

**Knowledge, risk perceptions and preventive behaviors on COVID-19 among medical laboratory science junior students of selected higher education institutions in CALABARZON: Basis for internship training plan**

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*Abstract – The COVID-19 pandemic caused a severe impact on higher education as universities closed their premises to control the spread of infection. Even though higher education institutions were rapid to replace traditional face-to-face lectures with remote learning, these may have a significant effect in achieving the expected competencies required during the clinical internship training. This cross-sectional study was conducted from the 22<sup>nd</sup> of March to 4<sup>th</sup> of April 2021. Participants were Filipino medical laboratory science junior students from selected higher education institutions in the CaLaBaRZon region using an online survey questionnaire. Results of the study showed high-level of self-reported knowledge, moderate risk perception, and high preventive behavioral performance on the COVID-19 pandemic.*

*Keywords – COVID-19 pandemic, knowledge, medical laboratory science junior students risk perceptions, preventive behaviors, ,*

## INTRODUCTION

The COVID-19 pandemic has become the most serious worldwide health challenge since the Spanish Flu one century ago [1]. It was reported that more than 2 million people worldwide were affected by the disease [2]. As of May 29, 2021, almost 169,118,995 people have been infected and over 3,519,175 died. In the Philippines, this interprets into nearly 1,209,154 infected and 20,566 deaths [3].

To impede the spread of the disease, most governments implemented radical actions to reduce the spread of infection such as posing lockdown, closing of boundaries, stringent travel restrictions, curfews and imposition of stringent quarantine protocols. This also included the temporary shutdown of educational institutions. As a ramification, the affected learners reached to more than a billion. In the Philippines, 28 million learners who have to stay at home and conform with the quarantine measures imposed by the government across academic levels [5]. The community lockdown and quarantine protocols in response to COVID-19 have interrupted conventional schooling and led to the delivery of distant learning platforms. Nevertheless, there are

numerous problems, challenges and risks in the implementation of remote learning to both the students and teachers particularly in the higher education institutions [6].

In response to these situations, the Commission on Higher Education (CHED) implemented the remote learning, electronic learning and other alternative methods of instructional delivery to students especially in the allied health programs. The implementation of e-learning, distance learning, virtual simulations and other alternative methods of delivery to students was perceived to be maximized during this pandemic [7]. While flexible learning is one of the most suitable and safest pedagogical approach during this time of pandemic, certain health programs require face to face mode of learning and that includes the Bachelor of Science in Medical Laboratory Science (BS MLS) program because of the need for hands-on training in the clinical laboratory required in the development of the entry-level competencies of the graduating students. In a study conducted by Valdez [8], assessing the competencies of the graduates of a certain University in the Philippines, majority of the medical technology

graduates were competent in terms of laboratory skills, professional responsibility and safe work practices, however further enhancement and retooling were needed such as the use of the competency-based standards model in the clinical internship training program. This is to give emphasis on the continuous mentoring, implementation, evaluation, and monitoring of MLS or MT students as well as the program. From this study, it is evident that the hands-on internship training in the clinical laboratories in different hospitals is an essential requirement in developing the required entry-level competencies of MT/MLS senior students in preparation for their professional practice in the real world. But because of the lockdown of several academic institutions and limitations in the entry and exit of hospital personnel during the COVID-19 pandemic, this essential part of the MLS curriculum is greatly affected.

In February 2021, the CHED together with the Department of Health (DOH) released strategies on the gradual opening of campuses of higher education institutions for limited face to face classes during the COVID-19 pandemic while maintaining the minimum standard health precautions to prevent further spread of the infection [9]. It is imperative to understand the relationship of individual's behavior and the perceived risk in terms of effective control and outbreak of this infectious disease.

In a disease outbreak, there are two interconnected aspects that should be considered. It is the behavior of individual and perception of risk. When there is an increased level of perceived risk it can lead to the adherence of individual to preventive measures and regulate the spread of the occurrence. It is imperative to consider the factors that predict risk perceptions and gain understanding on the impact on adhering to protective actions during the pandemic.

