EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 8
Issue: 8
8-17
Year: 2021

COMPLIANCE OF MEDICAL TECHNOLOGISTS WITH THE GUIDELINES FOR SHARP INJURY PREVENTION

Ace John Mondidu*[1], Reicelyn Dela Cruz[1], Paula Micaela Go[1], Rusty Quizon[1], Andrea Roque[1] and Dr. Penuel P. David, RM, RPh, PhD[1,2]

[1]Pharmacy and Medical Technology Department, Centro Escolar University - City of Malolos, Bulacan, Philippines.
[2]Graduate School, Centro Escolar University - Manila, Philippines.

***Corresponding Author: Ace John Mondidu**
Centro Escolar University – Malolos Bachelor of Science in Medical Technology.

Article Received on 26/05/2021 **Article Revised on 15/06/2021** **Article Accepted on 05/07/2021**

ABSTRACT
Workplaces must strictly enforce precautionary and safety measures to reduce untoward incidents and ensure the safety of health workers. Implementing sharps injury prevention policies or guidelines would assist hospital institutions in reassessing the quality of efforts or programs aimed at ensuring the safety of medical technologists. With this, the researchers aimed to determine the compliance of medical technologists with the guidelines for sharp injury prevention in both public and private hospitals in Malolos, Bulacan. The questionnaire was distributed to the respondents through a google survey form sent on their emails. The data shows that medical technologists are always compliant before, during, and after handling sharp objects. Furthermore, demographic profile (age, sex, and years of clinical experience), policies, education and training, and resources are factors that significantly affect the compliance of medical technologists to sharp injury prevention.

KEYWORDS: Compliance; Medical technologist; Sharp injury prevention; Guidelines.

INTRODUCTION
The most common occupational injuries among healthcare workers, including medical technologists, are sharp injuries. Hence, during their work cycles and infection after exposure, health care workers are vulnerable. According to the World Health Organization, they estimate that 1 in 10 health care workers (HCWs) worldwide sustains a sharp injury each year.

Medical technologists must take precautionary and safety measures with certainty to reduce workplace incidents and ensure that they are safe and protected. Implementation of sharp accident reduction measures or recommendations will promote the reassessment of the consistency of efforts or services by healthcare organizations to ensure the well-being of medical technologists. Therefore, carefully designed policies will provide a perspective for hospitals and laboratories and an incentive to educate and train their medical technologists on prevention, monitoring, and reporting actions for sharp injuries.

In the Philippines, it was reported by Tayaben (2015) that there were about 4,004 healthcare providers who acquired needlestick injuries in 2004. Therefore, It is also necessary to develop compliance with these guidelines, particularly for medical technologists to determine their safety at work, despite having sharp injury prevention guidelines. However, given the current sharp injury prevention guidance in hospitals and laboratories, it still continuously results in a large increase in sharps-related injuries among healthcare workers, including medical technologists.

The results of this study will provide a basis for improving programs or procedures for infection prevention, protection, and risk management in hospitals and laboratories here in the City of Malolos, Bulacan. The research aims to determine the level of compliance and extent of factors affecting medical technologists to sharp injury prevention guidelines.

OBJECTIVES
To determine how compliant the medical technologists in hospitals are towards the policies and practices for preventing sharp injury and the factors that affect medical technologists' compliance with sharp injury prevention guidelines.

METHODOLOGY
Research Design
This study used a descriptive correlational design that determines the level of compliance and extent of factors affecting medical technologists to sharp injury prevention guidelines. The researchers will be utilizing the descriptive design to identify the variables used, including the demographic profile of the respondents, the

extent of policies and procedure, the extent of education, training, and availability of resources, and level of compliance of medical technologists before, during and after handling sharp objects. The researchers explained the design based on determining the level of compliance and extent of factors affecting medical technologists' sharp injury prevention guidelines. The correlational nature of the research design was to determine if there is a significant relationship between the study variables. The researchers also used the design to test if the formulated hypotheses on the relationships would be accepted or not.

Sampling Technique

The focus of the study is medical technologists in both the public and private hospitals in Malolos, Bulacan. The hospitals in Malolos Bulacan met the requirement of secondary and tertiary hospitals, which means that there are already existing laboratories in every hospital. The study used a sample (n) to represent the population (N). The sample size computed was 94 (0.02 margin of error and 99% confidence interval) using slovin's formula.

The sampling technique used in the study was cluster random sampling. The researchers used an online generator in choosing the hospitals that will participate in the study.

Data collection

The data gathering procedure will be administered online by the researchers. An online survey was created consisting of questions scored on a Likert scale. Online surveys will be distributed to the respondents. The researchers will explain the contents of the questionnaire to each respondent before and during the answering process. Then, after the respondents have completed answering the questions, the researchers will compile the questionnaires.

This study was carried out in several hospitals in Malolos, Bulacan, both public and private. Due to the current situation caused by the COVID-19 virus pandemic, the study setting of the study is constrained by the internet. The test was conducted using a Google Form survey, and the results were computed.

The focus of the study is medical technologists employed in the City of Malolos, Bulacan's private and public hospital.

Research Instrument

The questionnaire in this study was divided into three sections: (a) demographic profile (age, sex, years of clinical experience, and areas of clinical assignment); (b) level of compliance to sharps injury prevention guideline; and (c) the extent of factors influencing compliance to sharps injury prevention guideline. Respondents were asked to check the boxes that corresponded to their answers: always comply, often comply, sometimes comply, seldom comply, and fairly comply to sharps injury prevention guideline compliance; and always affect, often affect, sometimes affect, seldom affect, and fairly affect to the extent of factors affecting their compliance to sharps injury prevention guideline compliance.

Statistical Treatment

After the questionnaires were reviewed and manually tallied, the data were analyzed by SPSS version 14.0 for frequency counts, percentages, and weighted means.

RESULTS

Study Population

Most of the respondents were aged 21-25 years old (*f* – 46, 49%), females (*f* – 73, 78%), 5-above years of length of service (*f* – 45, 49%), and working in Bulacan Medical Center Hospital (*f* – 40, 43%) (Table I).

