Knowledge, Attitudes, and Practices of Non-Health Allied College Students in the Philippine National Capital Region on Multidrug-Resistant *Mycobacterium Tuberculosis*

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Abstract: - Multidrug-resistant *Mycobacterium tuberculosis* (MDR-TB) infection has become a challenge in healthcare due to limited access to therapeutic drugs as seen in developing countries such as the Philippines, which according to the World Health Organization ranks fourth among countries with the cases of tuberculosis as of 2019. The study aimed to assess the level of knowledge, attitudes, and practices of college students who are taking non-health allied courses in the National Capital Region (NCR) of the Philippines regarding MDR-TB as a bacterial infection. A quantitative descriptive study was conducted in the NCR, Philippines. A total of 407 participants were selected by convenience sampling. Data collection was conducted through an online questionnaire containing questions dedicated to knowledge, attitudes, and practices towards MDR-TB. The study found that among the respondents, 71.5% have good knowledge, 63.6% have favorable attitudes, and 57% have favorable practices. Moreover, a significant relationship was found between knowledge and attitudes (p=0.025), knowledge and practices (p=0.002), and attitudes and practices (p=0.018). Further analysis of the weighted mean response per question indicated generally favorable responses across all inquiry sections except for an item pertaining to knowledge on the prevalence of MDR-TB. Despite having good knowledge, attitudes, and practices, the respondents demonstrated poor knowledge particularly on the prevalence of MDR-TB, which must be addressed especially in high-prevalence areas primarily due to its nature as a communicable disease.

Key Words: —*Bacterial Infection, Multidrug-resistant, Mycobacterium tuberculosis, Non-health allied college students.*

I. INTRODUCTION

Tuberculosis (TB) is a highly communicable disease caused by the bacterium Mycobacterium tuberculosis. It is spread through the air when an infected person coughs, speaks, or sneezes [1]. Tuberculosis has been one of the top ten causes of mortality in the world for the past few years. In 2018, a total of 1.5 million people died due to tuberculosis infection [2]. An emerging issue, Multidrug-resistant tuberculosis (MDR-TB) is caused by an organism that is resistant to at least isoniazid and rifampin, two of the first-line drugs used to fight off M. tuberculosis. This happens when the drugs are misused or mismanaged. Resistance also arises when patients do not complete the treatment and the levels of drug in the body is not enough to kill the bacteria.

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As TB cases continue to rise in the Philippines, cases of MDR-TB are also increasing each year.

There were 317, 266 relapse TB cases out of an estimated population of 104,921,597 in 2017. The National Capital Region (NCR) had the highest case notification rate with 384 people per 100,000 population [3]. Cases of tuberculosis infections in the Philippines remain prevalent, and the emergence of MDR-TB has only served to worsen the existing issues brought about this health issue. A study by [4] stated that the Philippines has been one of the countries with high prevalence of MDR-TB. In 2013, an estimate of 2% of new cases and 21% of retreatment cases had multidrug resistant tuberculosis.

Although there has been a rise in patients who initiated treatment, those who fail to follow-up have also increased.

The aim of the study was to assess the level of knowledge, attitudes, and practices of college students who are taking non-health allied courses in the National Capital Region regarding multidrug-resistant Mycobacterium tuberculosis (MDR-TB) as

a bacterial infection. The assessment of the respondents' knowledge, attitudes, and practices on MDR-TB can add valuable insights to policy making and improvements to current health education directed towards the youth.

II. METHODOLOGY

A. Research Design

A descriptive method of research was adapted for this study. The definition of the goal of descriptive research by [5], which is to describe a phenomenon and its characteristics. Additionally, it deals with what, rather than an explanation of why or how something happened. In relation, this study was conducted to find out what the knowledge, attitudes, and practices of non-health allied college students are towards MDR-TB along with the relevant implications. A study by [6] mentioned in their study that one of the main tools for this type of research is a survey. The survey utilized by this study is designed to assess the participants' knowledge, attitudes, and practices regarding MDR-TB using a quantitative scale for each question, and the knowledge, attitudes, and practices of the respondents will be described based on the quantitative results of the survey.