One of the most notable pieces of evidence on risk perception has originated during the earlier pandemics. A few studies during the influenza pandemic in Australia which they assessed the level of precautionary behaviors and risk perceptions. [10], France [11], Hongkong [12], and the Scotland, Wales and England [10] showing that protective behaviors were linked with risk perceptions about H1N1

influenza, anxiety, and perceived efficiency of the protective behaviors [13].

Balicer et al., (2006) [14], conducted a study on the perceptions of 308 local public health workers in Maryland, USA on their response to an influenza pandemic in 2005. The survey included the issues that might affect their capability and preparedness to come to duty in this occurrence. Some of these issues are the physical and contingent barriers such as availability of transportation or dependency of family members. Also, ambiguity regarding safety in the working environment, inadequate importance on the value of each employee, safety and well-being of family members, and insufficient emphasis on stress management techniques. Thus, results showed that nearly half of the local health department workers were likely not to report to duty during a pandemic. It has been shown that there is a relationship between the perceived risk among public health workers and the factors related to the hazard of this occurrence.

In Turkey, Cihan [2] reported the level of knowledge on COVID-19. Preventive Risk perception and preventive behavior were determined using a cross-sectional study. The students at the university in the field of health are the participants and the results revealed average knowledge, risk perception and attitude as well as behavior on COVID-19. It was concluded in the study that education about pandemic in universities will have positive individual and social effects. The level of knowledge will provide an individual a recognition and protection of infection. Similarly, conducting seminar about COVID-19 education is a requirement to prevent the spread of the disease and also for the health care personnel who will take a dynamic role in this health crisis.

Another study was conducted among frontline doctors of Pakistan assessing their risk perception, knowledge and preventive behavior about COVID-19 pandemic which also included prevalence and issues associated with anxiety and depression. It was reported that anxiety/depression are being experienced among frontline physicians and it revealed that there is a necessity to strengthen the mental health of doctors caring for patients during this health crisis. Likewise, psychological well-being of physicians was addressed through execution of effective interventions such as counseling through online and intellectual behavioral therapy to support mental health of physicians.

Likewise, a study assessing the knowledge level and perception of COVID-19 and its preventive measures was conducted among 1042 adults in Pakistan using an online questionnaire thru google form survey. In terms of

knowledge level, almost all participants (what percent) were aware of the common symptoms of the disease. It was found out that 97% of respondents thought that the use of face mask, washing of hands and avoiding close contact with sick people should be used as preventive measures.

Yıldırım & Güler conducted a study in 2020 assessing the severity of COVID-19, knowledge, preventive behaviors, self-efficacy and mental health among 3190 Turkish adults using online questionnaires. Results revealed that most of the respondents (64%) had an inadequate level of knowledge about the virus and were highly engaged in preventive behaviors. The findings emphasized the expansion of involvements directing to advance the mental health of individuals during pandemic.

Kwok et al., (2020) [16], studied responses of community during the early point of the epidemic in Hong Kong. One thousand seven hundred participants accomplished the survey, and the results revealed a high level of perceived severity (97%). Majority of the participants (97%) were anxious about COVID-19. Their daily routines were disturbed, and most participants were alerted to the evolution of disease of COVID-19 and employed protective measures.

In a study conducted by Abdelhafiz et al., [17] using an online survey through google form was conducted. The knowledge, attitude and risk perceptions of the Egyptian adults showed a good level about COVID-19. These findings are mainly acquired through browsing internet and social media and a positive attitude towards applying preventive actions which is significant in preventing the transmission of infection.

Organizations such as the WHO, global public health systems, and other public health agencies of the government have utilized various platforms to disseminate information on emerging disease and recommendations of public health [18]. Understanding the concerns, views and behaviors needs to be considered because this will aid in effective management of rules in public health and other trusted sources of information. Globally, numerous countries have utilized online cross-sectional study to easily determine the level of awareness, understand behaviors, identify information sources and misinformation during the pandemic. [18].

