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Regression Analysis in Assessing Lecturers' Health-Related Quality of Life (HRQoL) during COVID-19 Pandemic

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Abstract: The COVID-19 world health crisis has affected the mental and psychological health as well as the well-being of individuals around the world. However, little is known about the impact of the COVID-19 pandemic on the quality of life among lecturers. This research aims to determine the socio-demographic variables such as age, gender, income level, containment zone on health-related quality of life (HRQoL) among lecturers during the COVID-19 pandemic. Besides, this study also aims to establish the relationship between individual variables (anxiety, perceived susceptibility, perceived severity, optimistic bias), social support (family, friends, and significance other) towards HRQoL. A cross-sectional study was used where participants were recruited using simple random sampling. The sample consisted of 52 lecturers in UiTM Kelantan from both campuses of UiTM Machang and UiTM Kota Bharu. Since the purpose of this study is to analyze the individual HRQoL, hence the EQ-5D index calculator was used. The analysis of data was done using SPSS software to analyze the relationships between variables. In conclusion, from the multiple linear regression model, it shows that the perceived susceptibility, working years, and education level significantly affect the health-related quality of life among lecturers.

Keywords: COVID-19 pandemic, EQ-5D index, HRQoL, Regression Analysis

1 Introduction

Since December 2019, it has been determined that the 2019 Coronavirus Disease (COVID-19) is a disease caused by a new type of coronavirus, now called Severe Acute Respiratory Syndrome Coronavirus 2 (COVID-19). It spread rapidly around the world and was infected with the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2), causing millions of deaths. The virus was first discovered in Wuhan, Hubei Province, China.

COVID-19 was discovered in Malaysia for the first time in January 2020. Within weeks, Malaysia had become an Asian country with the fastest-growing COVID-19 outbreak. The Malaysian government acted quickly to prevent the spread of this pandemic. A nationwide Movement Control Order (MCO) was announced on March 18, 2020, in order to control the viral outbreak. To limit the spread of the virus and reduce interactions with people infected with COVID-19, the quarantine of infected people and social distancing were implemented. The MCO forced the Malaysian people to live in social isolation for a long period of time. The unprecedented rules had drastically altered people's lives and social interactions, resulting in high levels of anxiety as well as the fear of contracting the infection. Lockdowns, rigid isolation, social distancing, emergency remote lectures, confusion and delays in the start of classes, colleges, and universities have major effects on lecturers' socio-psychological well-being and anxiety levels. When the government announced that all universities are encouraged to conduct online learning, no one is allowed to engage in face-to-face classroom learning or even physical interactions. Lecturers are also required to conduct online teaching and work at home. This is to ensure that the higher education system can continue to operate and function normally on track [1].

Furthermore, because online learning is entirely dependent on technical devices and the internet, lecturers and students with limited internet access may be denied access to online learning. Since some of the students were having issues with internet connectivity, lecturers must provide notes and video recordings of demonstrations as a supplement to students that can be viewed offline. Besides, some of the lecturers also record videos of their lectures on the day of classes to make it easier for students to re-watch if they encounter internet and data limitations while in online classes [2]. However, due to a lack of specialized training, most lecturers are unfamiliar with specific issues of online pedagogy and fail to teach online [3], causing them to take a long time to prepare for good videos. Additionally, to ensure that students receive a successful lesson, they aim to prepare for interactive learning diligently, which causes certain lecturers to be exhausted and overworked.

Therefore, the results of this study can help Malaysian universities to form a theoretical basis for determining mental health and to determine evidence-based psychological intervention practices to provide assistance for lecturers during similar pandemics in the future. It should also provide guidelines for policymakers to understand possible mechanisms for reducing the impact of anxiety on lecturers during such health catastrophes.

2 Literature Review

In lieu of online classes, spending time indoors can have a different psychological effect depending on how a person reacts and responds to the situation. There is evidence that such interventions, especially family confinement, can cause unparalleled damage to the well-being of the population. In the current pandemic, all interventions are mainly aimed at minimizing people-to-people interaction and, thereby, to the possible extent of breaking the transmission chain [4]. Being forced to stay at home and restricted on daily activities may affect the health-related quality of life (HRQoL) and behavior-related people's lifestyles. During this period, academicians are no exception. Their work performance is measured by the number of articles published in influential journals. However, due to the burden of teaching, supervision and consulting, the HQRoL of administrative work has not hesitated to deteriorate, which may lead to the improvement of research work and teaching ability [5].