Table I shows the demographic profile of the Medical Technologists in Malolos, Bulacan. The total number of the respondent in this study is based on the computed sample size of 94.

Table I. Demographic Profile

		Frequency	Percentage (%)
Age	21-25	46	49
	26-30	20	21
	31-35	4	4
	36-40	4	4
	41-45	9	10
	46-50	7	8
	50 above	4	4
	Total	94	100
Sex	Male	21	22
	Female	73	78
	Total	94	100
Length of Service	< 1 Year	7	7
	1-2 Years	21	22
	3-4 Years	21	22
	5-above	45	49
	Total	94	100
Working Hospital	Bulacan Medical Center	40	43
	Sacred Heart Hospital	18	19
	Graman Medical and Maternity Hospital	15	17
	Mary Immaculate Maternity and General Hospital	5	5
	Santos General Hospital	5	5
	San Vicente Hospital	5	5
	Santissima Trinidad Hospital	3	3
	Romel Cruz Hospital	3	3

The age respondents of this study range from 21-55 years old with the mean age of 25, the majority of the respondents ranging from 21 to 25 years old, which is 49% of the total respondents, followed by 26-30 years old (21%), 41-45 (10%), 46-50 (8%) and the least age ranges are 31-35, 36-40, and > 50 with 4% each of the total respondents.

In terms of sex, most respondents were female with 73 or 78% of the total respondents, while the male respondents with 21 or 22% of the total respondents.

Most respondents have at least five years of service in a clinical laboratory with a percentage of 49% of the four criteria followed by 1-2 years and 3-4 years, both with 22% and < 1 year with 7%.

Regarding the type of hospital, most of the respondents were from the nine private hospitals with 57%, while in a public hospital with 43%. Still, they are considered as the most number of respondents in each institution with 40 respondents.

Table II. Comparison of the Practices when Respondents are Grouped According to Age

Practices	Age	Mean	p value	Sig
Before the Procedure	21-25	4.79 ± 0.30	0.077 > 0.05	NS
	26-30	4.96 ± 0.08		
	31-35	4.91 ± 0.19		
	36-40	4.97 ± 0.06		
	41-45	4.92 ± 0.17		
	46-50	4.98 ± 0.05		
	51-55	4.81 ± 0.22		
	Total	4.87 ± 0.24		
During the Procedure	21-25	4.85 ± 0.24	0.518 > 0.05	NS
	26-30	4.89 ± 0.24		
	31-35	4.75 ± 0.50		
	36-40	5.00 ± 0.00		
	41-45	4.95 ± 0.07		
	46-50	4.98 ± 0.05		
	51-55	4.86 ± 0.16		
	Total	4.88 ± 0.23		
After the Procedure	21-25	4.77 ± 0.39	0.370 > 0.05	NS
	26-30	4.90 ± 0.18		
	31-35	4.83 ± 035		
	36-40	5.00 ± 0.00		
	41-45	4.93 ± 0.09		
	46-50	4.97 ± 0.09		
	51-55	4.85 ± 0.19		
	Total	4.84 ± 0.31		
Overall	21-25	4.80 ± 0.24	0.129 > 0.05	NS
	26-30	4.92 ± 0.16		
	31-35	4.83 ± 0.34		
	36-40	4.99 ± 0.02		
	41-45	4.93 ± 0.10		
	46-50	4.98 ± 0.06		
	51-55	4.84 ± 0.19		
	Total	4.86 ± 0.21		

Table II presents that age has no significant difference with the sharp injury prevention practices having a p-value of 0.129, greater than the significance level (0.05). The result accepts the null hypothesis.

Table III. Comparison of the Factors Affecting the Compliance with the Grouped According to Age

Factors Affecting Level of Compliance	Age	Mean	p value	Sig
Policies	21-25	4.66 ± 0.50	0.222 > 0.05	NS
	26-30	4.87 ± 0.28		
	31-35	4.75 ± 0.50		
	36-40	5.00 ± 0.00		
	41-45	4.94 ± 0.17		
	46-50	4.91 ± 0.24		
	51-55	4.84 ± 0.19		
	Total	4.78 ± 0.41		
Education and Training	21-25	4.59 ± 0.47	0.026 < 0.05	S
	26-30	4.88 ± 0.27		
	31-35	4.75 ± 0.50		
	36-40	5.00 ± 0.00		
	41-45	4.85 ± 0.34		
	46-50	5.00 ± 0.00		
	51-55	4.58 ± 0.55		
	Total	4.73 ± 0.42		
Resources	21-25	4.77 ± 0.33	0.927 > 0.05	NS
	26-30	4.72 ± 0.65		
	31-35	4.70 ± 0.60		
	36-40	4.90 ± 0.20		
	41-45	4.89 ± 0.18		
	46-50	4.80 ± 0.26		
	51-55	4.90 ± 0.12		
	Total	4.78 ± 0.40		
Overall Compliance	21-25	4.71 ± 0.28	0.081 > 0.05	NS
	26-30	4.85 ± 0.24		
	31-35	4.76 ± 0.49		
	36-40	4.97 ± 0.05		
	41-45	4.90 ± 0.11		
	46-50	4.92 ± 0.08		
	51-55	4.79 ± 0.26		
	Total	4.79 ± 0.26		

Table III revealed a comparison of factors affecting compliance when the respondents are grouped according to age. It shows that age has a significant difference with education and training. The main reason for this is that old employees need further reinforcement and updates on preventing sharp injuries. On the other hand, some recent graduates believe that they have already received updated training in handling sharp objects since their collegiate year and can handle sharps properly.

It also shows that age has no significant difference with policies and resources, and the overall compliance having a p-value of 0.081, which is greater than the significance level of 0.05. The result accepts the null hypothesis.

Table IV. Comparison of the Practices when Respondents are Grouped According to Sex

Practices	Sex	Mean	p value	Sig
Before the Procedure	Male	4.70 ± 0.392	0.025 < 0.05	S
	Female	4.91 ± 0.147		
During the Procedure	Male	4.80 ± 0.280	0.083 > 0.05	NS
	Female	4.90 ± 0.213		
After the Procedure	Male	4.82 ± 0.344	0.661 > 0.05	NS
	Female	4.85 ± 0.297		
Overall	Male	4.77 ± 0.298	0.106 > 0.05	NS
	Female	4.89 ± 0.173		

Table IV showed a comparison of the practices of the respondents when they are grouped according to sex. The result showed that sex has a significant difference before the procedure of handling sharps. The result was supported by Engeda's (2017) study that presented female healthcare workers with a higher understanding of infection risk, making them more compliant than males.