B. Data Analysis

The data collected from this study was obtained through a questionnaire utilizing a Likert scale that assesses various areas of knowledge, attitudes, and practices of non-health allied college students residing in the NCR concerning MDR-TB. The questionnaire adopted in this study was originally created by the researchers of [7]. Permission to adopt the questionnaire was obtained from Dr. Thanduxolo Elford Fana through electronic mail. The gathered data from the questions are then sub-classified into three categories namely knowledge, attitudes, and practices depending on where the question is related to. The answers from the individual questions are then treated to obtain the weighted mean. The weighted means are then correlated with their corresponding verbal interpretation. Finally, Pearson-r and Cramer's V were used to determine the degree of association between knowledge and attitudes, knowledge and practices, and practices and attitudes.

C. Sample Population

Based on the data from [8], the population of the study is 685,510 students. A formula was used to calculate the sample size. A sample size of 407 was utilized for this study. The respondents must be at least 18 years old and not more than 25 years old. They should also be enrolled in any university or college within the NCR, Philippines, and must be currently taking up a non-health allied course. The sampling design used was convenience sampling wherein recruitment of respondents is highly dependent on the audience that the researchers can reach. The recruitment of respondents was done through crowdsourcing.

D. Statistical Analysis

The data gathered from this study will be analyzed using weighted mean, Pearson-r, and Cramer's V. Tables and descriptions are used to present the data gathered from the respondents of the study.

The weighted mean is generally used to compute the mean of data points contributing unequally to the final mean. In this study, the weighted mean was used to gauge the overall responses from the Likert scale to derive a proper descriptive interpretation. The obtained calculated weighted mean is also aligned to their corresponding verbal interpretation. To calculate the weighted mean the following formula is used (Figure 1).

$$W = \frac{\sum_{i=1}^{n} w_i X_i}{\sum_{i=1}^{n} w_i}$$

Fig.1. Weighted mean formula

Where W= weighted mean

n= number of terms to be averaged

wi= weights applied to x values

x= data values to be averaged

To determine the association between knowledge, attitudes, and practices, the proportion of respondents with good and poor knowledge, attitudes, and practices were obtained respectively. 1 point was given for each correct response, while a wrong response did not merit any point. The proportion of respondents with good and poor knowledge, attitudes, and practices, respectively, were analyzed using Pearson's correlation coefficient to determine if there is a significant association, and Cramer's V to assess the degree of the statistical relationship.

Pearson's correlation coefficient and Cramér's V on the other hand is utilized for the statistical interference of the paper. Pearson's r is utilized because it determines the relationship, strength, direction, and the degree of association between two quantitative variables in the study [9]. This would allow the researchers to determine if there is a relationship between the knowledge, attitudes, and practices of non-health allied students towards MDR-TB, and whether they have a positive,

negative, or no relation at all. To determine the Pearson's correlation coefficient the following formula is used (Figure 2).

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Fig.2. Pearson's correlation coefficient formula

Where r= correlation coefficient

xi= values of the x-variable in a sample

$\bar{X}$= mean of the values of the x-variable

Yi= values of the y-variable in a sample

$\bar{y}$= mean of the values of the y-variable

Finally, Cramér's V is a type of effect size measurement for the chi-square test of independence. It assesses how closely two categorical fields are associated [10]. In this research, Cramér's V was utilized to measure how strongly knowledge and attitudes, knowledge and practices, and practices and attitudes are associated together. The following formula is used to determine Cramér's V coefficient (Figure 3).

$$\text{Cramer's V} = \sqrt{\frac{\chi^2}{n \cdot \min(r-1, c-1)}}$$

Fig.3.Cramér's V coefficient formula

Where n= sample size

r= the number of rows

c= the number of columns

E. Data Collection

Data was collected through a questionnaire that contained sections dedicated to knowledge, attitudes, and practices towards MDR-TB. The questionnaire was disseminated through the use of Google Forms, as the platform to monitor the questionnaire responses from the students and collate the data for analysis. The Google Form link was disseminated through online platforms such as Facebook groups. Respondents were provided with an informed consent form stating that participation in the study is voluntary, and that any information collected shall be treated with utmost confidentiality. Responses were tabulated and analyzed accordingly.

