

# Knowledge, Attitude, and Practices about Medical Waste Management among Healthcare Personnel in Community Quarantine Facilities of Isabela

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**Abstract**— The pandemic resulted in an unexpectedly high volume of medical waste from hospitals, testing laboratories, and quarantine facilities, requiring healthcare personnel to thoroughly observe proper medical waste management. The study investigated the level of knowledge, attitude, and practices of healthcare personnel towards medical waste management in community quarantine facilities. The quantitative descriptive survey research design was employed. A total of one hundred and sixty-nine (169) healthcare personnel from community quarantine facilities of thirty-five (35) barangays under City Health Office 1 (CHO-1) of Isabela Province, thirty-five (35) licensed professionals, and one hundred thirty-four (134) unlicensed professionals were involved in the study, which were selected through stratified random sampling. The questionnaire was the main data gathering instrument and data were analyzed using descriptive statistics, one-way analysis of variance (ANOVA), and Post Hoc test analysis. The mean of the data showed that the knowledge of licensed healthcare personnel was good (4.20), the attitude was good (4.01), and the practices were good (4.18). The results were estimated to be good. On the other hand, the mean knowledge of the licensed healthcare personnel was good (3.70), the attitude was good (3.71), and the practice was good (4.15). The findings were described as good. Results further revealed a significant difference in the knowledge of the licensed healthcare personnel when grouped according to age, explaining that the aged 40-49 had significantly greater knowledge than those aged 20-29 and 30-39. The research concluded that proper medical waste disposal is bound to every healthcare personnel regardless of their gender, highest educational attainment, age, years of service, and especially professional status. Older licensed healthcare personnel must properly mentor their colleagues in the health profession to foster collaboration and unity. The national government should revisit offering suitable refresher training, policies, and standards for community quarantine facilities to operate and seal of good governance, particularly focusing on medical waste management.

**Keywords**— *medical waste management, knowledge, attitude, practices, licensed professional healthcare personnel, unlicensed professional healthcare personnel*

## I. INTRODUCTION

Medical centers, including hospitals, clinics, and diagnostic and treatment facilities, create highly toxic waste and expose individuals to potentially lethal infections (Shareefdeen, 2012). Medical waste was a source of toxic biomedical waste production. It was a sort of waste generated by healthcare facilities that included potentially harmful germs capable of infecting the public and created a significant risk to human health and the environment (Gitipour et al., 2017). The World Health Organization classified medical wastes into many categories, such as a) Infectious: materials that contained pathogens with high enough quantities to cause disease when exposed. Medical waste comprised surgical garbage, lab cultures, and personal protective equipment. b.) Sharps: disposable needles, syringes, blades, and shattered glasses were examples of sharps. c.) Pathological: tissues, organs, human flesh, and body fluids. d) Pharmaceuticals: returned, spilled, expired, or tainted medicines and chemicals. e) Chemical: waste from diagnostic procedures of cleaning materials. f) Radioactive waste: waste contaminated with radioactive materials used in illness detection and treatment. According to the World Health Organization (WHO), about 10% of all medical waste was hazardous, 85% was standard (non-hazardous), and just 5% was very dangerous (Hameed et al., 2022).

Waste management must be given proper consideration to address the growth in the development of hazardous wastes, particularly infectious wastes associated to COVID-19, as well as to protect the welfare of all users of healthcare facilities, according to the Department of Health (2020b). Medical waste is a significant problem since it can affect the environment and public health. Lack of understanding among healthcare personnel and the general public about improper medical waste disposal, an efficient regulatory framework and national plan, and budgetary limits were all problems that hampered medical waste management (Hasan & Rahman, 2018). Nagaraju et al. (2013) revealed that most people who live and work with

medical waste lack understanding and awareness of medical waste management regulations. As a result, improper medical waste treatment and management were practiced, putting individuals and the general public at risk of health and environmental dangers.

