

COVID Risk Assessment: A Case of Employees in Academic Sector

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Abstract

The academic sector is one of the sectors that is facing the impact brought by the COVID-19 infection. Many of the teachers and staff who work in the academic sector has a risk of getting infected by the virus because of the different sub-factors that risk factors have that can be the cause of the infection. The study aims to measure the risk level of employees in academic sectors for COVID-19 infection. An online survey questionnaire was conducted to gather the data needed for this study. The study used descriptive statistics and correlation analysis to determine if the following sub-factors of risk factors have a significant correlation with each other. After performing the correlation analysis, the researchers have concluded that sub-factors age, anxiety, comorbidities, compliance, hand washing, lockdown, residential, sanitizing, and total risk score have a significant correlation with each other.

Keywords

COVID-19, risk assessment, academic sector

1. Introduction

The COVID-19 disease has spread rapidly around the world because the transmission of the virus can easily infect others. The impact of the rapid spread of the virus is a challenging time for the employees in academic sectors and other sectors because they were permitted to go back to campus and work on-site to provide the quality of education that students need. Thus, the academic institutions in the Philippines have implemented online learning to ensure the safety of the academic staff and the students. Since it has been the new normal of education, the Philippine education sector has imposed to improve and enhance the capabilities in conducting online learning (Marquez, et.al, 2020). However, some academic institutions have demanded the suspension of online learning because not everyone has efficient academic materials and supplies especially students from poor families.

Moreover, some academic sectors are still at high risk of getting infected by COVID-19, especially those who work in public schools. The teachers and staffs in public schools are more exposed to the outdoor environment because they provide the module materials to their students. They usually have contact with other people not only with their colleagues. Other factors can lead to getting infected by the virus. Hence, analyzing the risk assessment of staff is detrimental. With the use of a risk assessment tool, the study will be able to determine which factors have a significant relationship in getting infected by the virus. Measuring the risk level of teachers and staff of an institution in getting infected by the virus helps the institution to provide more safety measures and guidelines to prevent the transmission of the virus.

2. Review of Related Literature

Risk awareness is one of the best courses of action and technique that can prevent and delay the rapid transmission of COVID-19 from an individual to another individual. Having the correct and proper risk communication assessment

can raise risk awareness in other people. The effectiveness of the risk communication is very much important to manage and control the infodemic. Most of the tools about risk assessment focus only on the tracking of the infected patients or detecting if the symptom of the patient has the chance to be COVID-19. Rika India has established a risk assessment tool that will go beyond the usual risk assessment tool, this new risk assessment tool will assess four factors namely: Health, Behavior, Exposure, and Social Policy. Furthermore, the results show that precautionary measures should be more strengthened at all costs (Chatterjee, et.al, 2020).

As the COVID-19 rapidly spreading around the world many countries have set their different action plan to delay and slow down the spread of the COVID-19 disease. One of the action plans that Germany did they lockdown schools from March 2020 and moderately re-opened them in May 2020. The teachers have tackled the need of adapting online teaching for them to continue to provide quality education amidst the Pandemic. However, some of the teachers have struggles in adapting to the new online learning because of the different technologies that will be used. Furthermore, the results show that 90% of teachers reported that they have managed to interact with their students regularly (König, et.al, 2020).

Different viruses can cause disease and infection for plants, animals, and humans, the new viral disease came from the existing viruses that mutate. The rapid spreading of COVID-19 across the globe causes a big crisis in the health systems and education systems. Schools were closed to prevent the spread of the virus and the new education system was adapted. The study aims to determine the perspective of the teachers regarding the effects of COVID-19 on the new education process in Turkey. The results show that teachers have both positive and negative perspectives about the competencies, distance learning, adapting the new learning system for both teacher and students (Karakaya, et.al, 2021).