It also shows that sex has no significant difference during the procedure, after the procedure, and the overall procedure having a p-value of 0.106, greater than the significance level of 0.05. The result accepts the null hypothesis

Table V. Comparison of the Factors Affecting the Compliance with the Grouped According to Sex

Factors Affecting Level of Compliance	Sex	Mean	p value	Sig
Policies	Male	4.71 ± 0.458	0.391 > 0.05	NS
	Female	4.80 ± 0.398		
Education and Training	Male	4.63 ± 0.431	0.201 > 0.05	NS
	Female	4.76 ± 0.415		
Resources	Male	4.75 ± 0.357	0.696 > 0.05	NS
	Female	4.79 ± 0.418		
Overall Compliance	Male	4.72 ± 0.277	0.152 > 0.05	NS
	Female	4.81 ± 0.258		

Table V described that sex has no significant relationship between policies, education, and resources, having a p-value greater than (0.05). The result depicts that it accepts the null hypothesis.

Table VI. Comparison of the Practices when Respondents are Grouped According to Length of Service

Practices	Length of Service	Mean	p value	Sig
Before the Procedure	0 & below	4.80 ± 0.330	0.030 < 0.05	S
	1-2 years	4.80 ± 0.245		
	3-4 years	4.79 ± 0.338		
	5 & above	4.94 ± 0.127		
	Total	4.87 ± 0.240		
During the Procedure	0 & below	4.82 ± 0.316	0.692 > 0.05	NS
	1-2 years	4.86 ± 0.275		
	3-4 years	4.86 ± 0.178		
	5 & above	4.91 ± 0.222		
	Total	4.88 ± 0.232		
After the Procedure	0 & below	4.81 ± 0.273	0.093 > 0.05	NS
	1-2 years	4.73 ± 0.522		
	3-4 years	4.80 ± 0.288		
	5 & above	4.92 ± 0.164		
	Total	4.84 ± 0.306		
Overall Procedure	0 & below	4.81 ± 0.258	0.061 > 0.05	NS
	1-2 years	4.80 ± 0.283		
	3-4 years	4.82 ± 0.194		
	5 & above	4.92 ± 0.155		
	Total	4.86 ± 0.211		

Table VI presented that respondents who have more than 5 yrs of clinical experience for the length of service are more compliant than those working only with less than five years. The result was supported by Beyamo, which shows that the longer you work in a certain institution, the more compliant a person will be.

It also shows that length of service has no significant difference during the procedure, after the procedure, and the overall compliance having a p-value of 0.061, which is greater than the significance level of 0.05. The result accepts the null hypothesis.

Table VII. Comparison of the Factors Affecting the Compliance with the Grouped According to Length of Service

Factors Affecting Level of Compliance	Length of Service	Mean	p value	Sig
Policies	0 & below	4.46 ± 0.644	0.006 < 0.05	S
	1-2 years	4.69 ± 0.398		
	3-4 years	4.66 ± 0.549		
	5 & above	4.92 ± 0.213		
	Total	4.78 ± 0.411		
Education and Training	0 & below	4.79 ± 0.329	0.005 < 0.05	S
	1-2 years	4.59 ± 0.433		
	3-4 years	4.54 ± 0.529		
	5 & above	4.88 ± 0.309		
	Total	4.73 ± 0.420		
Resources	0 & below	4.77 ± 0.243	0.266 > 0.05	NS
	1-2 years	4.66 ± 0.667		
	3-4 years	4.74 ± 0.347		
	5 & above	4.86 ± 0.255		
	Total	4.78 ± 0.404		
Overall Compliance	0 & below	4.71 ± 0.270	0.002 < 0.02	S
	1-2 years	4.68 ± 0.309		
	3-4 years	4.69 ± 0.289		
	5 & above	4.90 ± 0.182		
	Total	4.79 ± 0.264		

Table VII showed a comparison of factors affecting compliance when grouped according to the length of service. The result showed that respondents who have more than five years of clinical experience are more compliant than those working only with less than five years. The result was supported by Beyamo, which shows that the longer you work in a certain institution, the more compliant a person will be.

It also shows that years of service have no significant difference with resources having a p-value of 0.266, greater than the significance level of 0.05. However, the overall compliance shows a significant difference with a p-value of 0.002 less than the significance level of 0.05.

Table VIII. Comparison of the Practices when Respondents are Grouped According to Type of Hospital

Practices	Type of Hospital	Mean	p value	Sig
Before the Procedure	Private	4.79 ± 0.288	0.000 < 0.05	S
	Public	4.96 ± 0.86		
During the Procedure	Private	4.82 ± 0.264	0.001 < 0.05	S
	Public	4.96 ± 0.144		
After the Procedure	Private	4.77 ± 0.367	0.002 < 0.05	S
	Public	4.95 ± 0.148		
Overall Procedure	Private	4.79 ± 0.237	0.000 < 0.05	S
	Public	4.96 ± 0.118		

Table VIII showed the comparison of practices affecting compliance when grouped according to the type of hospital. The result shows that medical technologists who work from public hospitals were more compliant with the hospital's overall procedure than those working in private hospitals. This is because there can be more serious health cases in a large government hospital than in a secondary hospital.

The result was supported by Torrey (2020), stating that the tertiary level covers all types of diseases and has a bed capacity of 500 to 1000, while the secondary level can only provide emergency treatment and few surgical cases.

The overall procedure depicts significance with the type of hospital having a p-value of 0.000 less than the significance level of 0.05.