In the higher education sector, the CHED gave guidelines in the implementation of flexible learning especially in allied health programs requiring actual clinical internship in the hospital of which BS MLS is one of these. Medical Laboratory Science (MLS)

program is one of the allied health programs offered in different higher education institutions in the Philippines. One of the goals of this program is to develop competent medical laboratory scientists in the future and to meet the demands for workforce in the healthcare service with the aid of highly advanced technologies [19]. The curriculum of the program has an internship training program geared on developing the entry-level competencies of graduates. It is very imperative to conduct this training in order to achieve the outcome of the program and to develop the expected competencies of each student. It is necessary to exercise the competency to practice and combine knowledge and skills to address new challenges, critical thinking and problem-solving skills in the actual clinical laboratories in the hospitals. To attain this objective, the actual clinical laboratory experience is of utmost importance [20]. The incoming interns or senior students in the BS MLS program will also play an important role in the clinical laboratory during this pandemic as they are also collecting patients' samples under the supervision of their senior clinical laboratory staff.

According to Cihan et al., [2], the rate of transmission to healthcare professionals of COVID-19 is 29%. With this rate of transmission of the virus causing the disease coupled with the lack of correct and proper information will bring some form or can increase the level of anxiety and stress among the students, the staff as well as the parents of the students. Therefore, the necessity to conduct a study such as this is relevant and much needed since studies in literature on risk perceptions and preventive behaviors about COVID-19 pandemic is still limited in the Philippine setting.

#### **OBJECTIVES OF THE STUDY**

The study aimed to determine the level of knowledge, risk perceptions, and preventive behaviors on COVID-19 among medical laboratory science junior students of selected higher education institutions in CaLaBaRZon region prior to their clinical internship training in different hospitals. Specifically, the study aims to describe the profile of the selected respondents in terms of age and gender; to determine their level of knowledge, risk perceptions and preventive behaviors on COVID-19

disease; to determine the significant relationship between knowledge, perceptions, and preventive behaviors in COVID-19 disease; and to propose an action plan that could be utilized in the preparation for their clinical internship training.

## **MATERIALS AND METHODS**

### **Research design and population**

This study utilized descriptive method to assess the knowledge on COVID-19, risk perceptions and preventive behavior of junior medical laboratory science students from nine (9) selected higher educational institutions offering BS MLS formerly known as BS Medical Technology program in CaLaBaRZon region namely: Lyceum of the Philippines University – Batangas (LPU-B), DMMC Institute of Health Sciences (DMMC-IHS), First Asia Institute of Technology and Humanities (FAITH), University of Perpetual Help System - Laguna, Lyceum of the Philippines University – Laguna, Calayan Educational Foundation Incorporated (CEFI) in Quezon, Unciano Colleges Incorporated and Lyceum of the Philippines University – Cavite.

The required sample size was 215 and it was calculated using the Raosoft sample size calculator [21]. A 95% confidence level and 5% margin of error is based on the projected and 50% response distribution. The survey overall retrieval rate was 215/215 (100%).

### **Data collection tool and process**

Cross-sectional online survey was utilized in this study. The survey questionnaire was adapted with slight modification from the study conducted by Cihan et al., (2020) which were administered using google survey forms in English between March 22, 2021 to April 4, 2021. The questionnaire comprised of thirty (30) questions which included fifteen (15) items on knowledge concerning COVID-19, seven (7) items concerning preventive measures and ten (10) items about COVID-19 risk perception. The validity and reliability of the questionnaire were shown to be satisfactory with the Cronbach alpha level of 0.803.

Likert scale was used in assessing the level of knowledge with 1 = not knowledgeable, 2 = less knowledgeable, 3 = knowledgeable and 4 = very knowledgeable. To measure the level of risk

perceptions: 1 = strongly disagree (no risk perception); 2 = disagree (low risk perception), 3 = agree (moderate risk perception) and 4 = strongly agree (high risk perception). In assessing the level of preventive behaviors, 1 = highly negative behavior, 2 = negative behavior, 3 = positive behavior and 4 = highly positive behavior.

### **Statistical Analysis**

Means, percentages, and frequency were used to describe the demographics of the respondents. Pearson *r* correlation was used to determine the relationship between level of knowledge, risk perception and preventive behaviors. All data were processed using SPSS version 25.