III. Results And Discussion

Table.1. depicts the demographic profile of the respondents. A total of 407 respondents were included in the study. Majority of the respondents were between 18-20 years of age (53.81%) and were female (58.72%).

Table.1. Demographic Profile of Respondents

Variables		Frequency	Percentage (%)
Age	18-20	219	53.81
	21-23	183	44.96
	24 and above	5	1.23
Sex	Male	168	41.28
	Female	239	58.72
Year Level	First Year	47	11.55
	Second Year	71	17.44
	Third Year	260	63.88
	Fourth Year	22	5.41
	Fifth Year	7	1.72
College Course Category	Business and Management	114	28.01
	Engineering and Computer Technology	192	47.17
	Humanities and Arts	59	14.50
	Science	42	10.32

More than half of the respondents (63.88%) were in the third year level, and among the college course categories, most of the participants (47.17%) were taking up engineering and computer technology.

Table.2. Knowledge on MDR-TB

	Questions on KNOWLEDGE regarding MDR-TB	Weighted Mean	Verbal Interpretation
Generalities of MDR-TB, risk, and causes			
1	MDR-TB are caused by organisms or bacteria resistant to Rifampicin and Isoniazid (1st line antibiotics for TB)	3.04	A
2	Anyone can be infected by MDR-TB.	3.20	A
3	Dust, smoking, poverty, and drinking alcohol can increase risk of MDR-TB	3.28	SA
4	Incomplete and Incorrect treatment of TB can cause MDR-TB	3.33	SA
5	MDR-TB is a dangerous disease and a huge problem in my area.	2.21	D
Signs and symptoms of MDR-TB			
6	Weight loss and loss of appetite	3.06	A
7	Cough that last longer than 3 weeks	3.52	SA
8	Nightmares and hallucinations	2.12	D
9	Chest pains and shortness of breath	3.48	SA
10	Coughing up of blood	3.44	SA
Transmission of MDR-TB			
11	Witchcraft	1.18	SD

12	Through air when those with MDR-TB coughs and sneezes	3.27	SA
13	Through the blood as it is hereditary	2.32	D
14	Through the blood as it is hereditary	2.08	D
15	Touching items in public spaces or areas	2.28	D
Prevention of MDR-TB			
16	Covering mouth and nose when coughing or sneezing	3.48	SA
17	Avoiding close contact for long periods with MDR-TB infected	3.42	SA
18	By avoiding sharing cups and dishes	3.45	SA
19	Open windows and wearing masks when with DR-TB infected people	3.40	SA
20	By taking traditional medicines and herbal remedies	2.27	D
Diagnosis, treatment, costs, duration, and outcomes of MDR-TB			
21	MDR-TB infected remain infectious after completion	2.43	D
22	MDR-TB treatment is provided freely at designated TB centers	2.58	A
23	Psychosis and hearing loss are side effects of MDR-TB treatment	2.34	D
24	Treatment duration for MDR-TB is 6-12 months	2.97	A
25	Outcomes are evaluated by sputum and chest x-rays	3.28	SA

Verbal Interpretation: SA - Strongly Agree, A - Agree, D - Disagree, SD - Strongly Disagree

It can be depicted from Table.2. that the respondents agree (WM=3.04) that MDR-TB is caused by a bacterial strain that is resistant to rifampicin and isoniazid and that incomplete and incorrect treatment of TB can cause MDR-TB (WM: 3.33). These results are consistent with the findings in the study by [7], which also found that the respondents agree that MDR-TB is caused by a drug resistant strain and can be caused by incomplete and incorrect treatment.

The results also revealed that the respondents generally agree (WM= 3.20) that any individual can be infected with MDR-TB. This is in line with the findings of a cross-sectional study by [11] which also found that the majority of participants (67.2%) understood that anyone is susceptible to acquiring the disease. The respondents also agree (WM= 3.28) that dust, smoking, poverty, and drinking alcohol can increase the risk of acquiring MDR-TB. This is in line with the findings from the study of [12] which found that respondents attributed these factors to the development of TB disease, though not directly causing it.

