

## Embracing New Normal in Handling Surgical Cases

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### ABSTRACT

Due to COVID-19 pandemic discovered in Wuhan China in December of 2019, the Operating Room has abruptly transformed and cope up with the new normal to accommodate the needs in continuing surgical procedures. The research aimed to determine the changes that occurred in the practices in handling surgical cases before to during pandemic, identify the problems encountered in terms of safety, infection control, communication and management, and to create a practice-based guideline based on the identified problems. This study utilized concurrent triangulation mixed method design with a total population of 100 Operating Room Nurses of Private Tertiary Hospitals in Batangas. The quantitative data generated in this study through a self-report questionnaire suggest a statistically significant improvement in the practices in handling surgical cases before and during pandemic with a p value of 0.000 on the Pre-operative, Intra-Operative and Post-operative phases. The researcher was able to formulate an Operating Room Model of Metamorphosis derived from the qualitative data analysis using thematic analysis which can be utilized to further assess if there are changes in the protocols or guidelines that needs to be facilitated in the unit to match with the phase of the current situation. Therefore, a tailored fit guidelines or protocol can be coined and applied appropriately to the Operating Room. With the synthesis of both quantitative and qualitative data, the researcher arrived at a recommended guideline to further improve the practices in handling surgical cases in this pandemic time and for sustainability that can be applied in the hospitals within the community.

The lessons that were learned from the COVID-19 pandemic shall lead to new strategies for a substantial rearrangement of the routine in surgical practice, ensuring quality standards and preserving safety for both health workers and the patients, thus embracing the new normal.

**Keyword:** *New Normal, Operating Room, Operating Room Model of Metamorphosis, Surgical Practice.*

### 1. INTRODUCTION

In relation to the continuous rapid rise of COVID-19 cases all over the globe, the health workers are going the extra mile in implementing extra safety precautions such as maintaining social distance, online booking and consultation for surgeries, implementing additional safety protocols to keep the environment safe and some are using UV lights to keep the area / ORs sanitized well in order to continue delivering health services towards the mass people especially to those patients for surgeries. In regards to this, perioperative staff also rapidly embraced different new practices before and after undergoing a surgical procedure.

In December 2019, the outbreak of a highly contagious disease pathogen SARS CoV-2, known as COVID-19 infection was identified in Wuhan, China. COVID-19 has spread rapidly across the globe infecting over 28 million people with reported deaths of over 900,000 (WHO September 2020).

In Lipa City, according Lipa City Health Office, there has been 102 health workers tested positive in COVID-19 from March 2020 to January of 2021. Meanwhile, according to an article released by San Juan and France-Presse (2020) at Philippine Star Global with the association of the Department of Health (DOH), the DOH announced that a sum of 1, 336 medical workers in the Philippines have tested positive for the Coronavirus disease 2019 (COVID-19). Moreover, worldwide, nearly 300,000 healthcare workers as of November 2020 have been infected by the COVID-19 and is threat in the healthcare system according to Haseltine, W. (2020).

Initially, all scheduled operations were cancelled to free up hospital beds for the growing number of COVID-19 infected individuals. While everyone is coping with the situation and accommodating those who were infected by the virus and those that are subject for emergency surgery, there was a realization that continuity of care for elective cases should not be taken

for granted provided that extreme precautions and strict infection control measures are being observed. Hospital-acquired infections are one of the most crucial recognized problems that affect the quality of healthcare professionals and are the primary cause of negative impact towards the health of our healthcare professionals and their patients as well. The weight of responsibility in producing effective infection control practices is on the hospital staff specially the nurses involved inside the operating rooms and infection control nurses of every hospital to recognize shortcomings and risk zones inside their clinics or hospitals, not exclusively to improve persistent wellbeing, however to obstruct any monetary punishments Medicare may force on their associations in the months and years ahead.

Since numerous nations are facilitating their monetary and social limitations because of the COVID-19 pandemic, there's a great deal of discussion about the "New Normal". Means as long as the world has not discovered a fix or an immunization for COVID-19, we may need to acclimate to "new normal", which means another method of living and approaching our lives, work and cooperation with others. Numerous illnesses brought about by infections have no fix right up 'til the present time, not even the normal virus. There are no antibodies for some infections either. In any case, we have figured out how to adjust our ways of life to live with them. Take a gander at HIV (human immunodeficiency infection). It has been around since the 1980s, and potentially even before at that point, despite the fact that it is not as inescapable. We actually have not discovered an antibody for it. In contrast to HIV, COVID-19 is much more infectious and irresistible, and isn't generally connected with a specific way of life. Subsequently, our degree of transformation and the progressions we need to make in our lives is a lot higher. These transformations and changes are considered our "new normal", Embracing the new normal strategy is crucial for us to be able to cope up well and continue living just like before but with a great application of high standards safety measure for our health and to the betterment of not just our country but all over the globe as well.