### **Ethics Consideration**

This study was submitted for ethical review and approval by the Research Ethics Review Committee of Lyceum of the Philippines University – Batangas. An informed consent attached to the survey form describing the purpose of the survey and instructions on how to complete the online survey form was sent to the respondents. Identifier such as names were not included in the questionnaire to ensure anonymity and confidentiality of the respondents.

## **RESULTS AND DISCUSSION**

This study was conducted to determine the level of knowledge, risk perceptions, and preventive behaviors concerning COVID-19 of 215 medical laboratory science junior students from nine (9) higher education institutions offering the program in the CaLaBaRZon region.

A total of 215 students completed the questionnaire. Almost 70% (149/215) are in their mid-twenties which is usually the age of Filipino adults enrolled in tertiary education. The remaining 30% (66/215) were below 20 years of age. Most of the respondents (81%) were female. The CaLaBaRZon region is composed of five big provinces namely: Calamba, Laguna, Batangas, Rizal and Quezon. There were 95 (44%) respondents from schools located in Batangas province, 45 (21%) from schools located in Laguna, 39 (18%) from a school in Quezon, 36 (17%) students from 2 schools in Cavite and none from Rizal. Majority of the respondents came from the provinces of Batangas, Laguna and Cavite because there are more schools in these provinces that offer the program.

**Table 1. Level of Knowledge of the Medical Laboratory Science Junior Students towards COVID-19**

Indicators	WM	Verbal Interpretation
1. COVID-19 is a respiratory infection caused by a new species of the coronavirus family	3.73	Very Knowledgeable
2. The first case of COVID-19 was diagnosed in Wuhan, China	3.85	Very Knowledgeable
3. The origin of COVID-19 is not clear, but it seems that it has been transmitted to humans by seafood, snakes, or bats	3.27	Knowledgeable
4. Its common symptoms are fever, cough, and shortness of breath, but nausea and diarrhea were reported rarely.	3.60	Very Knowledgeable
5. Its incubation period is up to 14 days with a mean of 5 days	3.61	Very Knowledgeable
6. It can be diagnosed by a PCR test on samples collected from nasopharyngeal and oropharyngeal discharge or sputum and bronchial washing	3.73	Very Knowledgeable
7. It is transmitted through respiratory droplets produced from speaking, coughing, and sneezing	3.87	Very Knowledgeable
8. It is transmitted through close contact with an infected case (especially in family, crowded places, and health centers)	3.88	Very Knowledgeable
9. The diseases can be prevented through hand washing and personal hygiene.	3.75	Very Knowledgeable
10. A medical mask is useful to prevent the spread of respiratory droplets when coughing	3.85	Very Knowledgeable
11. The disease can be prevented by eliminating close contact such as shaking hands and kissing, not attending meetings, and frequent hand disinfection	3.80	Very Knowledgeable
12. All people in the society should wear masks	3.89	Very Knowledgeable
13. Only during bronchoscopy and cardiopulmonary resuscitation do you have to wear an N95 mask	2.86	Knowledgeable
14. The disease can be treated by usual antiviral drugs	2.63	Knowledgeable
15. If symptoms appear within 14 days from direct contact with a suspected case, the person should call and seek advice from a nearby public health center	3.79	Very Knowledgeable
<b>Composite Mean</b>	<b>3.61</b>	<b>Very Knowledgeable</b>

Legend: 1.00-1.49 = strongly disagree (not knowledgeable); 1.50-2.49 = disagree (less knowledgeable); 2.50-3.49 = agree (knowledgeable); 3.50-4.00 = strongly agree (very knowledgeable)

Table 1 presents the responses of students' level of knowledge about COVID-19 pandemic. Overall results showed a composite mean of 3.61 indicating that the respondents are very knowledgeable on what COVID-19 is all about.

Among the fifteen items about COVID-19, the students are very knowledgeable on the etiologic agent of the infection and that it is caused by a virus which originated in Wuhan, China; the mode of transmission of the infection through close contact via respiratory droplets from speaking, coughing and sneezing; the signs and symptoms of the infection; the minimum health protocols in preventing the spread of the virus like wearing of masks, proper handwashing, personal hygiene and refraining from close contact in gatherings; and how the virus can be diagnosed by collecting swabs from the nasopharynx and oropharynx and to test these samples by Polymerase Chain Reaction (PCR) method.