Table IX. Comparison of the Factors Affecting the Compliance with the Grouped According Type of Hospital

Factors Affecting Level of Compliance	Type of Hospital	Mean	p value	Sig
Policies	Private	4.62 ± 0.487	0.000 < 0.05	S
	Public	4.98 ± 0.70		
Education and Training	Private	4.56 ± 0.460	0.000 < 0.05	S
	Public	4.96 ± 0.199		
Resources	Private	4.71 ± 0.486	0.037 < 0.05	S
	Public	4.87 ± 0.230		
Overall Compliance	Private	4.67 ± 0.287	0.000 < 0.05	S
	Public	4.94 ± 0.105		

Table IX showed the comparison of factors affecting compliance when grouped according to the type of hospital. The result showed that there is a significant difference between the type of hospital and policies in terms of their practices. The result shows that those working in public hospitals believe that policies regarding sharp injury prevention must be followed for health worker safety and some working in private disagree with this. Even though they were not aware of the policies regarding health care safety in private hospitals, still, they were able to free themselves from

sharp injury prevention. Based on the result, they were already taught how to handle sharps properly during their collegiate year.

There is also a significant difference between the type of hospital and education and training. The results show that most of the workers in private hospitals have a clinical experience of less than five years. It implies that their belief in education and training provided by their hospital doesn't affect their compliance level. Based on the results, since most of them are fresh graduates, they believe they already have enough education and training during their collegiate years.

It can also show in this table that respondents who worked in a public hospital agreed that resources could affect the level of compliance. Based on the result, there are times when PPE's are lacking, and this happens because there are more patients in tertiary public hospitals than the private hospitals**.**

The overall compliance depicts significance with the type of hospital having a p-value of 0.000 less than the significance level of 0.05.

Table X. Level of Compliance of Medical Technologists in Prevention of Sharps Injuries Before a procedure

Before a procedure	Mean	Verbal Interpretation
1. Check's work environment for adequate lighting.	4.79 ± 0.437	Always Comply
2. Assesses adequacy of space in the work area.	4.80 ± 0.454	Always Comply
3. Organizes work area.	4.90 ± 0.296	Always Comply
4. Ensures sharp is always pointed away.	4.97 ± 0.177	Always Comply
5. Identifies location of sharps disposal container.	5.00 ± 0.000	Always Comply
6. Determines in advance where reusable sharps will be placed.	**4.80 ± 0.899**	**Always Comply**
7. Obtains assistance from other staff or a family member if uncooperative, combative and confused patient.	4.81± 0.554	Always Comply
8. Explains to patient importance of avoiding any sudden movement.	4.86 ± 0.430	Always Comply
Overall	4.87 ± 0.240	Always Comply

Table X showed the level of compliance of medical technologists in preventing sharp injuries before the procedure**.** It shows that all medical technologists always comply with sharps injury guidelines before handling sharps objects. In question number 6, which states, "Determines in advance where reusable sharps will be placed." It shows that even though most respondents determine in advance where reusable sharps trash bins will be placed, some don't comply, which is shown by its high standard deviation, which is 0.899. The result could prove Beyamo's (2019) study that years of service less than five years were not according to standard precautionary practices.

Table XI. Level of Compliance of Medical Technologists in Prevention of Sharps Injuries During a procedure

During a procedure	Mean	Verbal Interpretation
1. Maintains visual contact with procedure site and location of the sharp device.	4.93 ± 0.264	Always Comply
2. Aware of other staff in immediate environment, when handling an exposed sharp.	4.93 ± 0.302	Always Comply
3. Control's location of sharps.	4.94 ± 0.246	Always Comply
4. Avoids hand-passing exposed sharps.	4.96 ± 0.203	Always Comply
5. Uses pre-determined neutral zone or tray for placing and retrieving used needles.	4.84 ± 0.447	Always Comply
6. Avoids recapping used needles.	**4.67 ± 0.781**	**Always Comply**
7. Avoids hand-to-hand passing of needles during venipuncture procedure.	4.90 ± 0.330	Always Comply
Overall	4.88 ± 0.231	Always Comply

Table XI presented the level of compliance of medical technologists in preventing sharp injuries during the procedure. It shows that all medical technologists always comply with sharps injury guidelines during handling sharps objects. In question number 6, which states, "Avoids recapping used needles." However, the majority of our respondents follow the avoidance of recapping used needles. Some medical technologists don't comply with this guideline which is shown by its high standard deviation, which is 0.781. The result proves the study by Ibuna and Jabonete (2015) regarding the misconception that there is a need to recap or bend needles.

Table XII. Level of Compliance of Medical Technologists in Prevention of Sharps Injuries After a procedure

After a procedure	Mean	Verbal Interpretation
1. Inspects procedure trays, other surfaces for presence of sharps that may have been left inadvertently.	4.93 ± 0.302	Always Affect
2. Transport's reusable sharps in a closed container.	**4.74 ± 0.903**	**Always Comply**
3. Inspects sharps container for hazards.	4.91 ± 0.317	Always Comply
4. Ensures sharps container being used is large enough.	4.91 ± 0.317	Always Comply
5. Avoids bringing hands close to opening of a sharp container.	4.93 ± 0.302	Always Comply
6. Keeps hands off tubing with a needle upon disposal.	4.86 ± 0.598	Always Comply
7. Maintains control of tubing with a needle upon disposal.	4.83 ± 0.616	Always Comply
8. Makes sure safety box is not more than 3- quarter full.	4.69 ± 0.568	Always Comply
9. Uses forceps or tongs to remove any protruding devices.	4.89 ± 0.343	Always Comply
10. Inspects outside of waste container for protruding sharps.	4.94 ± 0.286	Always Comply
11. Keeps filled sharps containers awaiting final disposal in a secure area.	4.89 ± 0.401	Always Comply
12. Handles improperly disposed sharp and keeping hands behind the sharps at all times.	**4.77 ± 0.932**	**Always Comply**
13. Uses a mechanical device to pick up sharps.	**4.66 ± 0.741**	**Always Comply**
Overall	4.84 ± 0.306	Always Comply

Table XII revealed the level of compliance of medical technologists in preventing sharps injuries after the procedure. It shows that all medical technologists always comply with sharps injury guidelines after handling sharps objects. In question number 2, which states, "Transports reusable sharps in a closed container." the majority of the respondents were always compliant in transporting reusable sharps in a closed container. However, seven medical technologists stated that they are sometimes or never compliant, shown by their high standard deviation, which is 0.903. As stated in the sharps protocol of CDC, risks to sharp injury might occur when reusable sharps are not placed in a closed container during transport because of the possibility of spillage of contents.

