 5: Goodness of Fit

Model	R Square	Adjusted R Square
1	0.532	0.526

Table 5 above shows that based on the coefficient of determination it can be concluded that 53.2% of the total variation in awareness of oral cancer (Y) is explained by knowledge of signs or symptoms of oral cancer (X_1), knowledge of risk factor (X_2) and habits (X_3) while the balance 46.8% is explained by other factors. The R^2 adjusted for this model is 0.526 which indicates that the variation in awareness of oral cancer (Y) is reduced by 52.6% when X_1 , X_2 , and X_3 are considered into the regression model. Based on both values, it can be concluded that the regression line is fairly fit in this model.

iii. *Multicollinearity*

Based on the Table 6 below, the result shows the value of variance inflation for the independent variables. From the value, it was found that all the independent variables are independent within each other since the value of VIF are less than 10 while the value of Tolerance is more than 0.1. Therefore, multicollinearity does not exist in this case.

Table 6: Multicollinearity among Independent Variables

Variable	VIF	Tolerance
Knowledge of signs or symptoms of oral cancer	1.977	0.506
Knowledge of risk factor	1.820	0.550
Students' Habits	1.143	0.875

iv. *Result on model significant (ANOVA)*

Table 7 shows the F-value and significant p-value. The F-value and p-value are 87.547 and 0.000 respectively. Since p-value 0.000 which is less than significant value 0.05, therefore the model is significant. This means at least one of the independent variables give significant effect on the awareness on oral cancer.

Table 7: Overall F-Test – Test for Significance of Regression Model

F-statistic	p-value
87.547	0.000

v. *Model Formulation*

Table 8: Analysis of the predictors on awareness of oral cancer

Variable	P-Value	Decision Rule	Conclusion
Constant	0.000	Reject H_0	Significant
Knowledge of sign or symptom	0.000	Reject H_0	Significant
Knowledge of risk factor	0.000	Reject H_0	Significant
Habits	0.000	Reject H_0	Significant

Table 8 indicates that test for significance of individual predictor variable. It is shows that all predictor variables are significant since p-value for knowledge of sign or symptom, knowledge of risk factor and students' habits is 0.000 which is less than the alpha value 0.05. Therefore, all the

independent variables have significant effect on the awareness of oral cancer. The predicted model is $= 1.129 + 0.335X_1 + 0.266X_2 + 0.175X_3$.

5 Conclusion

The research was conducted to Assessing Oral Cancer Awareness among Undergraduate Student in Universiti Teknologi Mara Kota Bharu. Overall, this study found a high level of awareness of oral cancer. The variables that have been investigated were demographic profile of respondents, knowledge of signs or symptoms of oral cancer, knowledge of risk factor and students' habits. All the independent variables which are knowledge of signs or symptoms of oral cancer, knowledge of risk factor and students' habits have significant relationship with awareness of oral cancer with p-value 0.0000 less than 0.05. Lastly this study is interested to examine factors effecting on student's awareness of oral cancer in UiTM Kota Bharu. This study used Multiple Linear Regression and the result of this study shows that all of the factors; knowledge of signs or symptoms of oral cancer (X_1), knowledge of risk factor (X_2) and students' habits (X_3) were significant effect to the awareness of oral cancer (Y). Mass Media and health exhibition were the main source of information regarding oral cancer. Thus, public health campaign is required to increase the awareness of oral cancer. The use of television, advertisement and internet should be stressed to widely impart information on the risk factor of oral cancer.

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