Interestingly, an analysis of the relationship between positive bias and the perceived sensitivity and severity of coronavirus disease found that individuals with optimistic bias seem to underestimate their perceived sensitivity and severity of the virus [6]. According to [7], physical activity and exercise could help lessen the effects of the current pandemic on the mental and physical health of citizens around the world. Physical activities should be highly recommended [8] since it can improve the quality of life (QoL) by reducing the negative psychosocial effects of the COVID-19 pandemic lockdown [9]. A study from Spain found that doing indoor physical activities act as a preventive measure in lock-down situations, while the level of activities do not affect mental health [7]. The benefits of physical activities in this emerging condition are expected to exceed the known benefits of improving mental status and helping people to cope with the new normal and social withdrawal [10]. In the current coronavirus epidemic, there is no position to eliminate positive bias, because it makes people think that they will not be affected by the disease or that they are at a lower risk to themselves than others [11].

Teachers have not been free from vulnerabilities due to COVID-19 since then. They had to quit teaching immediately after the lockdown. Besides, they have been searching for ways to connect with friends, colleagues, and a few of their students who are available online [12]. However, just as closures have altered the nature of employment, the home life of teachers was also changed due to the pandemic. Along with the closure of institutions as early as March 13th, curfews were enforced, cities were isolated, and there was no access to workplaces, gyms, etc. Grocery stores (convenience stores), bakery shops, and medical facilities were the only services that people could go to during the limited hours of the day that were only for limited age groups. These measures favor sedentary lifestyles due to low mobility and may give an impact on the integrity of cardiovascular and mental health [10].

In addition, to improve their skills in using online distance learning platforms such as Zoom, Google Classroom, Google Meet, and Telegram, most teachers should regularly practice in front of their computers or cell phones. This situation indirectly can decrease their free time to interact with family members. A study done by [7] found that teachers perceive a decrease in the contact with their family members that could be related to telecommuting and the consequent increase in the workload. However, a study from the Philippines found that most of the teachers felt positive about spending time with their families during the quarantine [12].

In addition, home confinement and curfews have forced most people to work or study form home, a practice that is thought to compromise routine physical activities by increasing sitting time. Most people are thought to spend a long time in front of the screen, whether checking the news on the phone, or joining Zoom with the family, watching Netflix, or spending extra hours staring at the computer while working from home, and this can mean increasing social space in the family due to a long stay in front of the screen [10]. Since most institutions moved from face-to-face education to online distance learning, many teachers have turned to the use of education technology during the pandemic. According to [13], most teachers reported having little or no previous experience in online teaching, which means that they had difficulties in delivering lessons online. Plus, some of the teachers also found online teaching stressful.

Due to the sudden and radical change in the habits and lifestyles of the population, any form of socialization has been drastically reduced. Physical distance and self-isolation have had a strong impact on citizens' lives, affecting eating habits and everyday behavior [14]. Bad nutritional behavior may also be stimulated by emotional eating due to conning-induced anxiety, stress, and long sitting hours. Besides, home confinement may alter the eating patterns resulting from breadth and access to food. As a result, proper nutrition is vitally important to support the immune system, and improve energy balance, reduce the risk of developing chronic and infectious diseases [10]. A study from Jordan indicated that the mental well-being overall score was higher in people who adapted to healthy dieting [10]. Furthermore, a study from [15] found that most teachers reported not using any medicinal drugs in response to COVID-19's induced psychological distress, whereas a study from [12] found that only several teachers take supplements. The study shows a positive relationship between behaviour changes and health-related quality of life (HRQoL). This is because they are not able to do the things that they once used to do as their lifestyle changed during the pandemic [16].

3 Methodology

A Study Design and Instruments

A cross-sectional study was conducted to observe the impact of COVID-19 pandemic on quality of life among lecturers in UiTM Kelantan. The sampling method used was Simple Random Sampling method as every member of the population is aware and has an equal probability of being chosen as a subject. The target population was lecturers from UiTM Kelantan (358 lecturers) for both campuses UiTM Machang and UiTM Kota Bharu. A self-administered questionnaires were distributed online using Google Forms. However, only 52 sets of questionnaires were properly collected and valid. An overview of the goal of the data collection, as well as a letter of consent, were offered to respondents on the main page. The first section of the questionnaires consisted of participants' demographic and socioeconomic characteristics, including age, gender, ethnicity, educational level, containment zone, monthly household income, marital status, residential area, worry status, and epidemic effect. The second section contained the health-related quality of life (HRQoL) of the lecturers that was measured by using EQ-5D-5L scale. EQ-5D-5L is a universal tool for evaluating HRQoL (developed by EuroQol Group in 2011) [17]. EQ-5D-5L contains 5 aspects (activity, self-care, daily activities, pain/discomfort and anxiety/depression). Each dimension has 5 levels of response options (no problem, minor problems, moderate problems, serious problems, and impossible/extreme problems) to define all possible health conditions. To generate a healthy condition, the values of the five aspects of 5L can be merged in the order of activities, self-care, daily activities, pain/discomfort, and

anxiety/depression. The health status of 11111 will indicate a level of 1 ("no problem") for all dimensions [18]. EQ-5D index calculator was used to find the index value of HRQoL among lecturers. The third section covers individuals' variables of COVID-19 such as anxiety, perceived susceptibility, perceived severity, and optimistic bias. The fourth section comprises of social support such as family, friends, and life partners. Finally, several questions were designed to correspond to their daily lifestyle behaviors.