However, their knowledge seems to be limited in terms of transmission of the virus to humans by eating seafood, snakes, or bats and if the infection can be treated by antiviral drugs. These findings are due to the information dissemination conducted in several social media platforms and online lectures that were conducted by the Department of Health and other health-related organizations, societies, and associations during the

pandemic. Although the information sources used by respondents were not investigated, it should be noted that the community lockdown has given them more time to watch television and browsing internet while at home and, in this case, they have been able to gain knowledge.

In today's situation, in fact, mass media plays a vital role in disseminating updates on information about the evolution of pandemic. It imparts a substantial contribution to the individual to advance their level of knowledge and improve attitudes towards the virus as well as the ability to perceived risk. Mass communication media are significant in effectively educating the public about the risks and preventive measures to combat the infection. It is not only limited to identifying the new strain, developing vaccines and other suitable therapies, but also proper dissemination of information and efficient communication about risk information to the community should be considered.

The respondents, who are junior medical laboratory science students are knowledgeable on the use of these several social media platforms and can access this information on COVID-19 pandemic. In addition, their understanding of viral infections is part of their courses in their curriculum that can make it easier on their part to understand the pathophysiology and pathogenesis of the viral infection.

**Table 2. Level of Risk Perception of the Respondents towards COVID-19 pandemic**

Indicators	WM	Verbal Interpretation
1. I may be infected with COVID-19 more easily than others	2.29	Low risk perception
2. I am afraid to be infected with COVID-19	3.39	Moderate risk perception
3. Getting sick with coronavirus/COVID-19 can be serious	3.59	High risk perception
4. Even if a person is in good health, he/she may be infected with COVID-19	3.46	Moderate risk perception
5. I would be worried about my family being infected by COVID-19	3.72	High risk perception
6. Someone once reminded me to be careful of COVID-19	3.60	High risk perception
7. I think the media coverage about the disease is understated	2.78	Moderate risk perception
<b>Composite Mean</b>	<b>3.26</b>	<b>Moderate risk perception</b>

Legend: 1.00-1.49 = *strongly disagree (no risk perception)*; 1.50-2.49 = *disagree (low risk perception)*; 2.50-3.49 = *agree (moderate risk perception)*; 3.50-4.00 = *strongly agree (high risk perception)*

A moderate to high level of risk perception regarding COVID-19 by the respondents is shown in Table 2 with mean scores ranging from 2.78 to 3.72. Among the seven items on risks perception, the participants' perceived seriousness of the COVID-19 pandemic, perceived likelihood of contracting the virus themselves, and the perceived likelihood of their family catching the virus showed high levels. On the other hand, there is a moderate level of perceived risk on being infected by the virus even if an individual is healthy. These can be credited to the high level of knowledge of the student-participants on the mode of transmission of this viral infection.

There are several factors that influence them to perceived risk such as social, cultural and contextual and these go beyond the classic hazard. Likewise, since the media coverage disseminate legitimate information about the disease, the student's cognition may impact them to think that they would be afraid to be infected with the virus. Thus, it will lead to a higher level of perceived risk regarding the threat caused by the infection. The higher the level of knowledge of COVID-19, the more information they have about its manner of

transmission, signs and symptoms, and preventive measures, and the more they can completely realize that the virus has a strong pathogenic effect and disease is difficult to identify, so the risk perception level will tend to increase. However, the results of having a low-risk perception regarding the likelihood of being infected more easily than others may signify that the students may think that the virus cannot be transmitted easily even though proper health protocols are being practiced. Neglecting early symptoms of the disease and underestimation of the virus may affect their ability to perceived risk and apply preventive behaviors. Moreover, this low risk perceived respondents risk behaviors may lead to repeated outbreak. Thus, it is essential to reinforce the publicity effort on the risk of COVID-19 to further expand the risk perception of the disease among junior medical laboratory science students who also play crucial role in the collection of patients' samples for laboratory diagnosis, so that the necessary protective measures will be in place before they go for training and be exposed to the probable or even confirmed COVID-19 cases during their line of duty.