The majority of the research was done in a hospital, and quarantine facilities are one of the most overlooked aspects of waste management, especially in this unprecedented time. In past years, poor medical waste management has been linked to an increase in outbreaks and waste-related illnesses (Olaniyi et al., 2021). Based on this work, the researcher argues that developing nations experience challenges in managing their medical waste resulting in a lack of financial investment, organizational knowledge, skilled personnel, and adequate technology (Wilujeng, 2019). Most impoverished nations dispose of medical waste in open dumping, open burning, or low-efficiency incinerators. This harms both individuals and the environment (Kerdsuwan & Laohalidanond, 2015).

The Philippines has been declared a State of Public Health Emergency, according to the Department of Health (2020a), due to the rapid and widespread of confirmed COVID-19 cases. The healthcare industry is struggling to maintain healthcare waste management standards, or the proper handling, treatment, and disposal of healthcare waste, in this time of public health emergency, due to the large increase in demand for COVID-19 treatment and care in healthcare facilities. Examining the level of knowledge, attitude, and practices help identify areas where future information and education initiatives should be increased, as seen in the study of Wang et al. (2015). The way people view the waste being generated during times like a pandemic has a negative approach in the attitude towards maintaining waste that may lead to poor practices that suggest the relationship of knowledge and practice as a significant predictor but as stated by Desa et al. (2011). Education alone cannot change attitudes alone, but acceptance will depend on presenting the knowledge that would guide them to the dispose of biomedical waste properly.

Medical waste is a sort of rubbish created in hospitals containing blood, bodily fluids, or other potentially infectious elements. According to the World Health Organization (WHO), about 10% of all medical waste is hazardous, 85% is average (non-toxic), and 5% is highly harmful. As the number of treatments conducted in various health care settings has expanded, excessive waste has been generated at care institutions (Rao et al., 2018). Along with its infectious nature, this waste must be properly handled to avoid disease transmission (Wilujeng, 2019). Inadequate waste treatment and disposal might potentially pose a risk to one's health in the long run.

Recently, there has been no well-organized approach for adequate medical waste management to protect against environmental health hazards. In research from Hossain and Som (2018), many worldwide and national studies have identified very partial good practices for the disposal or dumping of health care waste. It has been stated that, except for a few private hospitals, most hospitals dispose of health care wastes by the roadside in the same way that commercial and other debris are disposed of. Every day, hundreds of healthcare

materials are used during patient care operations in hospitals, and these activities produce some unusable materials, referred to as medical waste (Singh et al., 2014).

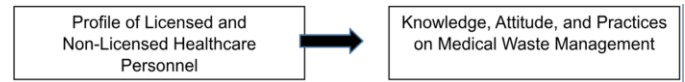


Fig. 1. The Knowledge, Attitude, Practices and Demographic Profile and its effect on Medical Waste Management.

Knowledge, attitude, and practice studies collect data on what is known, believed, and practiced about medical waste management in a particular population. Knowledge, attitude and practices are characteristics of a certain population.

In order to accomplish this objective, each individual, whether they are trained in the field or not, comes equipped with their own set of medical waste management knowledge, attitudes, and practices. As a result, the research paradigm, represented by figure above, served as the basis for the conceptualization of this research.

The research simulacrum assumes that there is a significant difference between the four variables, which are the knowledge, attitudes, practices, and demographic profile (Independent Variable), and effect on the Medical Waste Management (Dependent Variable), in the quarantine facilities of every Barangay that is under the jurisdiction of City Health Office 1 (CHO-1) in one of the cities in Isabela Province. In a similar vein, improved knowledge, attitude, and practices guarantee that medical waste management

## II. METHODS

### A. Research Design

The quantitative descriptive design was used in this study. Data on the frequency of healthcare personnel is assessed in medical waste knowledge, attitude, and practice.

### B. Locale and Respondents

The study was carried out in community quarantine facilities of one of the cities of Isabela Province. The locale of the study was limited to the City Health Office (CHO-1), which is composed of thirty-five (35) barangays). The respondents of this study are the healthcare personnel, particularly the licensed and unlicensed healthcare personnel working in the community quarantine facilities. Using stratified random sampling, a sample size of one hundred and thirty-four (134) unlicensed respondents and thirty-five (35) licensed respondents were included in the study.