Also, for question number 12, which states, "Handles improperly disposed sharp and keeping hands behind the sharps at all times," the medical technologists are compliant in handling improperly disposed sharp and keeping hands behind sharps. Still, some of them were sometimes and never compliant, which is also shown by their high standard deviation, which is 0.932. They are not compliant because they have less than five years of clinical experience, which is also supported by the study of Beyamo (2019).

Further, in question number 13, using a mechanical device to pick up sharps, most medical technologists are compliant. Still, some stated that they do not comply, which is shown by its high standard deviation of 0.741. One of the reasons is they only use gloves rather than mechanical devices such as forceps or tongs, and this was supported by the sharp safety plan of Oregon State University (2018). The results in the study of Tayaben (2015) also agree with our result, but in their case, some

nurses failed to perform the proper handling when it comes to picking up sharps.

Table XIII. Extent of policies and procedures as factors affecting compliance of medical technologists in sharps injury prevention guideline

Policies and Procedures	Mean	Verbal Interpretation
1. Organization's mission, vision, goals/or values reflect healthcare worker safety.	**4.70 ± 0.731**	**Always Affect**
2. Administration has strategies used to communicate importance of a safety environment.	4.80 ± 0.520	Always Affect
3. Administrative support like safety interventions.	4.76 ± 0.501	Always Affect
4. Organization has strategies to identify hazards in work environment.	4.80 ± 0.477	Always Affect
5. Records of incidents of sharps injuries.	4.76 ± 0.479	Always Affect
6. Reporting and dissemination of incidents of sharps injury.	4.85 ± 0.387	Always Affect
7. Specifies monitoring and improving prevention of sharps injury.	4.80 ± 0.454	Always Affect
8. Depicts application of sanctions of non-compliance of prevention of sharps injury.	4.76 ± 0.501	Always Affect
Overall	4.78 ± 0.411	Always Affect

Table XIII showed the extent of policies as factors affecting compliance of medical technologists in sharps injury prevention guidelines. The result shows an overall mean of 4.78 in which the policies as factors always affect the medical technologists in compliance with sharps injury prevention guidelines.

Table XIV. Extent of education and training as factors affecting compliance of medical technologists in sharps injury prevention guideline

Education and Training	Mean	Verbal Interpretation
1. Provision of training and updates specifically for medical technologist on prevention of sharps injury.	4.78 ± 0.467	Always Affect
2. Ensures healthcare personnel receives training and updates on prevention for sharps injury.	4.72 ± 0.537	Always Affect
3. Sharp's injury prevention incorporated into in-service presentation or department/ unit meeting discussions.	4.78 ± 0.444	Always Affect
4. Hands-on training receives by medical technologists specifically on handling of sharp device	4.76 ± 0.522	Always Affect
5. Availability of training supplies.	4.66 ± 0.597	Always Affect
6. Availability of trained personnel to conduct training on sharps injury prevention	4.69 ± 0.549	Always Affect
Overall	4.73 ± 0.420	Always Affect

Table XIV revealed the extent of education and training as factors affecting compliance of medical technologists in sharps injury prevention guidelines. The results showed that the education and training of medical technologists with an overall mean of 4.73 always affect the compliance of medical technologists on sharp injury prevention guidelines.

Table XV. Resources as factors affecting compliance of medical technologists in sharps injury prevention guideline

Resources	Mean	Verbal Interpretation
1. Adequate supplies (like gloves, masks, goggles).	4.80 ± 0.499	Always Affect
2. Available waste containers especially for sharp devices.	4.81 ± 0.470	Always Affect
3. Strategic placement of waste container in the area.	4.86 ± 0.430	Always Affect
4. Adequate staff or other members of health team.	**4.70 ± 0.731**	**Always Affect**
5. Availability of trained Infection Control Committee.	4.74 ± 0.638	Always Affect
Overall	4.78 ± 0.404	Always Affect

Table XV showed that resources as factors affecting the compliance of medical technologists in the prevention of sharp injuries. The result showed that the resources influence the compliance of medical technologists in the prevention of sharp injury. An overall mean of 4.78 means that the resources always affect the medical technologists' work to comply with the safety measures that prevent sharp injuries.

Table XVI. Relationship between the policies, education and training, and resources with the compliance of medical technologists.

		Policies	Education	Resources
Before the Procedure	p-value	<0.05	<0.05	<0.05
	Interpretation	Substantial	Low	Low
During the Procedure	p-value	<0.05	<0.05	<0.05
	Interpretation	Substantial	Low	Low
After the Procedure	p-value	>0.05	>0.05	>0.05
	Interpretation	Negligible	Negligible	Negligible
Overall	p-value	<0.05	<0.05	<0.05
	Interpretation	Low	Low	Low

Table XVI showed the relationship between the policies, education and training, and resources with the compliance of medical technologists. The result showed that the highest relationship is between before, during, and overall procedure with the policies. It was supported by Stum (2017) that policies are the written format of procedure, and the procedure is the steps your employees need to take to adhere to your policies. Therefore, medical technologists became compliant with the procedure of sharps protocol because they follow the procedure or steps written in the policies.

It is also shown that compliance of medical technologists after a procedure is insignificant to policies, education and training, and resources. Policies, education, and resources only affect before, during, and the overall procedure of medical technologist to sharps protocol. Some of the reasons why policies, education, and resources don't affect the compliance of medical technologists after a procedure is that; they believe that transport of sharps in a closed container to avoid spillage is not necessary. They also believe that they can handle the sharp objects without further position, which must be at the back of the sharps always, and lastly, they believe that picking up sharp objects using bare hands is enough. These might be the reason why sharp injuries still are very relevant up to now.

DISCUSSION

This study sought to determine the level of compliance and extent of factors affecting medical technologists to sharps injury prevention guidelines in public and private hospitals. The mean age of the respondents, which are the medical technologists, is 25. The majority of the respondents were female from the private hospital and had at least five years of service in a clinical laboratory. The study revealed that age has a significant difference with education. According to the results, the main reason for this is that old employees need further reinforcement and updates on preventing sharp injuries.