Majority of the respondents (WM= 2.21) do not agree that MDR-TB is a dangerous disease and a huge problem in their area. This coincides with the cross-sectional study [13] wherein 64.69% of the students did not know the term MDR-TB.

Additionally, respondents generally agree that weight loss and loss of appetite, coughs that last longer than 3 weeks, chest pains and shortness of breath, as well as coughing up blood are symptoms of MDR-TB. The findings of this study which shows that the respondents are aware of the symptoms of MDR-TB are in line with the findings of [7] wherein the respondents agreed to all the symptoms stated in the survey except for nightmares and hallucinations, which is not a symptom but rather a side effect of treatment for MDR-TB. These results are also consistent with the findings in a study [13] which states that 80.47% of the respondents are aware of the common symptoms of TB, which can also be similar to the manifestations of MDR-TB.

Moreover, respondents strongly disagree (WM=1.18) that MDR-TB is transmitted through the practice of witchcraft. This is contrary to the findings of a study by [14], which found that around a quarter (26.6%) of respondents still believed that the disease was a punishment inflicted through witchcraft practices.

The results state that respondents generally agree (WM 3.27) that MDR-TB can be transmitted through the air when an infected individual sneezes or coughs. This coincides with the findings of a study by [15], which also saw a majority of respondents (around 90.2%) agree with the mode of transmission occurring in the air.

Respondents disagree (WM=2.32), however, that MDR-TB is hereditary or can be passed from parent to offspring through genetics. This response is contrary to the findings of a study by [16] assessing the knowledge towards TB of the general population in North East Libya, wherein only 11.2% of the respondents knew that MDR-TB could not be passed on through genetic means. The authors of the study found that the disparity in educational level of the respondents caused a significant difference in the individuals' knowledge regarding TB. This aspect may have influenced the poor knowledge of the respondents in the study of [16] in comparison to the respondents of this study, who are all taking up courses in higher education

The tabulated data also shows that respondents disagree (WM 2.08) that MDR-TB can be spread by hugging or shaking hands with infected individuals. A similar response was given wherein respondents disagree (WM 2.28) with the statement, that MDR-TB can be transmitted through touching items in public spaces or areas. This is in line with the findings of the study by [7] which also found that respondents were knowledgeable about these actions not leading to the transmission of TB from one person to another.

The results show that the respondents strongly agree with all of the MDR-TB prevention practices stated in the questionnaire, which include covering one's mouth and nose while coughing or sneezing, avoiding close contact for long periods with MDR-TB patients, avoiding the sharing of utensils, and opening windows and wearing of masks when with MDR-TB patients. These results agree with the findings of [7] which found that the respondents had good knowledge about the prevention practices, as well as the study of [17] which states that wearing of masks is a common practice among workers who provide primary care to MDR-TB infected patients. In contrast, the respondents disagreed that traditional or herbal remedies can be used as a prevention measure against MDR-TB. This contrasts with findings from the study by [7] which discovered that around 20% of respondents believed that taking traditional or herbal medicines was an effective preventive measure for MDR-TB.

The respondents disagree that MDR-TB patients remain infectious after completion of treatment. While this is in agreement with the findings of [7], at present, there remains to be inconsistencies with regards to the protocol in the isolation of MDR-TB patients [18]. Additionally, most of the respondents (WM= 2.58) disagree that MDR-TB treatment is provided freely at designated TB centers. This coincides with the study by [19] wherein only a minority (43.1%) of the respondents knew that diagnosis and treatment of TB are free in their state. The results also revealed that respondents (WM= 2.34) are not aware that psychosis and hearing loss are side effects of treatment for MDR-TB. The results agree with the study by [7], wherein only 33% of the respondents knew that psychosis, hearing, and vision loss are side effects of DR-TB. Lastly, the respondents (WM= 2.97) generally agree that treatment duration for MDR-TB is 6-12 months. The results are in contrast to the cross-sectional study by [13] wherein only a minority of the respondents (8.18%) have knowledge about the exact treatment duration, while 7.12% did not know about the treatment duration.