### C. Instrument

The researchers utilized a questionnaire adopted from Govender et al (2018) to examine licensed healthcare personnel's knowledge, attitudes, and practices about medical waste management. In addition, the questionnaire of Makhura et al (2016) was also used to examine the knowledge, attitudes, and practices of unlicensed healthcare personnel toward medical waste management. An English, Tagalog, Ibanag, and Ilocano version of the questionnaire were made available for

the respondents to facilitate data gathering. The scoring for the questionnaire of knowledge, attitude, and practices used a five (5) point Likert Scale, where 1 means I don't know; 2 means Strongly disagree; 3 means Moderately Disagree; 4 means Moderately Agree, and 5 means Strongly Agree.

**D. Data Analysis**

For the profile variables of the respondents, frequency/percentage was utilized. The weighted mean was used for the level of knowledge, attitude, and practices on medical waste management of the healthcare personnel.

On the other hand, the one-way analysis of variance was used to assess the level of knowledge, attitude, and practices of licensed and unlicensed healthcare personnel. This statistical analysis is a parametric test used for three or more data groups to gain information about the Knowledge, Attitude, and Practices of medical waste management among the healthcare personnel.

TABLE I. QUALITATIVE INTERPRETATION OF LEVEL OF KNOWLEDGE, ATTITUDE AND PRACTICES OF THE RESPONDENTS

Range of Mean Score	Qualitative Interpretation
4.50-5.00	Very Good
3.50-4.49	Good
2.50-3.49	Fair
1.50-2.49	Poor
1.00-1.49	Very Poor

Furthermore, Post hoc test analysis, or a posteriori analysis, which generally refers to a type of statistical analysis that is conducted following the rejection of an omnibus null hypothesis, would be used in case it the study would find out that there was a significant difference in knowledge, attitude, practices on medical waste management of licensed and unlicensed healthcare personnel when grouped according to their profile variables.

**E. Ethical Considerations**

The researchers sought official permission from the respondents and the administrators in the quarantine facility before the conduct of data collection. The researchers ensured the confidentiality of the respondents' personal information and views that they shared with them in this study. The researchers obtained the informed consent of the chosen respondents to ensure their participation is voluntary. The respondents were also advised that they can withdraw participation at any time during the study.

**III. RESULTS AND DISCUSSION**

TABLE II. DEMOGRAPHIC PROFILE OF THE RESPONDENTS

Variables	Licensed Healthcare Personnel		Unlicensed Healthcare Personnel	
	Frequency (n=35)	Percentage	Frequency (n=135)	Percentage
Sex				
Male	5	14	33	25
Female	30	86	101	75
Age				
20-29 years old	8	23	24	18

30-39 years old	20	57	38	28
40-49 years old	5	14	49	37
50-59 years old	1	3	16	12
60-69 years old	1	3	7	5
Educational Attainment				
Elementary			20	15
High School			42	31
College	32	91	67	50
Others	3	9	5	4
Years of Service				
1-3 years	11	31	43	32
4-6 years	11	31	41	31
7-9 years	5	14	27	20
10 above	8	23	23	17

It is seen in table 2 that among the 35 licensed healthcare personnel who participated in the study, majority of them were female, the age group of 30-39 years old had a higher percentage among all the other age groups, majority are college graduates, and majority of the respondents rendered 1-3 years of service.

It is also seen in table 2 that among the 134 unlicensed healthcare personnel, majority of the respondents were female, the age group of 40-49 years old had a higher percentage among all the other age groups, majority were college graduates, who rendered 1-3 years of service.

The sociodemographic profile of healthcare personnel was examined through descriptive statistics. The results showed that the majority of the healthcare personnel in the health profession were female. The findings of the study are confirmed in the study by Habib et.al (2020) where women predominate the workforce in the health and social work labor markets and found that women constitute 70% of the health workforce. It was a common misconception that women are more capable than men in the health profession.

Additionally, the licensed healthcare personnel were less numerous than unlicensed healthcare personnel, thereby implying the difficult journey before one can become licensed professional healthcare personnel. In lieu of this finding, the same study conducted by Razu et.al (2021) highlights that the number of doctors in Bangladesh government healthcare facilities is scarce with a ratio of 5.26 doctors/10,000 people. Thus, the Philippine government should devise mechanisms for increasing the number of licensed professional healthcare personnel and optimizing further their strengths and skills. This will surely be essential to achieving many aspects of the sustainable Development Goals of the country.