On the other hand, some recent graduates may believe that they have already received updated training in handling sharp objects since their collegiate year and capable of handling sharps properly. Sex also has a

significant difference before the procedure of handling sharps. The result was supported by Engeda's (2017) study that presented female healthcare workers have a higher understanding of infection risk, making them more compliant than males. For the length of service, respondents who have more than five years of clinical experience are more compliant than those working only with less than five years. The result also was supported by Beyamo, which shows that the longer you work in a certain institution, the more compliant a person will be. For the overall procedure of the type of hospital, based on the results, medical technologists who work from public hospitals were more compliant than those who were working in private hospitals. This is because there can be more serious health cases in a large government hospital than in a secondary level hospital. The result was supported by Torrey (2020), stating that the tertiary level covers all types of diseases and has a bed capacity of 500 to 1000, while the secondary level can only provide emergency treatment and few surgical cases.

Furthermore, there is also a significant difference between the type of hospital and policies. Since there are different policies in private and public hospitals, the result shows that those working in public hospitals believe that policies regarding sharp injury prevention must be implemented for health worker safety and some working in private disagree with this. The reason for this is even though they were not aware of the policies regarding health care safety in private hospitals, they were still able to free themselves from sharp injury prevention. Based on the result, they were already taught how to handle sharps properly during their collegiate year. Most of the workers in private hospitals have a clinical experience of less than five years. The result implies that their belief in education and training provided by their hospital doesn't affect their compliance level. Based on the results, since most of them are fresh graduates, they believe they already have enough education and training during their collegiate years. Respondents who worked in a public hospital agreed that resources could affect the level of compliance. Based on the result, there are times when PPEs are lacking, and this happens because there are more patients in tertiary public hospitals than the private hospitals.

Regarding the level of compliance with the guidelines on sharp injury prevention before the procedure, the study revealed that medical technologists always comply with sharps injury guidelines. However, in question number six, though most of our respondents determine in advance where reusable sharps trash bin will be placed, some medical technologists never comply, as shown in its high standard deviation. The result proves Beyamo (2019) study that years of service less than five years were not following standard precautionary practices. Another issue that is indicated in the result is the compliance of medical technologists during the procedure. The result shows that all medical technologists always comply with sharps injury guidelines during handling sharps objects; however, although most respondents follow the avoidance of recapping use needles, some medical technologists do not comply with this guideline. As shown from Ibuna and Jabonete's (2015) study, there is a misconception that there is a need to recap or bend needles after use. The OSHA policy strongly recommends that recapping of needles, in general, is not appropriate and must be placed in sharps disposal containers without recapping. In terms of medical technologists' compliance after handling sharps objects, the results show that the medical technologists are compliant, which is a good practice. Used needles and other sharps are dangerous to health care workers and the personnel involved in the disposal of the sharps container because they can spread bloodborne pathogens when they contact or penetrate the skin. The majority of respondents were always compliant in transporting reusable sharps in a closed container. However, seven medical technologists stated that they are sometimes or never compliant at all. As stated in the sharps protocol of CDC, risks to sharp injury might occur when reusable sharps are not placed in a closed container during transport because of the possibility of spillage of contents. Also, the medical technologists are compliant in handling improperly disposed sharp and keeping hands behind sharps at all times. Still, some of them were sometimes and never compliant at all. They are not compliant because they have less than five years of clinical experience, which is also supported by the study of Beyamo (2019).

Further, in using a mechanical device in picking up sharps, most medical technologists are compliant, but some stated that they do not comply. Possibilities might be they only use gloves rather than mechanical devices such as forceps or tongs, and this was supported by the sharp safety plan of Oregon State University (2018). The results in the study of Tayaben (2015) also agree with our result, but in their case, some nurses failed to perform the proper handling when it comes to picking up sharps. The study revealed that the medical technologists in both public and private hospitals are compliant before, during, and after handling sharp objects.

Moreover, for the significant relationship between the compliance of medical technologists in sharp protocol and the policies, education, training, and resources, it showed that the highest relationship is between before, during, and overall procedure with policies. According to Stum (2017), policies are the written format of procedure, and the procedure is the steps your employees must take to comply with your policies. As a result, medical technologists became compliant with the sharps protocol because they simply followed the procedure or steps outlined in the policies. It is also shown that compliance of medical technologists after a procedure is insignificant to policies, education and training, and resources. However, policies, education, and resources affect before, during, and the overall procedure of medical technologist to sharps protocol. Some of the

reasons why policies, education, and resources do not affect medical technologists' post-procedure compliance are as follows: first, they believe that transporting sharps in a closed container to avoid spillage is unnecessary. Second, they believe that picking up sharp objects with bare hands is sufficient, although they must always be at the back of the sharps. Lastly, they believe that picking up sharp objects with bare hands is sufficient, which is one reason why sharp injuries are still prevalent today.

CONCLUSIONS AND RECOMMENDATIONS

The medical technologists in the hospitals of Malolos, Bulacan, always comply with safe working practices before, during, and after the procedure of handling sharp objects. Factors such as policies, education, and resources significantly affect only before and during handling sharp objects. These findings concluded that these factors affect the overall compliance of medical technologists to sharp injury prevention guidelines. Therefore, policies and procedures, education and training, and resources should be addressed by hospitals and strictly implemented to prevent sharp injury. Without these, the compliance of medical technologists can be at stake.

ACKNOWLEDGMENTS

This research study would not be possible without the guidance and the help of several individuals who, in one way or another, contributed and extended their valuable assistance in the preparation and completion of this study.

First and foremost, our utmost appreciation to Penuel P. David, RPh, MSPh, Ph.D. Undergraduate Research adviser of 3rd-year Medical Technology students of Centro Escolar University Malolos Campus gave the golden opportunity to conduct this study and for her valuable support that helped the researchers finish.

The researchers would also like to express special thanks to their families who supported them morally and financially.

To the faculty who supported and guided the researchers throughout the whole research process.

To our statistician, Dr. Avelina Raqueno who guided us in our research data.

To all the chosen respondents for their full participation and cooperation wholeheartedly to make this research possible.