Table.3. Attitudes on MDR-TB

	Questions on ATTITUDES regarding MDR-TB	Weighted Mean	Verbal Interpretation
Reaction of the community if you have MDR-TB			
1	They will reject you	2.46	D
2	They will avoid you but remain friendly	3.02	A
3	They will be supportive and helpful	2.93	A
How will you react if infected with MDR-TB			
4	I will be fearless and hopeful	2.80	A
5	I will be ashamed and embarrassed	2.07	D
6	I will be surprised and sad	3.18	A
Who will you tell or speak to if infected with MDR-TB			
7	Friends, family members, and neighbors	3.44	SA
8	Health care workers	3.73	SA
9	No one	1.36	SD
What will you do if a family member has MDR-TB			
10	I will support and assist the person	3.55	SA
11	I will be friendly but avoid the person	2.46	D
12	I will hate the person	1.12	SD
What is your greatest challenge or fear if infected with MDR-TB			
13	Rejection, ill-treatment and discrimination attitudes and practices by clinic staff and community members	3.06	A
14	Fear of MDR-TB drug, side effects costs associated with treatment	3.13	A
15	I don't have nor foresee any challenges	1.73	SD
Statements about community perceptions and beliefs about MDR-TB			
16	It is correct to forcefully isolate MDR-TB infected prevent its spread	2.88	A
17	I can cope with MDR-TB and also be a volunteer for MDR-TB infected	2.53	A
18	MDR-TB infected deserve respect and fair treatment like everyone	3.69	SA
19	It's a waste of money to treat MDR-TB as its spread cannot be prevented	1.42	SD
20	MDR-TB drugs are toxic, useless, and cannot cure MDR-TB	1.57	SD
21	It is correct disseminate and	2.05	D

	treat badly MDR-TB infected		
22	Those who default treatment are to blame for spread of MDR-TB	1.91	D
23	I do not mind MDR-TB infection because I will get disability grant	1.40	SD
24	Multidrug Resistant TB is a disease of the poor and HIV infected	1.64	SD
25	All HIV positive have MDR-TB	1.51	SD

Verbal Interpretation: SA - Strongly Agree, A - Agree, D - Disagree, SD - Strongly Disagree

The results of Table.3. show that the majority (WM= 2.80) of the respondents agree that they will be fearless and hopeful when infected with diseases. This coincides with the study done by [7] where 80% of the respondents also agree that they will be fearless and hopeful, however this is in contrast with studies done by [20] and [21]. This may be due to the high current successful treatment rate of MDR-TB globally [22]. As well as the availability of the treatment via the DOTS program within the country. Majority of the respondents also strongly agree with informing others such as family and friends (WM= 3.44) and healthcare workers (WM=3.73) about their illness. This may be to receive support, which is beneficial in the person's treatment according to [23].

Furthermore, the majority (WM = 3.55) strongly agree with supporting and assisting people infected with MDR-TB. Contrary to the other results, a greater number of respondents (WM = 2.46) disagree with remaining friends but avoid the person. This may be due to the sympathy felt by the individual and in hopes of offering support to the infected person. In some cases, MDR-TB patients tend to also have comorbidities with some type of chronic disease. Table 3 also illustrates that the majority (WM = 2.46) of the respondents disagree with avoiding the infected individual. According to [24], having a chronic and/or serious illness may cause the deterioration of mental health. According to [25], having a support system helps in reducing stress and further leading to depression which may be the reason for this case. The majority also agree in being able to cope with MDR-TB and volunteering for those who are infected with MDR-TB. This may be due to the individual's empathy which influences them to feel compassion towards the infected according to [26].

Most of the respondents disagree (WM = 2.07) on feeling shame and embarrassment in having the illness, which is similar to a study [7] with shame and embarrassment being the least chosen choice, having only 25%. Although, the respondents agree (WM = 3.18) on being surprised and sad for having contracted the disease. This result is also expected considering MDR-TB is uncommon knowledge. Furthermore, these emotions are commonly included by psychologists in the basic emotions which are instinctual to us according to the study of [27]. Most of the respondents also strongly disagree (WM = 1.36) with hiding the fact of being infected with MDR-TB. The respondents also strongly disagree (WM = 1.12) with the idea of hating the infected person. According to [23], having psychological support raises the patients' rate of treatment completion and cure.