The global population is now facing the most serious health risk caused by the new strain of novel coronavirus. The purpose of the study is to examine the risk perception of the teachers, self-efficacy, response efficacy, and approach to the disease precautionary measures during the COVID-19 outbreak in Taiwan. A descriptive and cross-sectional online survey is used to gather data for the study and the Pearson correlation between the different variables was computed. The result of the study shows that a teacher who has higher risk perception indicates a stronger acquisition of the prevention measures of disease, however, they also showed low self-efficacy. Furthermore, teachers who have high self-efficacy have higher response efficacy (Tang, et.al, 2020).

The number of people who are obese across the world is getting higher and worse because it becomes a severe health problem. The cause of obesity is the increase in calories, including eating junk food and low physical activity. One of the most crucial labor elements that improve the human development index is teachers. Determining the risk factor for obesity and some non-communicable health problems during pandemics on the female teachers is the aim of this study. The results show that age, consumption of junk food, type of diet, and physical activity are risk factors of obesity for female school teachers (Al Rahmad, 2021).

In the United States, numerous schools in the district are tackling whether and how to re-open again the schools, colleges, and universities. The researchers used household data before the pandemic, and they examined how people who have health conditions placing them at a higher risk of getting infected by the virus whether they are school employees or school-age children. The results of the study show that adult school employees are considered to have a risk of getting infected. In comparison with non-working adults, workers had a lower chance of risk getting infected and it was less likely to increase the risk. The re-opening of schools, colleges, and universities in the district should require careful risk assessment (Selden, et.al, 2020).

On March 2, 2020, in an early stage of the pandemic, the government of Japan requested a nationwide closure of elementary schools and junior high school schools. The re-opening of the schools will be in June and the Ministry of Education, Culture, Sports, Science, and Technology established manuals and guidelines about the infection control that will be used by the schools. The study aims to determine the COVID-19 confirmed cases among the teachers and students in elementary schools and junior high school schools between June and July 31. Results show that numerous COVID-19 cases were reported among the teachers and students, the household transmission is the dominant transmission route. Teachers and students were asked to keep away from different social gatherings to avoid getting infected (Wada, et.al, 2020).

The data that came from a massive survey in the United States indicates that a person who has a child that goes to school has increased the risk of getting infected by COVID-19. Different schools implemented different measures and guidelines to reduce the risk of infection, particularly with the person who has symptoms of COVID-19. Persons who are in the academic sector are also associated with household COVID-19 transmission, but this risk can be managed with proper protocol and measures in the schools. The result of the study shows that people who are in school or the academic sector have a risk to transfer the virus to their household. The researchers also found that having precautionary measures in the schools can reduce the risk of getting infected (Lessler, J., et.al, 2021)

COVID-19 is spread quickly in the whole world and the surge of the death rates is more increasing that we may see in many countries having these alarming circumstances different measures were provided for example the hand washing and proper sanitation this two has the features to prevent getting infected. According to CDC, handwashing with soap and water for at least 20 seconds or using different alcohol or sanitizers is a precautionary measure to stop the spreading of the infection. Even before this Pandemic, there is enough evidence that handwashing among the healthcare system remained under improvement. Education and information about proper handwashing have been seen when the COVID-19 pandemic started. When the Pandemic is over, we must still promote handwashing not only for the healthcare system but also throughout the communities.

The COVID-19 pandemic is an unusual circumstance that we have never experienced during the last century. In the absence of medicinal treatments or vaccines we must cope up with these circumstances by having universal infection control resources; hand hygiene, environmental control, and wearing personal protective equipment (PPE) and quarantine. Proper wearing of a mask is very important nowadays and we all know that there is a different kind of masks in the market. The focus of this study is to determine what type of face mask is appropriate for everyone amidst COVID-19 Pandemic. The result of the study shows that surgical masks are the best type of mask for everyone amidst of COVID-19 Pandemic because they can prevent droplet transmission. Furthermore, the cotton mask is much better than a HEPA mask and this cotton mask can be the last resort for a person without respiratory symptoms (Kim, 2020).