Last but not least, the one above all us, our God, for giving them motivation and strength to finish this study. Thank you so much, our dear God.

APPENDIX

Questionnaire

Table I. Level of compliance of medical technologists in the prevention of sharps injuries before a procedure.

1. Ensure availability of equipment and within arms reach.
2. Check the work environment for adequate lighting.
3. Assesses adequacy of space in the work area
4. Organizes work area
5. Ensures sharp is always pointed away.
6. Identifies the location of sharps disposal container
7. Determines in advance where reusable sharps will be placed.
8. Obtains assistance from other staff or a family member if uncooperative, combative, and confused patient
9. Explains to patients the importance of avoiding any sudden movement.

Table II. Level of compliance of medical technologists in the prevention of sharps injuries during a procedure.

1. Maintains visual contact with the procedure site and location of the sharp device.
2. Aware of other staff in an immediate environment when handling an exposed sharp.
3. Control location of sharps.
4. Avoids hand-passing exposed sharps
5. Uses pre-determined neutral zones or trays for placing and retrieving used needles.
6. Avoids recapping used needles.
7. Avoids hand-to-hand passing of needles during the venipuncture procedure

Table III. Level of compliance of medical technologists in the prevention of sharps injuries after a procedure.

1. Inspects procedure trays, other surfaces for the presence of sharps that may have been left inadvertently.
2. Transport reusable sharps in a closed container.
3. Inspects sharps container for hazards.
4. Ensures the sharps container being used is large enough.
5. Avoids bringing hands close to the opening of a sharp container.
6. Keeps hands off tubing with a needle upon disposal.
7. Keeps hands off tubing with a needle upon disposal.
8. Make sure the safety box is not more than 3- quarter full.
9. Uses forceps or tongs to remove any protruding devices.
10. Inspects outside of the waste container for protruding sharps
11. Keeps filled sharps containers awaiting final disposal in a secure area
12. Handles improperly disposed sharp and keeping hands behind the sharps at all times
13. Uses a mechanical device to pick up sharps.

Table IV. The extent of policies and procedures as factors affecting compliance of medical technologists in sharps injury prevention guidelines.

1. The organization's mission, vision, goals/or values reflect healthcare worker safety.
2. Administration has strategies used to communicate the importance of a safety environment.
3. Administrative support like safety interventions.
4. Organization has strategies to identify hazards in the work environment.
5. Organization has strategies to identify hazards in the work environment.
6. Reporting and dissemination of incidents of sharps injury
7. Specifies monitoring and improving prevention of sharps injury.
8. Depicts application of sanctions of non-compliance of prevention of sharps injury.

Table V. Extent of education and training as factors affecting compliance of medical technologists in sharps injury prevention guideline

1. Provision of training and updates specifically for medical technologists on prevention of sharps injury.
2. Ensures healthcare personnel receives training and updates on prevention for sharps injury.
3. Sharps injury prevention incorporated into in-service presentation or department/ unit meeting discussions.
4. Hands-on training received by medical technologists specifically on handling of sharp devices.
5. Availability of training supplies.
6. Availability of trained personnel to conduct training on sharps injury prevention.

Table VI. Resources as factors affecting compliance of medical technologists in the prevention of sharps injuries.

1. Adequate supplies (like gloves, masks, goggles).
2. Available waste containers, especially for sharp devices.
3. Strategic placement of waste container in the area
4. Adequate staff or other members of the health team.
5. Availability of trained Infection Control Committee

REFERENCES

1. Abdulmageed, S. et al. (2018). Assessment of occupational exposure to sharp injuries among healthcare workers in King Abdulaziz University Hospital. DOI: http://dx.doi.org/10.18203/2394 6040.ijcmph20181434
2. Abebe, A. et al., (2018, November). Prevalence of needlestick and sharp object injuries and its associated factors. BMC Res Notes. 2018; 11: 840. DOI: 10.1186/s13104-018-3930-4
3. Abebe Dilie, Desalegn Amare, Tenaw Gualu, "Occupational Exposure to Needle Stick and Sharp Injuries and Associated Factors among Health Care Workers in Awi Zone, Amhara Regional State, Northwest Ethiopia,201 6", Journal of Environmental and Public Health, vol. 2017, Article ID 2438713, 6 pages, 2017. https://doi.org/10.1155/2017/2438713
4. Archana LPA, Ashrof R, Meriton SA, Christina MP, Gladius JH. A cross-sectional study on needle stick and sharp injuries among health care providers in tertiary centers, Tamil Nadu. Int J Community Med Public Health 2018;5:982-6
5. Beyamo, A. et al. (2019, June). Compliance with standard precaution practices and associated factors among health care workers in Dawuro zone, south west Ethiopia, cross-sectional study. BMC Health Services Research. https://bmchealthservres.biomedcentralcom/articles/10.1186/s12913-019-4172-4
6. Centers for Disease and Control and Prevention (2008). Workbook for Designing, Implementing and Evaluating a Sharps Injury Prevention Program. https://www.cdc.gov/sharpssafety/part3TEXTONLY.html/?fbclid=IwAR2Tx4SHjgSpV7ziIG7tgSZGJaik3YN27BRUrPXpQ7XuXvul2K3C9FHFh0wA
7. Cooke, C. E., & Stephens, J. M. (2017). Clinical, economic, and humanistic burden of needlestick injuries in healthcare workers. Medical devices (Auckland, N.Z.), 10, 225–235. https://doi.org/10.2147/MDER.S140846
8. Cui, Z., Zhu, J., Zhang, X. et al. Sharp injuries: a cross-sectional study among health care workers in a provincial teaching hospital in China. Environ Health Prev Med 23, 2 (2018). https://doi.org/10.1186/s12199-017-0691-y Engeda, E. (2017, January). Compliance with standard precautions and associated factors among healthcare workers in Gondar University comprehensive specialized hospital, northwest Ethiopia. Publishing Open Access research journals & papers | Hindawi. https://www.hindawi.com/journals/jeph/2017/2050635/
9. Engeda, E. *C*ompliance with standard precautions and associated factors among healthcare workers in Gondar University comprehensive specialized hospital, northwest Ethiopia. Publishing Open Access research journals & papers | Hindawi. (2017). https://www.hindawi.com/journals/jeph/2017/2050635/
10. Gao, X., Hu, B., Suo, Y. et al. A large-scale survey on sharp injuries among hospital-based healthcare workers in China. Sci Rep 7, 42620 (2017). https://doi.org/10.1038/srep42620
11. Haselhort, K.et al., (2020) Bloodborne Pathogens: HBV, HCV and HIV Reporting ExposureIncidents.Doi: https://www.atrainceu.com/content/8-reporting-exposure-incidents?fbclid=IwAR2syZ9KL6aks7udXcS8Gt6_s2GYLetQeUyJdnP8wmRtCOCUv9d2jpZyw-0
12. Ibuna M. and Jabonete M. (2015). Needlestick and Sharps Injuries among Healthcare Workers in Military Hospitals. httpsnational-u.edu.ph/wp-content/uploads/2018 /07/JSTAR3-3_Needlestick-and-Sharps-Injuries-among-Healthcare-Workers-in-Military-Hospitals.pdf
13. Irving (2014). Policies and Procedures for Healthcare Organizations: A Risk Management Perspective. https://www.psqh.com/analysis/policies-and-