B Statistical Analysis

Data analysis was done using SPSS software to analyze the mean difference between groups of socio-demographic variables such as age, gender, monthly income, containment zone and income level. A frequency table was used to explain in detail about demographic variables. Besides, the relationship between individual variables of COVID-19 such as anxiety, perceived susceptibility, perceived severity, and optimistic bias were also analyzed using Multiple Linear Regression (MLR) models. MLR was to model the linear relationship between the explanatory (independent) variables and response (dependent) variable. The formula is as follows:

$$Y\,i = \beta 0 + \beta 1xi1 + \beta 2xi2 + ... + \beta pxip + \epsilon \quad (1)$$

where, for $i=n$ observations:
yi= dependent variable
xi= explanatory variables
$\beta 0$= y-intercept (constant term)
βp= slope coefficients for each explanatory variable
ϵ=the model's error term (also known as the residuals)

The multiple regression model is based on the following assumptions:

- There is a linear relationship between the dependent variables and the independent variables
- The independent variables are not too highly correlated with each other
- yi observations are selected independently and randomly from the population
- Residuals should be normally distributed with a mean of 0 and variance σ

All statistical tests were two-tailed and the statistical significance level was set at p-value < 0.10.

4 Results and Discussion

A Socio-demographic Profile

Table 1 below shows the characteristics of the 52 lecturers. Out of 52 lecturers who have completed the questionnaires, there were 9 (17.3%) male respondents and 43 (82.7%) female respondents in this study. A majority of the lecturers (16 respondents) were 36 to 40 years old representing 30.8%. This is followed by more than 45 years old, with 14 lecturers (26.9%). There were 12 lecturers of age 30 to 35 years old (23.1%) and only 10 lecturers were 41 to 45 years old. Majority of the respondents from this study were married, 9 respondents were single and only 2 respondents were widowed. The highest level of education of the respondents was PhD holders consisting of 25% while the rest were Master's degree holders. Most of the lecturers (37 respondents) have worked for 10 to 20 years representing 71.2%. This is followed by less than 10 years, with 8 respondents (15.4%). Only 7 respondents have worked for more than 20 years representing 13.5%. Most respondents (31 in total) had monthly incomes ranging from RM5,000 to RM10,000 (59.6 percent). There were 14 respondents (26.9 percent) with monthly incomes of RM10,000-RM15,000. Following that, there were 5 respondents (9.6%) respondents with monthly incomes ranging from RM15,000 to RM20,000. Only one respondent (1.9%) had the highest salary of more than RM20,000 per month. Last but not least, 1

respondent had a salary of less than RM5,000. Most of the lecturers stayed in Machang and Kota Bharu. While lecturers who lived in Tumpat, Tanah Merah and Pasir Puteh were recorded with moderate percentages of respondents which were 7.7%, 5.8%, and 11.5%, respectively, since that district were quite far from campus. Meanwhile, only one respondent was recorded from Jeli with 1.9%.

Table 1: Socio-demographic characteristics of the respondents

Characteristics	n=52	Percentage (%)
Gender		
Male	9	17.3
Female	43	82.7
Age		
30-35 years old	12	23.1
36-40 years old	16	30.8
41-45 years old	10	19.2
More than 45 years old	14	26.9
Marital status		
Single	9	17.4
Married	41	78.8
Widowed	2	3.8
Education level		
PhD	13	25
Master	39	75
Years of Working		
< 10 years	8	15.4
10 – 20 years	37	71.2
More than 20 years	7	13.5
Monthly Income		
Less than MYR 5,000	1	1.9
MYR 5,000 - MYR 10,000	31	59.6
MYR 10,000-MYR 15,000	14	26.9
MYR 15,000-MYR 20,000	5	9.6
More than MYR 20,000	1	1.9
District of Residence		
Kota Bharu	17	32.7
Tumpat	4	77
Tanah Merah	3	5.8
Pasir Puteh	6	11.5
Machang	21	40.4
Jeli	1	1.9

B Multiple Linear Regression Model

Figure 1 shows a histogram of regression standardized residual which were normally distributed. The data fits very well in this model. For Figure 2, the residual points follow a straight line which indicates that the normality assusmption has been met. Finally, based on Figure 3, it stipulates that there is no pattern in the plot. Thus, the residuals have a constant variance. Hence, the assumption of homoscedasticity is satisfied.

According to Table 2, the F-value was recorded as 1.762, with a p-value of 0.094, which is less than the significant level of 0.1. This implies that the independent variables (Perceived Susceptibility, Perceived Education level, Working Years) were having significant relationship with the dependent variables (HQRoL Index).