Majority (WM= 1.73) believe that there will be challenges while facing the disease. This may be due to the particular strain of TB being resistant to the commonly used drugs and financial problems on the cost of the treatment. Moreover, most (WM = 1.40) of the respondents still disagree with being alright with MDR-TB even with the possibility of gaining a disability grant. This is in line with [7] where having a disability grant over health still had the second lowest frequency amongst community attitudes.

The table also shows that the majority of the respondents agree that the community should avoid those infected but remain friendly. This is caused by the stigma of avoiding those with diseases to avoid getting infected and it is backed by the study of [28] which claims disease avoidance as a functional basis for stigmatization. However, 55% of the respondents agree on being supportive to those infected. Conversely, in a study conducted by [7] and [29] most of the respondents believe that the community would remain friendly but would lack support and help. The table further shows that the community (W=3.69) strongly agrees that people infected with MDR-TB deserve respect and fair treatment like everyone else. This result highlights the regard of the community towards basic human rights which are universal and inalienable as emphasized by [22] as the right to be free from degrading treatment. Furthermore, a similar study by [30] revealed that only 19.3% believed that discriminating against TB patients is necessary.

The results also revealed that most (40.50%) in the community would not reject those who acquire MDR-TB. However, a study conducted by [31] disagrees with this claim as most of their respondents (44%) would rather stay away from persons with TB rather than help them. Furthermore, most also (WM=2.05) disagree that it is correct to disseminate and treat badly MDR-TB infected people. The results further reveal that the community (39.60%) does not blame those who default treatment for the spread of MDR-TB. These two results highlight again the regard of the community towards basic

human rights when it comes to health and fair treatment. These findings are consistent with a study conducted by [7].

Majority in the community (WM=1.64, 1.51) also strongly disagree that MDR-TB is a disease of the poor and HIV infected and that all HIV positives have MDR-TB, respectively. This may relate with the fact that HIV education is integrated in the country's education curriculum as implemented by The Philippine AIDS Prevention and Control Act 1998 s. 4 (PH) resulting in a reduced generalization about HIV cases. Lastly, Table 3 illustrates that when asked about their perception regarding MDR-TB, most (WM= 2.88) indicated that it is correct to forcefully isolate MDR-TB infected to prevent its spread. It is possible that the stigma surrounding TB may contribute to this perception regarding MDR-TB infected individuals.

Table 4. Practices on MDR-TB

	Questions on PRACTICES regarding MDR-TB	Weighted Mean	Verbal Interpretation
What will you do if you suspect you have DR-TB			
1	Consult a herbalist	1.61	SD
2	Visit Health Care Centre or hospital	3.85	SA
3	Just stay at home, rest, and pray	1.73	SD
4	Initiate self-treatment	1.73	SD
When will you go to a clinic or hospital after getting TB?			
5	When self-treatment does not work	2.26	D
6	As soon as I realize that I have TB	3.74	SA
7	Never	1.10	SD
What should be done to prevent the spread of DR-TB to others?			
8	Covering my mouth when coughing and sneezing	3.78	SA
9	By taking prescribed medication only when feeling sick	2.69	A
10	Not spitting indiscriminately	3.63	A
11	Avoiding shaking hands with MDR-TB infected people	3.06	A
12	Constantly taking traditional medication or herbs	2.09	SA
13	Constantly praying	2.47	D
14	Taking prescribed MDR-TB drugs with the assistance of DOH supporter	3.58	SA
15	Avoid contact with infected person even if he is on treatment	3.18	A
16	Avoid sharing dishes and cups with MDR-TB infected people	3.60	SA
17	Wearing an N95 protective or surgical mask	3.56	SA

Verbal Interpretation: SA - Strongly Agree, A - Agree, D - Disagree, SD - Strongly Disagree

Table.4. provides information related to respondents' drug resistant TB prevention and treatment practices. This study found out that most of the respondents (57%) would not choose to consult a herbalist (WM=1.61) if they are diagnosed with MDT-TB. The respondents strongly agreed (0.86%) that going to a health care center or hospital (WM= 3.85) to be treated would be a much better option. The findings of this study coincides with the results of the study conducted by [32] which also showed only a minute amount of their respondents 3.4% would choose to buy herbal medicines, and only 1.5% would choose to seek a witch doctor.