Furthermore, the number of respondents working between 1-6 years was significantly higher than the other array of years of service since the respondents are leaving due to a meager amount of salary. According to the preliminary results of the Philippine Statistics Authority's (PSA) January round of the Labor Force Survey (2022), it showed the jobless rate stood at 6.4%, slightly easing from 6.6% in December and 8.8% in January 2021. Hence, there has to be a competitive salary for every non- licensed healthcare personnel, this was grounded on the reason that their temporary servitude in the health profession impairs the holistic health care system because of repeated transition periods incurred which eventually adds to

the total operational costs. If these expected additional costs are converted to an increase in their salary or cash incentives, it would somehow motivate them to stay and do well in their corresponding workloads.

TABLE III. LEVEL OF KNOWLEDGE, ATTITUDES AND PRACTICES OF THE RESPONDENTS ON MEDICAL WASTE MANAGEMENT

Variables	Licensed Healthcare Personnel		Unlicensed Healthcare Personnel	
	Mean	Qualitative Interpretation	Mean	Qualitative Interpretation
Knowledge	4.20	Good	3.70	Good
Attitude	4.01	Good	3.71	Good
Practices	4.18	Good	4.15	Good

The table above shows that both the licensed and unlicensed health personnel of the quarantine facilities have a good level of knowledge, attitude, and practices about medical waste management.

TABLE IV. SIGNIFICANT DIFFERENCE IN THE LEVEL OF KNOWLEDGE ON MEDICAL WASTE MANAGEMENT OF THE RESPONDENTS WHEN GROUPED ACCORDING TO THEIR PROFILE VARIABLES

Variables	Licensed Healthcare Personnel			Unlicensed Healthcare Personnel		
	t/F-value	p-value	Decision	t/F-value	p-value	Decision
Age	7.074	.003*	Reject Ho	.399	.809	Do not Reject Ho
Sex	.734	.468	Do not Reject Ho	.540	.590	Do not Reject Ho
Highest Education	.525	.603	Do not Reject Ho	1.394	.248	Do not Reject Ho
Years of Service	2.201	.108	Do not Reject Ho	.041	.989	Do not Reject Ho

\* SIGNIFICANT AT 0.05 LEVEL

It can be gleaned from the table above that the level of knowledge on medical waste management of both licensed and unlicensed health personnel have no significant difference when grouped according to their sex, highest educational attainment, and years of service. Moreover, there is also no significant difference seen in the knowledge of unlicensed health personnel when grouped according to their age. However, the level of knowledge of licensed health personnel significantly differs according to their age.

TABLE V. SIGNIFICANT DIFFERENCE IN THE LEVEL OF ATTITUDES ON MEDICAL WASTE MANAGEMENT OF THE RESPONDENTS WHEN GROUPED ACCORDING TO THEIR PROFILE VARIABLES

Variables	Licensed Healthcare Personnel			Unlicensed Healthcare Personnel		
	t/F-value	p-value	Decision	t/F-value	p-value	Decision
Age	.227	.798	Reject Ho	.538	.708	Do not Reject Ho
Sex	.027	.979	Do not Reject Ho	.048	.962	Do not Reject Ho

Highest Education	1.109	.276	Do not Reject Ho	.954	.417	Do not Reject Ho
Years of Service	.720	.547	Do not Reject Ho	1.107	.349	Do not Reject Ho

\* SIGNIFICANT AT 0.05 LEVEL

The table above shows that the level of attitude on medical waste management of both licensed and unlicensed health personnel have no significant difference when grouped according to their age, sex, highest educational attainment, and years of service.