procedures-for-healthcare-organizations-a-risk-management-perspective/
14. Leahy (2019). The Importance Of Healthcare Policy And Procedures https://www.policymedical.com/importance-healthcare-policy-and-procedures/
15. Markovic-Denic, L. et al., (2015, January). Occupational exposure to blood and body fluid among healthcare workers in Serbia. https://www.karger.com/Article/FullText/368234
16. Matsubara, C. (2018). Prevalence and risk factors of needle stick and sharp injury among tertiary hospital workers, Vientiane, Lao PDR. https://doi.org/10.1539/joh.17-0084-FS
17. Motaarefi, H., Mahmoudi, H., Mohammadi, E., & Hasanpour-Dehkordi, A. (2016). Factors Associated with Needlestick Injuries in Health Care Occupations: A Systematic Review. Journal of clinical and diagnostic research: JCDR, 10(8), IE01–IE04. https://doi.org/10.7860/JCDR/2016/17973.8221
18. National University of Natural Medicine. (2018, May). Needlestick or Bloodborne pathogen exposure protocol. https://nunm.edu/security/reportincident/exposure-protocol/
19. Nouetchognou, J. et al., (2016, February). Accidental exposures to blood and body fluids among health care workers in a referral hospital of Cameroon. BMC Research Notes. https://bmcresnotes.biomedcentral.com/articles/10.1186/s13104-016-1923-8
20. Occupational Safety and Health Center (2015). NeedleStick and Sharps Injuries Among Healthcare Workers in Selected Level 3 Hospitals in Metro Manila.
21. Oregon State University. (2018, May). Sharps Safety Plan.
22. OR TODAY (2020, September). Sharps safety: Injuries remain a sticking point in 2020.https://ortoday.com/sharps-safety-injuries-remain-a-sticking-point-in-2020/.
23. Papadopoli, R. et. al., (2019, August). Sharps and needlestick injuries among medical residents and healthcare professional students: pattern and reporting in Italy-a cross-sectional analytical study. PubMed.
24. Pakowsa, A.G. et al. (2018). Circumstances and Structure of Occupational Sharp Injuries among Healthcare Workers of a Selected Hospital in Central Poland. https://doi.org/10.3390/ijerph15081722
25. Samargandy, S. A., Bukhari, L. M., Samargandy, S. A., Bahlas, R. S., Aldigs, E. K., Alawi, M. A., Al-Abdullah, N. A., & Madani, T. A. (2016). Epidemiology and clinical consequences of occupational exposure to blood and other body fluids in a university hospital in Saudi Arabia. Saudi medical journal, 37(7), 783–790. https://doi.org/10.15537/smj.2016.7.14261
26. Stum, L. (2017). Seven Reasons People Don't Read Instructions. Learning Stream. https://www.learningstream.com/2017/11/01/people-dontread instructions/?fbclid=IwAR17DpFvfx7M4TxCE8ZBfDNINN7WwW21bwhot7Vj5hYOMeT0zkaVOoSawzE
27. Tawiah, P. et al., (2020, June). Occupational exposure to blood and body fluids among medical laboratory science students of the University of Health and Allied sciences during vocational internship in the Volta region of Ghana. ResearchGate. https://www.researchgate.net/publication/341787888_Occupational_Exposure_to_Blood_and_Body_Fluids_among_Medical_Laboratory_Science_Students_of_Ghana
28. Tayaben J. (2015). Compliance with sharps injury prevention guideline among nurses in tertiary care hospitals in the Philippines. International Journal of Infection Control. ISSN 1996-9783. DOI: 10.3396/IJIC.v11i2.015.15
29. WHO guidelines on drawing blood: Best practices in phlebotomy. (2010). World Health Organization. https://www.who.int/infectionprevention publications/drawing_blood_best/en/
30. Yi, Y. et al., (2018, September 26). Assessment of adherence behaviors for the self-reporting of occupational exposure to blood and body fluids among registered nurses: A cross-sectional study. PLOS. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0202069
31. Zadi Akhuleh O, Nasiri E, Heidari M, Bazari Z. Frequency of sharp injuries and its related factors among high-risk wards staff. J Nurs Midwifery Sci [serial online] 2019 [cited 2020 Dec 26]; 6:204-9. https://www.jnmsjournal.org/text.asp?2019/6/4/204/266127A cross-sectional study on needle stick and sharp injuries among health care providers in tertiary centers, Tamil Nadu.
32. Zeb, A. (2019, August 22). Factors affecting nurses' compliance to standard precautions in resource-scarce settings. Biomedgrid.https://biomedgrid.com/fulltext/volume4/factors-affecting-nurses-compliance-to-standard-precautions-in-resource-settings.
33. Zenbaba, D. et. al., (2020, January). Prevalence and factors associated with needlestick injuries and splash with blood and body fluids among healthcare workers in hospitals of bale zone, southeast Ethiopia. Ethiopian Medical Journal. https://emjema.org/index.php/EMJ/article/view/1167.