**Table 3. Level of Preventive Behaviors of the Respondents towards COVID-19 Pandemic**

Indicators	WM	Verbal Interpretation
1. I canceled or postponed meetings with friends, eating our or sporting events	3.61	Highly positive behavior
2. I reduced the use of public transportation (i.e., tricycle, taxi, uber, bus)	3.60	Highly positive behavior
3. I went shopping less frequently	3.71	Highly positive behavior
4. I avoided coughing around people as much as possible	3.95	Highly positive behavior
5. I avoided places where many people are gathered	3.88	Highly positive behavior
6. I increased the frequency of cleaning and disinfecting items that can be easily touched by the hands (i.e., door handles and surfaces).	3.76	Highly positive behavior
7. I washed my hands more often than usual	3.89	Highly positive behavior
8. I discussed with my family and friends about COVID-19 preventions	3.58	Highly positive behavior
9. I always wear face mask and face shield when I go outside the house	3.97	Highly positive behavior
<b>Composite Mean</b>	<b>3.78</b>	<b>Highly positive behavior</b>



Legend: 1.00-1.49 = never (highly negative behavior); 1.76-2.49 = seldom (negative behavior); 2.50-3.49 = sometimes (positive behavior); 3.50-4.00 = always (highly positive behavior)

Table 3 exhibited the self-reported preventive behaviors in the COVID-19 pandemic. All ten items show that students had highly positive behavior with a composite mean of 3.78. Among the items, students apply behavioral performance regarding always wearing face masks and face shields when go outside; practicing intensive hand washing and surface disinfection; talking to people about prevention nearby; reducing the use of public spaces in daily life; preventive behavior about coughing and the willingness to be isolated at a quarantine hospital in case of close contact with person infected with the virus. These findings had a direct relationship with the knowledge level of students on the disease which means that the higher level of knowledge on the disease, students may tend to take preventive behavior to avoid acquiring the infection. Likewise, these findings may be the outcome of having an education on COVID-19. However, these results did not agree with a study conducted by Cihan [2] which indicated low preventive behavioral performance in medical, healthcare, and nursing students. This is since preventive practices did not apply by the students or having the lack of knowledge regarding the mechanism of how the virus can be transmitted. In contrast, these results concur with the studies indicating high preventive behavioral performance in medical students in Egypt

Wearing face mask and face shield was the highest with a weighted mean of 3.97. Face masks are a component of the Personal Protective Equipment (PPE) necessary for clinical laboratory students and professionals in providing a barrier when they are processing and examining specimens in the clinical laboratory. The use of face masks has been regarded as a forefront in preventing and containing disease transmission. This finding is due to the understanding of proper donning and doffing of PPE which is part of their courses in their curriculum that aid them to apply their knowledge and skills into practice.

On the other hand, they have limited behavioral performance on talking to people especially with their friends and relatives about COVID-19 preventions. The reason behind why they do not discuss is may be due the fact that they expect that their family member and friends are knowledgeable about COVID-19 preventions. Thus, they will practice preventive measures to avoid getting contracted with the virus.

Medical laboratory educators need to consider these alarming results and adopt preventive practices and laboratory safety measures. Health safety and prevention protocols should be established among

students by including these concepts in all professional courses.

**Table 4 Correlation between Knowledge, Risk Perceptions and Preventive Behaviors in COVID-19 pandemic among Medical Laboratory Science Junior Students (n= 215)**

		Knowledge	Risk perception	Preventive behavior
Knowledge	Pearson	1	0.020	0.198*
	Correlation Sig. (2-tailed)			
Risk perception	Pearson	0.020	0.766	0.004
	Correlation Sig. (2-tailed)	0.004	1	0.163*
Preventive Behavior	Pearson		0.016	
	Correlation (2-tailed)			