TABLE VI. SIGNIFICANT DIFFERENCE IN THE LEVEL OF PRACTICES ON MEDICAL WASTE MANAGEMENT OF THE RESPONDENTS WHEN GROUPED ACCORDING TO THEIR PROFILE VARIABLES

Variables	Licensed Healthcare Personnel			Unlicensed Healthcare Personnel		
	t/F-value	p-value	Decision	t/F-value	p-value	Decision
Age	1.820	.178	Reject Ho	.3947	.439	Do not Reject Ho
Sex	.807	.425	Do not Reject Ho	1.042	.299	Do not Reject Ho
Highest Education	1.537	.134	Do not Reject Ho	1.647	.182	Do not Reject Ho
Years of Service	.528	.666	Do not Reject Ho	.738	.531	Do not Reject Ho

The table above shows that the level of practices on medical waste management of both licensed and unlicensed health personnel have no significant difference when grouped according to their age, sex, highest educational attainment, and years of service.

The present study reveals that generally, the level of knowledge, attitude, and practices can be described as good, after careful examination of the level of knowledge, attitude, and practices of the licensed healthcare personnel through the use of a one-way analysis of variance.

Furthermore, these good levels of knowledge, attitude, and practices manifested were honed primarily because of the intensity of their duties as they study, diagnose, treat and prevent human illness, injury, and other physical and mental impairments in accordance with the needs of the populations they serve. However, qualifying to become good should not be the end goal of the healthcare personnel, relevant training and updated policies on proper medical waste management in quarantine facilities should not be overlooked, and licensed healthcare personnel must continuously strive harder to be very good or to become excellent in the near future (Mukesh Kumar et al., 2015; Ranu et al., 2016).

Some researchers/authors suggest that licensed healthcare personnel have very good knowledge, positive attitude, and good practices regarding infectious waste management which were found to be statistically significant (Aldeguer, et al., 2021). It is worth mentioning that when it comes to the medical waste management aspect of the healthcare system, licensed

healthcare personnel should also lend a hand to their unlicensed colleagues in the health profession to effectuate outstanding performance among them when it comes to proper medical waste management in their corresponding community quarantine facilities. However, the above findings of our study refute the findings in the study of (Govender et al., 2018) where knowledge of licensed healthcare personnel was generally inadequate and scored 'poor' overall, and just over half of the participants reported a good attitude towards the appropriate disposal of medical waste.

The results of the study also showed that licensed healthcare personnel were very good in knowledge in terms of sorting or separation of medical waste management in quarantine facilities, identifying the need to sort the medical waste during the collection, and very good at identifying the nature of medical waste and improving quality assurance. These findings of the study are confirmed by the study conducted by Sanches et al. (2018), stating that licensed healthcare personnel, being directly related to waste sorting plays an important role in the development of an appropriate healthcare waste management and the implementation of the healthcare waste management plan, collaborating with structural changes, vocational training, and policies for the management of waste. Moreover, it is indicative that their profession as healthcare personnel contribute greatly to their knowledge that they could understand the potential health and environmental impact of improper waste management thereby ensuring that medical wastes of every community quarantine facility be managed effectively and efficiently

However, the licensed healthcare personnel were poor when it came to reading and understanding that throwing expired blood units in domestic waste was not an adequate disposal procedure. This finding of the study is reinforced in the study conducted by Sarker et al. (2020) where it was observed among medical doctors, and medical technologists that they tend to overlook proper waste management because it is a common perception that dealing with medical waste issues is not a doctor's responsibility; so, most of the time they neglect this issue. Therefore, it is reasonable to assume in this study, that because of the tons of workload being shouldered by every healthcare licensed professional they tend to focus more on these workloads thereby compromising some of the salient principles of proper medical waste management.

The present study also discloses that the level of attitude of the licensed healthcare personnel was demonstrated in having a good approach because they were more capable of understanding the consequences of improperly handling medical waste. It was further revealed that the licensed healthcare personnel were very good in the usage of color codes for the separation of medical wastes, very good in the safe disposal of medical waste necessary for healthcare setup and very good in proper medical waste management in enhancing the quality assurance of healthcare sectors. Similar study was conducted by Akkajit et al. (2020) where it was found that more than 85 percent of respondents had a positive attitude toward waste management, and the overall attitude score based on all of the respondents' scores was classified as high. Therefore, it is reasonable to assume in this study it was due to licensed healthcare personnel receiving adequate formal training in

medical waste handling and performing admirably in terms of policy adherence.