The researchers determined that some of the literature studies that were discussed value the use of risk assessment tools and action plans in fighting against COVID-19. The researchers in the literature studies focus more on the impact of COVID-19 on the different sectors and their coping mechanisms with regards to the impact caused by the pandemic. On the other hand, this study would like to measure the risk level of the employees in the academic sector based on the health, behavioral, exposure, and social factors. In addition, correlation analysis is applied in this study to determine the relationship of the sub-factors of each risk factor.

Given this condition, this study aims to measure the risk level of employees for COVID-19 infection covering the academic sectors from the different regions of the Philippines. The risk assessment tool will be used to identify and assess all factors involved in the overall risk level of personnel in the educational field. The factors that were considered in this study are health, behavioral, exposure, and social policy risk factors.

3. Methods

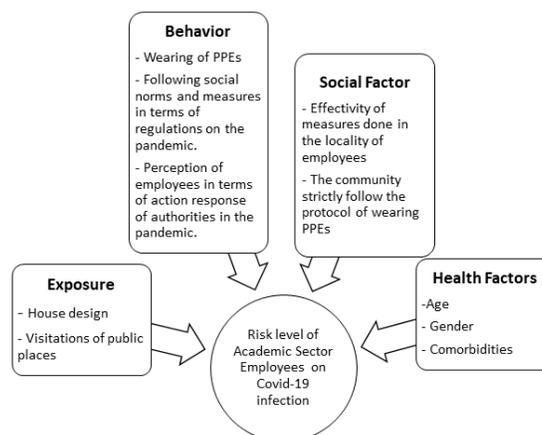


Figure 1: Predictor Criterion Model of Measuring Risk Level of Employees of the Academic Sector on the Covid-19 Infection

As shown in Figure 1, four (4) contributing factors affect the risk level of employees of different academic institutions. The first factor that could affect the risk level of employees is their health status; their age, gender, and comorbidities could affect their chances of getting infected with the virus. Based on the literature reviews, the rate of infection may vary based on their age range and gender. In addition, comorbidities or health issues present to the employee could also possibly alter the rate of infection. For instance, if the employee has a history of pulmonary diseases, chances are the employee will be vulnerable to getting infected by the virus.

Another factor that may affect risk level is the exposure of employees to different environments. Due to the possibility of catching the virus in different environments, especially since the Department of Health had stated that the virus could be transmitted without physical contact, even short exposures to potential spreaders of the virus could easily be transmitted to individuals. Along with this factor, the behavior of the employees may also be a factor that could affect risk level. The behavior of employees in terms of following health protocols in both internal and external environments must also be observed, negligence due to behavior may also result in a different risk level against infection of the virus. Lastly, Social factors could also influence the risk level of employees because it is not just self-actions that could make individuals vulnerable to the virus but actions of people surrounding us could also affect vulnerability.

3.2. Respondents of the Study

The subject of the study is composed of 30 employees in the academic sector from different academic institutions. An online survey questionnaire was used to gather data regarding the profile of the respondents and their risk of being exposed in COVID-19. In the gathered data, it was shown that most of the respondents are located from NCR and CALABARZON.

3.3. Risk Assessment Tool

The ergonomic tool that was used in this study is the Risk Assessment tool (RIKA). The risk assessment tool is a guide to identify the potential hazard in the workplace. These are the tools that can help minimize any uncertainties in the possibility of the workers being harmed due to work-related activities. The uncertainty is to be assessed to avoid harming people and it should be addressed by tracking down the risk, what are the probable cause, and how it will be mitigated. This tool is being used to effectively communicate the potential hazard with top management. With this, the risk can be addressed and reported in a systematic and user-friendly approach.

3.4. Statistical Treatment of Data

Descriptive statistics are used in this study as a statistical analysis that presents the summary of the results having the mean and standard deviation. It also provides the frequency and percentage of the different factors to be used in correlation analysis. Correlation analysis is a statistical tool that distinguishes the strength of the relationship between the two variables. These statistical tools used helps the researchers to determine the objectives of this study. Furthermore, it will be a great contribution to the research since the analysis can provide information about the potential factors that could increase the chances of getting infected by the virus.