The researcher, as one of the Perioperative Nurses, is intent to be acquainted with the changes that occurred in the practices of perioperative nurses inside the operating room towards the surgery patients that they handle. The researcher proposed this study to discuss the old and new safety strategies in handling perioperative patients to better determine the most crucial importance of it and to further produce a more effective and practiced based guidelines for healthcare professionals to deliver better care services to their perioperative patients diligently.

## **2. METHODS AND METHODOLOGY**

### **Research Design**

Both quantitative and qualitative research design is utilized in this study. "Polit, 2017 [2]". First, Quantitative, descriptive methodology through the identification of practices of the healthcare workers before pandemic and practices of healthcare workers during pandemic. The use of a survey questionnaire was utilized. Second, Qualitative methodology is used to uncover the changes that occurred in the operating room as experienced by the healthcare workers, how were they able to cope up with the changes, nurses' encountered challenges, and their recommendation to further improvement supported the data gathered primarily in quantitative phase.

Concurrent Triangulation was utilized by the research as data collection. Both Quantitative and Qualitative were conducted and analyzed at the same time. The purpose of this type of investigation is to validate the findings generated by each method through evidence produced by the other. "Creswell 2003 [3]".

### **Setting and Participants**

This study is conducted initially in private tertiary hospitals in Lipa City. However, due to limited respondents the researcher has decided to extend the coverage of the research to private tertiary hospitals in Batangas. Total population sampling was used in the data gathering. A total of 100 operating room nurses participated in the study from 8 Private Tertiary Hospitals in Batangas with a retrieval rate of 98%. A letter of approval was presented first to the Chief Nurses and Hospital Administrator together with the research title, objectives, and sample questionnaire prior to handing over to the respective respondents. Operating room nurses of the above-mentioned hospitals were briefed with the purpose of the research and explained with the data privacy and have them signed the consent prior to taking the survey.

### **Data Gathering Instrument**

A self-report questionnaire and an interview guide question is applied in this study. The Part 1 and Part 2 of the questionnaire was inspired by the Perioperative Registered Nurses Association of the Philippines Inc., Recommended Guidelines on Perioperative Nursing Management during COVID-19 Pandemic and have undergone pilot testing prior to distribution; Part 1 Questions: Practices in handling surgical case before pandemic Cronbach Alpha score of 0.815 in pre-operative phase, 0.790 in Intra-operative phase and 0.759 in post-operative. Part 2 Questions: Practices in handling surgical cases during pandemic has Cronbach Alpha scores of 0.881 in pre-operative phase, 0.903 in Intra-operative phase and 0.921 in post-operative phase. The questionnaire included: 1. Practices of healthcare workers who are handling surgical cases prior to pandemic based on the standard perioperative protocol; 2. Practices of healthcare workers who are handling surgical cases during this pandemic based on the institutional perioperative protocol; and 3. Author-designed questions. Open-ended

questions are carried out to gather qualitative data.

### Data Collection Procedures

#### *Quantitative Phase*

The first phase of data gathering is collected through survey questionnaire distributed initially to operating room nurses of private tertiary hospitals within Lipa City. However, due to limited participants, the researcher opted to have the questionnaire distributed to operating room nurses of Tertiary Hospital within Batangas.

Purposive Sampling, particularly total population was utilized by the researcher in this study. A total of 100 respondents participated in taking the survey questionnaire with a retrieval rate of 98%. The participants were informed of the purpose of the study and were handed over with a hard copy of the questionnaire which included their practices in handling surgical cases before and during the pandemic. The results were precisely encoded, summarized, and was then analyzed.

Questionnaires were distributed towards the end of January 2021. Responses were collected immediately until the first week of March 2021. Data collection was affected greatly by shifting duties of respondents, skeletal workforce implementation, vacation/ leaves, sick leaves i.e., quarantine, and the pandemic precautions.