About 50.10% of the respondents are knowledgeable that staying home and doing nothing, and constant praying (WM=1.73) were not an appropriate drug resistant TB treatment practice. About 54.10% of the respondents are adequately informed that the initiation of self-treatment (WM=1.73) is not an acceptable treatment practice. Respondents would still go to a clinic or hospital even when self-treatment does not work (WM= 2.26). Furthermore, the results also show that most of the respondents (0.87%) would immediately seek medical treatment as soon as they realize that they are diagnosed with MDR-TB (WM=3.74). Conversely, a study conducted by [7] found that majority of their respondents would not seek immediate medical assistance if diagnosed with MDR-TB, due to several factors such as social isolation, prejudice, and negative attitudes or views of the community that make people avoid seeking medical assistance at the early onset of the disease.

WHO recommends that a person diagnosed with MDR-TB be immediately referred to a specialist to be given proper treatment, and 93.10% knew that never going to a hospital or health center to seek treatment (WM=1.10) is not an acceptable treatment practice. The results of this study regarding the degree of awareness of the respondents to the non-acceptability of the initiation of self-treatment in treating MDR-TB, showed that 53% of respondents of this study agreed to the said statement, which is comparatively higher, than the study done by [7], in which only 23% of the respondents agreed.

Results gathered for prevention practice found that most of the respondents agree that covering one's mouth when coughing and sneezing is a good practice to prevent spread of TB with 80% of the respondents that strongly agree (WM=3.78). It is recommended by [33] that TB can be spread through coughs in the form of air droplets. It was also noted that 38% of the respondents also strongly agree in taking prescribed medication only when feeling sick (WM=2.69). One factor that contributes to multidrug resistant Tuberculosis is non-compliance to the TB-DOTs program. A possible reason for

this is to complete the drug regimen; medications should be taken even without the feeling of sickness according to [34]. Some of the factors that contribute to multidrug resistance is due to incomplete treatment regimen, wrong treatment given, and financial factors. Results also state that the respondents agree to not spitting indiscriminately (WM=3.63) with 73% of the respondents strongly agree and 37% of the respondents strongly agree in avoiding shaking hands with MDR-TB infected people (WM= 3.06). A study [35] showed that TB could be spread when a person spits indiscriminately due to infectious droplets being spread into the air through the spit.

The results also found out that the respondents do not regard taking traditional medication or herbs with about 34% of the respondents that strongly disagree (WM=2.09). Herbal medicine can be used for treating mild to moderate illnesses however it is believed that people are aware of its limitations in combination with self-medication and non-expert consultation of herbal medicine that could potentially harm a person. Constantly praying (WM=2.47) deemed by 29% of the respondents as not helpful in treating MDR-TB although it is believed that patient centered care should not only be centered on the physical aspect but also holistic forms and dimensions [36]. The results also show that 65% of the respondents strongly agree that taking prescribed MDR-TB drugs with the assistance of DOH supporter showed good practice (WM=3.58). Any form of contact is also avoided while on treatment (WM=3.18) with 42% of the respondents that strongly agree while 66% of the respondents strongly agree that sharing of dishes and cups is discouraged upon (WM=3.60). It has been recommended by [33] that a person cannot acquire TB from sharing drinking containers or eating utensils, smoking or sharing cigarettes with others, and saliva shared from kissing. Tuberculosis is also not spread through shaking one's hand. Wearing an N95 protective or surgical mask (WM=3.56) also showed good practice as it leans more towards strongly agree with 62% of the respondents who strongly agree. Overall, the practices exhibited by non-health allied courses are good.