4. Results and Discussion

Table 1. Summary Statistics of Demographic Profile

Respondent's Profile	Category	N	%
Gender	Male	18	60%
	Female	12	40%
Age	21-30	11	37%
	31-40	14	47%
	41-50	3	10%
	51-60	2	7%
Area of Residence	NCR	6	20%

	CALABARZON	21	70%
	Others	3	10%
Years Employed	10 years and below	21	70%
	11 - 20 years	6	20%
	21 - 30 years	2	7%
	31 - 40 years	1	3%
Position	Teachers	23	77%
	Staff	7	23%
Employment status	Full time	27	90%
	Part time	3	10%
Monthly income	10,000 - 20,000	12	40%
	20,000 - 40,000	13	43%
	40,000 - 70,000	1	3%
	70,000 - 130,000	2	7%
	130,000 - 200,000	1	3%
	200,000 and above	1	3%

As shown in the results in Table 1, the demographics of the 30 employees of different academic institutions, 60% of the respondents are mostly male. 47% of the respondents are between the ages of 31-40 years old. 70% of the respondents live in the CALABARZON region and have a minimum of 10 years of experience in the institution. 77% of the respondents are teachers and the rest are staffs of the academic institution. 90% of the employees take this as a full-time job and 10% do it part-time. 83% of the sample have monthly salary ranges between 10,000 to 40,000 and others range 40,000 and above.

Table 2. Summary of Health Risk Factor

HEALTH RISK				
FACTOR	VARIABLE	RISK SCALE	N	%
Age	21 - 30	1	11	36.67%
	31 - 40	2	14	46.67%
	41 - 50	3	3	10.00%
	51 - 60	4	2	6.67%
	60 and above	5	0	0.00%
Co-morbidities	none	1	23	76.67%
	1	2	5	16.67%
	2	3	2	6.67%
	3 or more	4	0	0.00%
Gender	Female	1	12	40.00%
	Male	2	18	60.00%
Smoking habit	Never	1	29	96.67%
	Seldom	2	1	3.33%
	Occasionally	3	0	0.00%
	Very frequently	4	0	0.00%

Based on Table 2, factors that affect the overall health risk of the employee are their age, co-morbidity, gender, and smoking habit. 76.67% of the employees do not have any co-morbidity or health issues that could affect their risk factor while 16.67% and 6.67% of the employees have 1 and 2 co-morbidities, respectively. For smoking habit, 29 of the employees do not smoke while only one employee seldom smokes cigarettes.

Table 3. Summary of Behavioral Risk Factor

BEHAVIORAL RISK				
FACTOR	VARIABLE	RISK SCALE	N	%
Use of face mask	N95 mask	1	9	30%

	medical mask	2	21	70%
	cloth mask	3	0	0%
	others	4	0	0%
Frequency of hand washing	very frequently	1	12	40%
	frequently	2	17	57%
	seldom	3	1	3%
	never	4	0	0%
Sanitizing before touching the face	yes	1	13	43%
	sometimes	2	17	57%
	no	3	0	0%
Following social distancing	yes	1	25	83%
	sometimes	2	5	17%
	no	3	0	0%
Anxiety about situation	not very	1	5	17%
	a little bit	2	9	30%
	very much	3	16	53%
Trust in gov't measures	yes	1	5	17%
	maybe	2	19	63%
	no	3	6	20%