#### *Qualitative Phase*

Purposive sampling was utilized in the qualitative phase of this study. All the answers of the participants in the interview guide questions were encoded and tabulated and was then subjected to analyzation using thematic analysis.

Data gathering began after thorough explanation about the research ethical considerations to the participants and securing their consent.

The collection of data was challenged by the current global health issue wherein interview was initially planned to be collected through a recorded video call interviews but as the situation improved, face to face interview while observing strict social distancing guidelines is conducted. However, the current situation did not permit the researcher to do the above mentioned and opted to include the interview guide questions to the survey questionnaire itself wherein the respondents were able to freely answer the questions.

### Data Analysis

Data is encoded and entered by using Statistical Package for Sciences (SPSS 26). A descriptive statistic is used to analyze the data obtained from the participants about their practices in handling surgical cases before and during pandemic. T-Test, an appropriate statistical tool that is used to compare the means of two group “Bevans 2020 [4]”, is utilized to analyze the survey results.

Recorded answers to the interview guide questions were tabulated and carefully analyzed using thematic analysis.

### Ethical Consideration

The first step to conduct the study is to obtain an approval from the research instrument proponent, nursing school, and nursing administration and research ethical committee. Nurses who participated in this research has received an explanation of the purpose of this study. The participants were informed that they have the right to choose not to complete and to exit from the study if they decide to. In addition, nurses involved in this study was provided with an official consent and the anonymity and confidentiality was ensured for all the participants.

## 3. RESULTS

The findings of this study show the quantitative results. The results are integrated and presented in accordance with the research questions.

**Table 1.1. Practices of Health Workers in Handling Surgical Cases before Pandemic in terms of Pre-Operative Phase**

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Perioperative nurses must have a proper orientation and training on proper donning and doffing of PPEs, including areas of such procedures.	1.08	Not Practiced	19
2. Infection prevention & control protocols are strictly implemented and monitored (e.g., wearing of mask, social distancing, and proper hygiene).	1.20	Not Practiced	8

3. Perioperative nurses are provided with correct information on timely reporting and contact tracing which are to be reported to the authorized personnel.	1.15	Not Practiced	14
4. Only trained intra-operative nurses are at the OR to ensure efficiency and effectiveness, thus maintaining the smoothness of the procedure to minimize operative duration and potential undue exposure.	1.26	Not Practiced	4
5. Inventory of PPEs is monitored strictly and the staff are made aware of any deficiencies and shortages.	1.21	Not Practiced	7
6. Surgical team uses PPEs according to the Risk Stratification COVID 19-transmission.	1.11	Not Practiced	15
7. Use of Negative pressure in the Operating Room is being observed every time there is an ongoing aerosolized procedure.	1.16	Not Practiced	12
8. There is a designated Isolation OR for Suspected and Confirmed Positive Patients.	1.11	Not Practiced	15
9. Turnaround time of each procedure is taken into consideration, expecting no less than 1 hour for cleaning and disinfection. Hence, terminal cleaning and disinfection process are accounted for in the schedule to avoid overlap.	1.20	Not Practiced	8
10. Communication and coordination with the surgical team members is vital to the efficiency of the OR.	1.39	Not Practiced	1
11. Perioperative nurse prepares the surgical-related equipment/machines/supplies in advance to minimize movements during the operation.	1.27	Not Practiced	3
12. Ideally, disposable supplies and equipment are used for COVID confirmed patients. If this cannot be avoided, proper cleaning and disinfection is paramount to ensure safety of succeeding cases.	1.16	Not Practiced	12
13. Patients are tested for Covid-19 prior to any procedure.	1.09	Not Practiced	18
14. If patient is exhibiting symptoms, Infectious Disease consultation is a must before the procedure is to take place.	1.18	Not Practiced	11
15. Informed consent contains possible risk of hospital- acquired COVID 19 infection during the hospital stay.	1.20	Not Practiced	8
16. Surgical team members are tested for Covid-19 members prior to surgical procedure.	1.26	Not Practiced	4
17. All members of the surgical team are screened for COVID symptoms and exposure, including body temperature prior to donning.	1.26	Not Practiced	4
18. The surgical team is in PPE-based risk stratification before the patient is brought into the suite.	1.10	Not Practiced	17
19. Planning and mapping of OR rooms to be used during procedures in the restricted areas should be communicated to the team.	1.28	Not Practiced	2
<b>Composite Mean</b>	<b>1.19</b>	<b>Not Practiced</b>	