The hypothesis that stated that Perceived Susceptibility has significant relationship with the HRQoL Index. Based on Table 2, the significant value (p-value) of perceived susceptibility was recorded as 0.051 which is less than 0.1. This indicates that there is significant relationship between perceived susceptibility and HRQoL Index. The significant value (p-value) of education level recorded as 0.053 which is less than 0.1. Hence, there is significant relationship between education level and HRQoL Index. Lastly, the significant value (p-value) working years was recorded as 0.059 which is less than 0.1.

Figure 1: Histogram of the Residuals

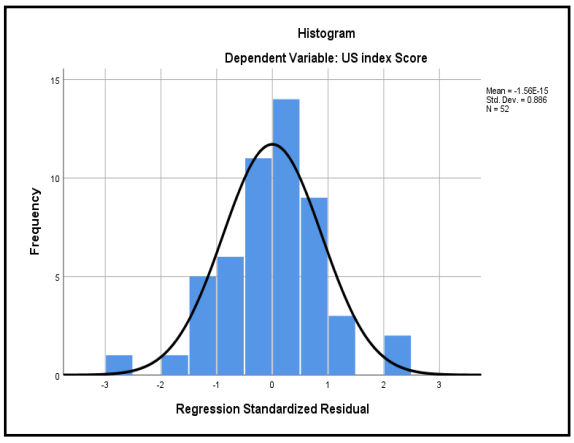
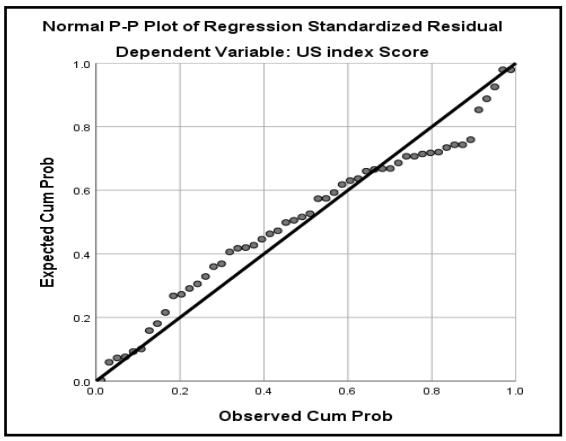


Figure 2: Scatterplot of the Residuals



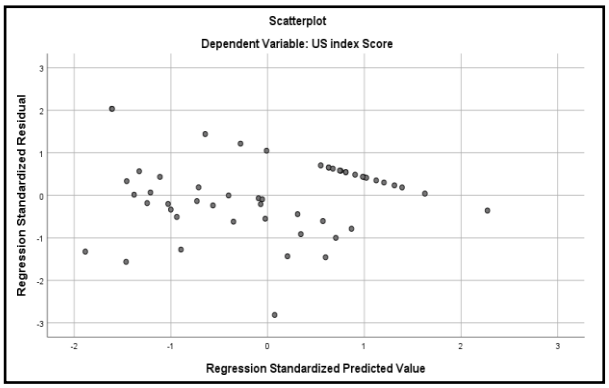


Figure 3: P-P Plot of Residuals

Table 2: Results of the Multiple Linear Regression

Variable	B	SE	p-value	Tolerance	VIF
Perceived Susceptibility	-0.038	0.019	0.051	0.530	1.887
Education Level	0.080	0.040	0.053	0.579	1.727
Working Years	-0.068	0.035	0.059	0.504	1.985
F-statistics = 1.762 (p-value = 0.094)					

5 Conclusion

The role of perceived susceptibility is not limited to direct effects, but also includes mediating and regulating pathways of influence [19] on the psychological state of academicians during the COVID-19 pandemic. Based on Table 2, the result shows that p-value is 0.051 which was the lowest significant value than other variables and the coefficient value was recorded as (-0.038) which defined that susceptibility has an inverse influence towards HRQoL index. This study proves that perceived susceptibility could influence the health status of lecturers. Another view on the relationship between perceived susceptibility and behavior is that the initial state of perceived susceptibility can adjust changes in other social and psychological factors that affect subsequent intentions and behaviors. People with superior knowledge of viruses, vaccines, and therapeutic targets were discovered to have higher education levels and bio-backgrounds. Interestingly, overseas students tended to have more advanced knowledge, whereas others tended to have more basic information. This study shows the educational level is significant towards HRQoL index among lecturers. This is supported by the result in Table 2 with p-value (0.053) which is less than 0.1 and the coefficient value recorded as (0.080) defines that educational level have a direct influence towards HRQoL index. The result shows that working years is significant with HRQoL index with p-value (0.059) and coefficient value recorded as (-0.068) defines that working years have an inverse influence towards HRQoL index.

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