Table.5. Association of Knowledge, Attitudes, and Practices

			Attitudes		Total
			Good	Poor	
Knowledge	Good	Count	195	96	291
		% of Total	47.9%	23.6%	71.5%
	Poor	Count	64	52	116
		%Total	15.7%	12.8%	28.5%
Total		Count	259	148	407
		% Total	63.6%	36.4%	100.0%

			Practices		Total
			Good	Poor	
Knowledge	Good	Count	180	111	291
		% of Total	44.2%	27.3%	71.5%
	Poor	Count	52	64	116
		%Total	12.8%	15.7%	28.5%
Total		Count	232	175	407
		% Total	57.0%	43.0%	100.0%

			Practices		Total
			Good	Poor	
Attitudes	Good	Count	159	100	259
		% of Total	39.1%	24.6%	63.6%
	Poor	Count	73	75	148
		%Total	17.9%	18.4%	36.4%
Total		Count	232	175	407
		% Total	57.0%	43.0%	100.0%

Table.5. shows that 291 (71.5%) of the respondents have good knowledge regarding MDR-TB, while 116 (28.5%) have poor knowledge. With regards to attitudes, 259 respondents (63.6%) express favorable attitudes, while 148 respondents (36.4%) have unfavorable attitudes towards MDR-TB. Lastly, 232 respondents (57.0%) demonstrate good practices, while 175 respondents (43.0%) demonstrate poor practices in relation to MDR-TB.

Table.6. Statistical Relationship of Knowledge, Attitudes, and Practices

Variables tested	**p-value**	**Interpretation**	**Cramer's V**	**Interpretation**
Knowledge and Attitudes	0.025	Significant relationship	0.111	Moderate relationship
Knowledge and Practices	0.002	Significant relationship	0.155	Strong relationship
Attitudes and Practices	0.018	Significant relationship	0.117	Moderate relationship

Table.6. shows a statistically significant relationship between knowledge and attitudes (p=0.025), knowledge and practices (p=0.002), and attitudes and practices (p=0.018). Previous studies conducted using the KAP framework have also shown significant associations between knowledge, attitudes, and practices of respondents across various health risks such as COVID-19 [37], hepatitis B [38], and food poisoning [39].

In line with the findings of this study, studies by [40] and [41] have also shown significant associations between disease knowledge and behaviors regarding infectious diseases and vector-borne diseases, respectively. Additionally, findings obtained by [17] suggest that those with good knowledge about

MDR-TB are more inclined to practicing good preventive measures.

The significant relationship between the knowledge and attitudes of the participants revealed that knowledge influences attitudes and vice versa. Similar findings are shown in the studies of [42] and [43]. However, the findings of this study are not in line with that of [44]. Since the current study exemplifies that, the good knowledge of the non-health allied college students influenced their positive attitudes and vice versa, correct information and knowledge on MDR-TB would allow them to display proper and positive health seeking behaviors if the disease manifests.

The results also indicate a significant relationship between attitudes and practices of the participants with regards to MDR-TB. Respondents also showed a good attitude that consequently leads to good practices. Findings of this study are similar to that of [38], [43], and [45], however, are in contrast with the findings of [46].

IV. CONCLUSION

Based on the gathered data, the respondents generally demonstrate good knowledge regarding the generalities, mode of transmission, prevention practices, and treatment of MDR-TB, however they have poor knowledge regarding the prevalence of MDR-TB in the National Capital Region, a possible reason why cases continue to rise in the region. The participants also show favorable attitudes with regards to community and self-perception in the context of MDR-TB as they agree with receiving treatment, remaining hopeful, and overcoming the stigma surrounding the disease. The results have shown that the respondents carry out good practices in the treatment and prevention of MDR-TB, particularly as seen in their favorable health-seeking behaviors. Lastly, the data reveals that there is a significant relationship between the variables.

Ethical Considerations:

This study has been granted ethical approval by the University of Santo Tomas Faculty of Pharmacy Research Ethics Committee and is provided with the study protocol code FOP-REC-2021-01-029.

Conflict Of Interest:

The authors of this study declare that the research was conducted without any conflict of interest.

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