Legend: 3.50 – 4.00 = Highly Practiced; 2.50 – 3.49 = Practiced; 1.50 – 2.49 = Moderately Practiced; 1.00 – 1.49 = Not Practiced

**Table 1.2. Practices of Health Workers in Handling Surgical Cases before Pandemic in terms of Intra-Operative Phase**

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. All known or suspected COVID-19 positive patients requiring surgical intervention are treated as positive until proven otherwise in order to minimize infection spread.	1.11	Not Practiced	11
2. Designated COVID operating areas are allocated to COVID patients' urgent/emergent procedures.	1.08	Not Practiced	12
3. All staff are specifically trained to don, doff, and dispose of personal protection equipment (PPE). Staff are oriented on the proper designated areas for donning and doffing procedure.	1.14	Not Practiced	10
4. Handing-off or endorsement of patient from Covid-19 Unit/Ward to Perioperative Unit are done via telephone.	1.31	Not Practiced	2
5. The post-operative destination of the patient is already determined and made known to the Unit to avoid delays in transports. Dedicated equipment for COVID-19 confirmed patients is identified (e.g., transport ventilators, stretchers, wheelchairs, incubators).	1.20	Not Practiced	7.5
6. Surgical instrument sets, packs, essential items, and supplies shall be opened and covered with sterile drape before anesthesia induction.	1.27	Not Practiced	5
7. The number of the surgical team and equipment inside the Operating Suite is minimized. Once the procedure is ongoing, the team makes all efforts to use what is available inside the OR suite to minimize foot traffic and prevent cross contamination.	1.28	Not Practiced	4
8. The Time Out Process (WHO Surgical Safety Checklist) must be performed. No member of the surgical team shall go outside the OR suite. If one must leave the OR suite, he/she shall remove the PPE at the doffing area and don a new set of PPEs before going back to the OR suite.	1.20	Not Practiced	7.5
9. The OR door is kept closed at all times. Personnel present in the OR during surgery must not leave the room. There is a "runner" nurse outside the OR suite who will attend to the needs of the surgical team and will be responsible for the documentation of the whole procedure.	1.24	Not Practiced	6
10. Smoke evacuator when electrocautery is being used and available.	1.32	Not Practiced	1
11. Soiled and pre-cleaned instruments are placed in a yellow plastic bag and proceed to designated area of decontamination.	1.31	Not Practiced	2
12. All unused supplies and drugs brought inside the OR are discarded. Exposed equipment and machine which remain inside the OR shall undergo disinfection using UV light or chemical disinfection.	1.17	Not Practiced	9
13. A physical barrier between the incubator and the patient is used to minimize exposure. An "aerosol box", consisting of a transparent acrylic box has been widely adapted for use in various ORs around the world, effectively shields a health provider's face from patient's airway.	1.08	Not Practiced	12
<b>Composite Mean</b>	<b>1.21</b>	<b>Not Practiced</b>	

Legend: 3.50 – 4.00 = Highly Practiced; 2.50 – 3.49 = Practiced; 1.50 – 2.49 = Moderately Practiced; 1.00 – 1.49 = Not Practiced

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**Table 1.3. Practices of Health Workers in Handling Surgical Cases before Pandemic in terms of Post - Operative Phase**

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. PPE is properly removed and disposed of outside the OR in the dedicated doffing area. It is during breaks in the doffing process that a health care worker could get infected.	1.08	Not Practiced	9
2. After surgery, the patient can either stay in a dedicated PACU for COVID-19 cases, or remain inside the theater for post-anesthetic care until safe transport to the regular unit is assured.	1.16	Not Practiced	6
3. Once the room is vacated, meticulous environmental sanitation is being performed	1.21	Not Practiced	4
4. The hospital has a step-by-step, well-defined path pre-allocating some corridors and elevators to COVID-19 patients.	1.24	Not Practiced	1
5. Transport personnel use the same route/path from transport origin to destination.	1.22	Not Practiced	3
6. The hospital also instructs the housekeeping services to sanitize the path/route of the infected patient.	1.19	Not Practiced	5
7. The transport personnel sanitize hands before donning of new PPEs, (wear a surgical mask, disposable waterproof gloves, disposable cap, and shoe covers) during transport and minimize contact with other patients.	1.12	Not Practiced	8
8. Transport personnel will doff and do hand hygiene after endorsement in the ward/ICU and the bed use for transport must be sanitized before going back to point of origin.	1.13	Not Practiced	7
9. The perioperative nurse strictly implements infection control measures like using face mask at times, hand hygiene.	1.23	Not Practiced	2
<b>Composite Mean</b>	<b>1.18</b>	Not Practiced	