In terms of the level of the practices, it was revealed that licensed healthcare personnel evidently engaged in a good manner, demonstrating good practice in separating hazardous and non-hazardous waste, preventing contamination, and practicing proper handling of medical waste. This finding concurs with the study by Jalal et al. (2021) where the majority of respondents adhered to policies regarding the separation of biomedical waste into non-hazardous, hazardous, and sharp waste. Furthermore, it was revealed in the present study that licensed healthcare personnel were very good at preventing contamination while handling medical waste management, and very good practice in the usage of personal protection tools (e.g., gloves, safety goggles, face masks) when handling medical waste. These findings were supported by the study of Kabito et al. (2021) in which licensed healthcare personnel's practice results in a long tenure of service being honed and developed through experience and equipped with maximum consideration.

However, it was further revealed in this study that the licensed healthcare personnel were fair in collecting liquid waste separate from other waste, fair in collecting expired medicines separate from other wastes and were fair in making sure that their community quarantine facilities visitors were not exposed to medical waste. These findings were confirmed in the study conducted by Govender et al (2018), where only 51.2% of other professionals and 52.8% of nurses reported sorting healthcare waste before placing it in collection bins, but over 80% of unlicensed reported sorting healthcare waste before collection. Therefore, it is rational to assume that critical areas where healthcare waste disposal standards fell short were collecting liquid waste with other waste and the failure to separate sharp and blunt materials.

The present study reveals that the knowledge, attitude, and practices of unlicensed healthcare personnel were found to be good after careful examination of the level of knowledge, attitude, and practices of the unlicensed healthcare personnel through the use of a one-way analysis of variance.

In view of the above-mentioned findings, it was supported by the study conducted by Elmahi et al. (2016) where it was found that the majority of unlicensed respondents had a good level of knowledge of waste management. Therefore, it is reasonable to assume that since their levels are average, unlicensed healthcare personnel must continuously strive harder to be very good or to become excellent in the near future by immersing them with relevant training and updated policies on proper medical waste management in quarantine facilities.

In terms of knowledge in medical waste management, unlicensed healthcare personnel were good at knowing that improper waste disposal can lead to needle stick injuries. This demonstrates that they know some wastes might be contaminated with infectious microorganisms that can transmit harmful effects when not properly disposed. It is also revealed that they were good at reading and understanding that improper waste disposal may lead to the transmission of diseases. Hence, unlicensed healthcare personnel considered the potential risks that improper waste disposal may cause. These findings further

indicate that wastes need to be thrown out in separate bins to avoid acquiring infections.

The results also showed that unlicensed healthcare personnel were marked as fair in being aware that untreated medical waste can be stored for more than 48 hours due to a lack of learning in medical procedures. They do not have the knowledge to store medical waste compared to licensed professionals. Furthermore, it was revealed that unlicensed healthcare personnel were marked fair in the policy document that liquid waste must not be disposed of in the sewage system which indicated that they lacked knowledge about the correct procedures when dealing with liquid waste disposal. Similarly, they were graded as fair in reading and understanding that throwing expired units in domestic waste was an adequate disposal procedure. This speaks that they do not have the idea of treating expired waste. These findings are confirmed in the study conducted by Chand et. al (2021) where it was found that all the healthcare facilities operating and the terminal sewage plant operators are responsible for treating the liquid waste. Hence, most of the workers involved in the handling of wastewater treatment are unlicensed healthcare personnel making a weak implementation of the regional sanitation regulations and must encourage skilled health workers to implement sanitation regulation

The present study also reveals that in terms of attitude in medical waste management, unlicensed healthcare personnel were very good at using color codes for the separation of medical wastes. This demonstrates that they show an appropriate attitude toward identifying the nature and importance of sorting medical waste during collection and disposal. The findings of the present study concur with the study conducted by Aldeguer et al. (2020) where unlicensed healthcare personnel were found to have a positive attitude toward medical waste management since they are more exposed to segregation.