Based on Table 3, the behavioral risk is also a contributing factor in the risk of getting infected by Covid-19. The sub-factors that could allow increasing the behavioral risk are the use of facemask, hygiene, social distancing and community restrictions, anxiety on the situation, and trust in government measures. Based on the results shown, 70% of the employees wear a medical face mask (surgical mask), and the remaining employees wear n95 masks. Fortunately, all the employees use a face mask that has been studied and approved by different health institutions which are surgical masks and HEPA N95 masks (Kim, M., 2020). On the other hand, 57% of the employees wash their hands frequently while 40% and 3% wash their hands very frequently and seldom, respectively. 43% of the employees sanitize their hands regularly while the rest seldomly use sanitizers for their hands. As for social distancing, 83% of the employees follow this protocol in their workplace while the remaining 17% of the respondents follow the protocol sometimes. The reason for not completely complying with social distancing is the possibility of having a small area of workspace but rest assured that this restriction is still met by the employees of the academic institutions. 53% of the employees are very anxious in the situation, this anxiety could be caused by the information that has been spreading across the news about the pandemic and the response of the community to the pandemic. 17% and 30% of the employees on the other hand do not feel anxious and a little bit anxious about the situation, respectively. Unfortunately, 63% of the employees do not have a concrete answer whether according to the trust on government's measure and response on the pandemic. While 17% trust the government's measures and 20% do not trust the government's measures at all.

Table 4. Summary of Exposure Risk Factor

EXPOSURE RISK				
FACTOR	VARIABLE	RISK SCALE	N	%
Residential type	detached home	1	24	80%
	condo	2	1	3%
	apartment	3	5	17%
	informal settlement	4	0	0%
Occupation	offsite worker	1	0	0%
	essential worker	2	30	100%
	front liner	3	0	0%
	medical personnel	4	0	0%
Travel history	no history	1	15	50%
	with travel history	2	2	7%
	attended mass gathering	3	10	33%

	travel history & mass gathering	4	3	10%
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Based on Table 4, the factors affecting exposure risk are the type of residential area the employees are living in, the type of occupation of the employees, and their travel history. Since the focus of this research is about the employees of the academic institutions, 100% of them will be categorized as essential workers since their offered service is needed in the community. As for the type of residential area, luckily 80% of the employees live in a single-detached home, meaning their exposure in their local community is minimal since they are the only ones who used the facilities of their home. 3% and 17% of them live in a condominium and an apartment, respectively. For the travel history of the employees, 50% of the respondents have no experience traveling during the pandemic while 33% of them attended mass gatherings. This is common in the Philippines since the country has a strong devotion to Catholicism and Christianity. 10% of the employees have both traveling and mass gathering history. The remaining 7% have a travel history during the pandemic.

Table 5. Summary of Social Policy Risk Factor

SOCIAL POLICY RISK				
FACTOR	VARIABLE	RISK SCALE	N	%
Effectiveness of lockdown	most are following	1	5	17%
	some are following	2	21	70%
	very few are following	3	4	13%
Community compliance	most are following	1	7	23%
	some are following	2	21	70%
	very few are following	3	2	7%

Based on Table 5, the main factors of social policy risk are the effectiveness of lockdown and the community's compliance with the health protocols implemented in the community. Based on the results, 70% of the respondents that the effectiveness of lockdown is 'somewhat effective', while 17% of them indicates that the lockdown was 'greatly effective', and the remaining does not think it is effective. On the other hand, community compliance has similar feedback with the employees 70% thinks that some of the communities are complying with the health protocols implemented in the locality. 23% think that most of the community are following and 7% think that only a few are completely following the community compliance. In terms of compliance, since people in communities have different socioeconomic statuses their capability of complying with standard protocols may vary.

Table 6. Correlation Analysis of Variables from the Different Risk Factors

Variables	Pearson Correlation	P-Value	Remarks
Age and Sanitizing	0.535	0.002	High Correlation
Total Risk Score and Comorbidities	0.395	0.031	Moderate Correlation
Total Risk Score and Hand Washing	0.475	0.008	Moderate Correlation
Total Risk Score and Anxiety	0.592	0.001	High Correlation
Total Risk Score and Residential	0.369	0.045	Moderate Correlation
Lockdown and Compliance	0.565	0.001	High Correlation
Total Risk Score and Travel History	0.634	0.0000	High Correlation