Legend: \*\*, Correlation is significant at the 0.01 level (2-tailed); \*, Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows the correlation between knowledge, risk perceptions, and preventive behaviors. There was a negligible positive correlation ( $p = 0.198$ ) between the junior medical laboratory science students' knowledge level and their preventive behaviors. This implies that medical laboratory science students who are knowledgeable and obtained information about COVID-19 from various sources, exhibited higher preventive behavioral performance. Likewise, there is a negligible positive correlation ( $p = 0.163$ ) between risk perceptions and preventive behaviors. This indicates that the higher their self-reported risk perceptions, the more they become compliant to COVID-19 preventive measures. This finding is congruent with the global study on COVID-19 risk perceptions among ten countries in America, Asia, Europe, where it concluded that risk perception has a significant correlation with the preventive health behaviors adopted by the respondents [23]. However, a study among Iranian medical students conveyed a negative correlation between risk perceptions and preventive behaviors [24]. Risk perception is a vital factor influencing risk behaviors. Numerous factors such as societal, individual, cultural, contextual and different social factors impact risk perception and risk evaluation. Individuals with low level perceived risk will lead to take risk behaviors or decrease preventive behaviors while individual with high level of risk perception tend to take preventive behavior.

**Proposed Action Plan for Internship Training**

Based on the findings of this study, the following action plan will be considered in preparing the incoming interns for their actual training in the clinical setting. The implementation of various seminars/workshop related to COVID-19 education will aid in the dissemination of information to promote awareness and to enhance the

medical laboratory science students' risk perceptions and preventive behaviors. This action that will be taken implies that those students who will obtain information about COVID-19 from various sources will exhibit a higher preventive behavior.

Thus, it will minimize the risk of contracting the infection. The conduct of training on the institutional hazard, risk, and safety policies including proper donning and doffing of Personal Protective Equipment (PPE) on interns will be implemented. Similarly, proper orientation on Infection Control and Prevention in respective clinical facilities will be also executed.

Furthermore, the results in terms of risk perceptions that revealed a moderate risk of the students on COVID-19 will serve as a guidance in course improvements that is applicable in this aspect. The implementation of vaccination program will be encouraged thereby all students who will undergo internship training will have an immunity against COVID-19. In the event of the students who will be assigned to enter the hospital for their duty, it is recommended to have a cyclical shifting model. For instance, each Higher Education Institutions will adopt a 4–10-day cycle as stated in the Joint Memorandum Circular released by CHED. Four days will be the maximum days that they need to go to the hospital per week and ten days quarantine. This is to protect the health of each student in case of exposure to the virus. Likewise, if the population of the students in certain HEI is low, quarantine facility/dormitory near the hospital is highly recommended.

For preventive behaviors, health and prevention protocols will be establish among students emphasizing these concepts in all professional courses. Prior to the internship training, a health declaration form will be provided to all students, medical check-up and a negative COVID-19 PCR or Antigen test will be a requirement. Lastly, is the implementation of protocols aligned to Inter-Agency Task Force (IATF) regarding COVID-19 prevention.

#### Limitations of the Study

The study involved only the entire population of medical laboratory science students among selected higher education institutions in CALABARZON. The online administration of the data gathering tool may have influenced the responses of the respondents. However, this investigation's findings can be valuable inputs to internship training plan improvements in the field of medical laboratory sciences.

#### CONCLUSION AND RECOMMENDATION

The junior medical laboratory science students on selected HEI's in CALABARZON revealed a high-level of self-reported knowledge, moderate risk perception, and

high preventive behavioral performance in the COVID-19 pandemic. Students who are very knowledgeable regarding COVID-19 reported higher preventive behaviors. Furthermore, the risk perceptions are positively correlated to their preventive behavior. Risk perceptions and preventive behaviors could be rectified and improved through curricular intervention and fortified guidance in their MLS education and clinical training, along with the professional courses with laboratory components. Examples special topics include laboratory safety practices in a pandemic and review of the biosafety protocols in handling viral specimens and epidemiology, emphasizing the pandemic. Provision of mentorship and continuing professional education that addresses COVID-19 knowledge and preventive behaviors in coordination with Philippine Association of Medical Technologists (PAMET) and local government health institutions may result in increased risk perception and preventive behaviors among laboratory personnel, healthcare workers and community members.

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