However, the study also revealed that unlicensed healthcare personnel performed poorly in segregating medical waste into different categories. This was due to the time-consuming nature of the task, inadequate segregation at the source, increased risk of injury to waste handlers, and overall poor medical waste management, which created an additional work burden. Therefore, it is rational to assume that in this study, unlicensed healthcare personnel think that segregating waste was difficult to do and just a waste of their time, so most do not consider doing it which happens when they have an inappropriate attitude about segregation. Also, they do not think and care about those responsible for carrying the waste which speaks that they don't consider themselves accountable for their work. These findings of the study are reinforced by the study conducted by Govender et al (2018) in which most of their participants expressed poor practice and a lack of adequate knowledge. Therefore, there is a need to review the healthcare worker training curriculum to ensure that healthcare workers' policies and practices are adequately covered in the undergraduate curriculum.

The present study further reveals that in terms of the practices in medical waste management, unlicensed healthcare personnel were very good at adhering to the infection control

policy while handling waste. This demonstrates that they follow implemented rules and observe good practices in treating infections seriously. They are also marked as very good at segregating medical wastes into infectious and non-infectious. This shows that unlicensed healthcare personnel observe good practice in disposing of medical waste in their appropriate trash bin. They were properly organized when it came to segregating waste. unlicensed healthcare personnel were also graded very well in taking care in preventing sharp related injury. This shows that they were told and taught where to dispose of various sharps. They ensure that their community quarantine facilities practice safe waste disposal, especially in dealing with contaminated or infectious materials to avoid injury and transmission of diseases. These findings were reinforced in the study conducted by Govender et al. (2018) which disclosed that the level of practice by unlicensed healthcare personnel in waste disposal skills was satisfactory high in their study.

Moreover, it was further revealed that unlicensed healthcare personnel were marked fair in disposing of blood in separate bags that prevent leakage. This occurs due to a lack of awareness regarding the requirement that blood must be transported individually to various blood bags. They were unaware of the proper procedures to follow while working with blood samples. Additionally, unlicensed healthcare personnel were also graded fairly in ensuring that their community quarantine facilities disposed of medical waste outside their vehicle. This demonstrates that they were not told about getting the waste and putting it in their assigned vehicle. This may be the result of poor communication and planning. Also, they were marked poor in using special plastic bags once only for collecting medical waste. This means that they do not practice a good collection of waste. They gather and put the waste into the garbage or plastic bags and fill it up until full. They do not do the correct disposal and leave the waste piled up in one trash bag. This is supported by the findings of various researchers/authors (Govender et al., 2018), who found that the majority of their participants had poor practice and a lack of adequate knowledge. As a result, the healthcare worker training curriculum should be reviewed to ensure that healthcare waste policies and practices are adequately covered in the undergraduate curriculum.

The present study reveals that the knowledge of licensed healthcare personnel, when grouped by age, had a significant difference and thus rejected the null hypothesis. However, when it comes to findings. The study further revealed that licensed healthcare personnel aged 40 to 49 were more knowledgeable than the younger age brackets. This demonstrated that as people get older, they become more knowledgeable about their jobs. This finding is confirmed in the study conducted by Laor et al. (2018) when compared to other age groups, the less-than-20-years-old group had the highest percentage of people with a low level of medical waste management knowledge as opposed to those who belong to the higher age groups.

TABLE VII. MULTIPLE COMPARISONS ON THE SIGNIFICANT DIFFERENCE IN THE LICENSED HEALTHCARE PERSONNEL KNOWLEDGE ON MEDICAL WASTE MANAGEMENT WHEN GROUPED ACCORDING TO AGE

Age	Mean Difference	p-value
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20-29 years old	30-39 years old	-.07125	.613
	40-49 years old	-.57589*	.002
30-39 years old	20-29 years old	.07125	.613
	40-49 years old	-.50464*	.002
40-49 years old	20-29 years old	.57589*	.002
	30-39 years old	.50464*	.002

\* SIGNIFICANT AT 0.05 LEVEL

The table above shows that the licensed health personnel aged 40-49 years have a better level of knowledge on medical waste management compared to their colleagues who are younger.

The knowledge of younger licensed healthcare personnel needs to be improved. Thus, those who were older licensed healthcare personnel must properly mentor their colleagues in the health profession to foster collaboration and unity. This is confirmed in the study conducted by Sharma et al (2020) where it was found that goals to change personality for some traits primarily reflect on the guidance of the knowledgeable adults. Additionally, the quarantine facilities must have sufficient machinery to ensure compliance among all healthcare personnel. Furthermore, the national government should revisit offering suitable refresher training, policies, and standards for community quarantine facilities to operate, and seal good governance, particularly focusing on medical waste management.