Based on the correlation analysis presented at Table 6, total risk score and travel history have the highest correlation among all factors. Travel history will involve a lot of exposure which is very vulnerable for the employee since the certainty of being exposed to a carrier of covid-19 infection. The next highest correlation is the risk score on anxiety and risk score effective lockdown and compliance. These 2 correlations have an equal P-value of 0.001 and correlation

value of 0.592 and 0.565, respectively. Therefore, these 2 correlations have a positive correlation with one another. As for age and sanitizing habits, it has a high positive correlation, therefore, as the age of the employee increases hygiene and sanitization becomes more frequent. This can also be supported by DOH reports that older people will be more vulnerable than younger people since they have lower immunity. For this reason, older people will tend to sanitize more frequently than younger people. However, this does not mean that the age differences will have different actions in terms of responding to the virus, younger people should also be as cautious as older people. A moderate correlation between Total risk score and comorbidities has been found and this is true since people with health issues will more likely be vulnerable to getting infected by the virus especially in people with past pulmonary and cardiovascular diseases. Washing of hands has also positive correlations in terms of risk score since hygiene has become detrimental in this pandemonium. As for the residential area that the employee lives in it has a moderate correlation on risk score since it indicates their level of exposure to people that they do not have personal relations with. But luckily, most of the respondents live in a single-detached home.

Table 7. Summary of Risk Level

Risk level	Freq.	%
low	21	70%
moderate	9	30%
high	0	0%

As for the summary of risk level shown in Table 7, 70% of the employees have a negligible risk of getting infected with the covid-19 virus while 30% remain at moderate risk. As we can see all the employees in the academic sector are unlikely to get infected because their actions and other factors that could affect their health are being conserved such as their area of residence, their actions, and compliance in terms of health protocols implemented and maintaining their health.

5. Conclusion

The researchers were able to determine the risk levels of employees in academic institutions. In addition, they were also able to determine what risk factors truly correlate with one another. In the correlation analysis result, four variables have high correlation namely; age and sanitizing, total risk score and anxiety, lockdown and compliance, and lastly total risk score and travel history. Moreover, there are three variables for moderate correlation, total risk score and comorbidities, total risk score and hand washing, and total risk score and residential. From the result, for risk level out of 30 respondents, 21 respondents have a low-risk level of getting infected and 9 respondents have a moderate chance of getting infected by the virus.

6. Recommendation

Based on the findings of the study, the following are the recommendation for the future researchers of this study:

1. The researchers would like to recommend the future researchers of this study improve the sample size of the data to produce more accurate and reliable findings.
2. Provide questions that have more in-depth information when it comes to the transmission of COVID-19 from one person to another.
3. Academic institutions must collaborate with their local government to formulate a plan that will help minimize the risk of acquiring the COVID-19 virus, for instance, conducting a program that teaches the proper hygiene to the students and employees of the institution.
4. Implement strict safety protocols such as requiring the employees of the institutions and students to wear face masks underneath a cloth mask and personal alcohol for sanitation.
5. Apply some principles of the OSHA directives and newly published guidelines in the workplace about the Covid-19 virus.

As for innovative solutions, the researchers suggest an online system that would manage the overall capacity of the school's facility. The features of the system would allow staff to book a reservation of workbench in schools, a contact tracking system, manage the overall staff that would be allowed to work at school, and the time of stay on the campus.

This system would provide information on whether it is available to enter the facility or not as it already has reached its limit capacity. The system would be able to give information to the employee whether it would be in par or good condition to go to the campus at a certain time. The system will provide an update from time to time to disseminate information urgently to minimize the risk of overcrowding the campus. Reducing the number of people in the facility in the school would mean a lesser probability of transmission of the virus.

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Biographies

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William Davin D. Perez, a 2nd Industrial Engineering Student, in Mapua University and currently taking his Operations Research. He is a member and an officer of the Philippine Institute of Industrial Engineers- Mapua Student Chapter and was able to handle several obligations such as being an ambassador of PIIE-Mapua in Industrial Management Engineering Society. His works that were accepted in the IEOM conference are “Relationship of Noise Level to the Mental Fatigue Level of the Students during Online Classes” and “Application of Analytical Hierarchy Process in the Comparison of Jollibee, McDonald’s, and KFC In-House Online Delivery System.”

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