The present study reveals that there is no significant difference in knowledge, attitude, and practices on medical waste management of unlicensed healthcare personnel when grouped according to profile variables. This finding is supported in the study conducted by Akkajit et al (2020) where it was found that there are no significant differences for the healthcare workers when grouped according to their sociodemographic characteristics. Hence, proper disposal of medical waste is bound to every unlicensed healthcare personnel regardless of their gender, highest educational attainment, age, years of service, and especially professional status. Therefore, it is reasonable to assume that in this study, unlicensed healthcare personnel must be familiar with various disposal methods cascaded by international and national health authorities and must follow specific criteria to improve and develop their medical waste management.

Waste management must be given proper consideration to address the growth in the development of hazardous wastes, particularly infectious wastes associated with COVID-19, as well as to protect the welfare of all users of healthcare facilities, according to the Department of Health (2020b). The measures currently being taken in order to adapt to the proper medical waste management to the new situation are essential for mitigating harmful germs capable of infecting the public and creating a significant risk to human health and the environment. If the appropriate knowledge, attitude, and practices are not taken with the due diligence it may impair the recovery of our nation from this unprecedented time, the Covid-19 outbreak. Therefore, along with follow-up study within the next few months, further training and refresher courses must be implemented at the soonest possible time.

#### IV. CONCLUSION

The level of knowledge, attitude, and practices of licensed and unlicensed healthcare personnel for medical waste management was assessed to be good, indicating an average or adequate implementation of proper waste management in community quarantine facilities. Moreover, basic infection control techniques are vital means of containing the pandemic, as evidenced by the current situation. Appropriate medical waste disposal is an important part of these management measures. This study draws the attention of concerned governments and local administrative levels to the need for complete execution of the mandated policies with the goal of improving overall medical waste segregation and management in daily practice, which will be of substantial use even after the pandemic. Furthermore, when the findings of the study were categorized by age, there was only a significant difference in licensed healthcare personnel's knowledge. As a result, older licensed professional healthcare personnel must mentor their younger colleagues in order to create collaboration and unity.

#### V. RECOMMENDATIONS

In light of the findings and conclusions, the following recommendations are made for supervisors and administrators of quarantine facilities:

- To include in the roster of seminars and trainings that should be offered to licensed healthcare personnel and monitor their attendance to account for their Continuing Professional Development units needed in renewing their licenses.
- To offer human resource development by providing specific training on handling, disposal, and treatment of various medical waste found in the community quarantine facilities
- To establish a policy that mandates that individuals who are relatively new to working in the healthcare industry must undergo fundamental or ongoing training regularly. In addition, the necessary logistics should be made available, and those working in healthcare should be routinely motivated to adhere to the standard precautions.
- To ensure healthcare personnel should receive regular training to ensure that their knowledge, attitudes, and practices regarding managing medical waste in community quarantine facilities are maintained and that the quality of care provided to patients is improved.
- To have a regular visit planned to each facility under quarantine to address any issues that may have arisen and to recognize and commend those members of the healthcare staff who have ensured and maintained proper waste management in their respective quarantine facilities.

In light of the findings and conclusions, the following recommendations are made for City Health Office-1 and Local Government Unit of Isabela Province:

- To formulate and implement local policy and provision of sufficient funding from national and

provincial governments to address the issue of medical waste.

- To commence a project where every barangay should have COVID-related and general waste disposal bins. They should also disseminate regulatory information that will assist healthcare personnel in comprehending the problem and carrying out their duties in accordance with the regulations.
- To consider the resources at their disposal, government agencies should be responsible for managing medical waste and conducting feasibility studies to determine whether or not it is possible to train and supervise all healthcare workers in the disposal of medical waste.
- To make all aspects of society work together to supervise, define, and legislate the management of medical waste, as well as to plan for the management of medical waste.
- To ensure that visitors in community quarantine facilities are not exposed to medical waste, it should be implemented that the medical waste should be placed away from people.

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