Legend: 3.50 – 4.00 = Highly Practiced; 2.50 – 3.49 = Practiced; 1.50 – 2.49 = Moderately Practiced; 1.00 – 1.49 = Not Practiced

**Table 1.4. Summary Table on the Practices of Health Workers in Handling Surgical Cases before Pandemic**

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Pre-Operative Phase	1.19	Not Practiced	2
2. Intra-Operative Phase	1.21	Not Practiced	1
3. Post - Operative Phase	1.18	Not Practiced	3
<b>Composite Mean</b>	<b>1.19</b>	<b>Not Practiced</b>	

Legend: 3.50 – 4.00 = Highly Practiced; 2.50 – 3.49 = Practiced; 1.50 – 2.49 = Moderately Practiced; 1.00 – 1.49 = Not Practiced

**Table 2.1. Practices of Health Workers in Handling Surgical Cases During Pandemic in terms of Pre-Operative Phase**

Indicators	Weighted	Verbal	Rank
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	Mean	Interpretation	
1. Perioperative nurses must have a proper orientation and training on proper donning and doffing of PPEs, including areas of such procedures.	3.92	Highly Practiced	2
2. Infection prevention & control protocols are strictly implemented and monitored (e.g., wearing of mask, social distancing, and proper hygiene).	3.92	Highly Practiced	2
3. Perioperative nurses are provided with correct information on timely reporting and contact tracing which are to be reported to the authorized personnel.	3.81	Highly Practiced	10
4. Only trained intra-operative nurses are at the OR to ensure efficiency and effectiveness, thus maintaining the smoothness of the procedure to minimize operative duration and potential undue exposure.	3.90	Highly Practiced	4
5. Inventory of PPEs is monitored strictly and the staff are made aware of any deficiencies and shortages.	3.74	Highly Practiced	15
6. Surgical team uses PPEs according to the Risk Stratification COVID-19 transmission.	3.81	Highly Practiced	10
7. Use of Negative pressure in the Operating Room is being observed every time there is an ongoing aerosolized procedure.	3.60	Highly Practiced	17
8. There is a designated Isolation OR for Suspected and Confirmed Positive Patients.	3.79	Highly Practiced	13
9. Turnaround time of each procedure is taken into consideration, expecting no less than 1 hour for cleaning and disinfection. Hence, terminal cleaning and disinfection process are accounted for in the schedule to avoid overlap.	3.77	Highly Practiced	14
10. Communication and coordination with the surgical team members is vital to the efficiency of the OR.	3.92	Highly Practiced	2
11. Perioperative nurse prepares the surgical-related equipment/machines/ supplies in advance to minimize movements during the operation.	3.88	Highly Practiced	7
12. Ideally, disposable supplies and equipment are used for COVID-19 confirmed patients. If this cannot be avoided, proper cleaning and disinfection is paramount to ensure safety of succeeding cases.	3.90	Highly Practiced	4
13. Patients are tested for COVID-19 prior to any procedure.	3.89	Highly Practiced	6
14. If patient is exhibiting symptoms, Infectious Disease consultation is a must before the procedure is to take place.	3.86	Highly Practiced	8
15. Informed consent contains possible risk of hospital- acquired COVID-19 infection during the hospital stay.	3.69	Highly Practiced	16
16. Surgical team members are tested for Covid-19 members prior to surgical procedure.	3.46	Highly Practiced	19
17. All members of the surgical team are screened for COVID-19 symptoms and exposure, including body temperature prior to donning.	3.59	Highly Practiced	18
18. The surgical team is in PPE-based risk stratification before the patient is brought into the suite.	3.81	Highly Practiced	10
19. Planning and mapping of OR rooms to be used during procedures in the restricted areas should be communicated to the team.	3.85	Highly Practiced	9
<b>Composite Mean</b>	<b>3.80</b>	<b>Highly Practiced</b>	

Legend: 3.50 – 4.00 = Highly Practiced; 2.50 – 3.49 = Practiced; 1.50 – 2.49 = Moderately Practiced; 1.00 – 1.49 = Not Practiced

**Table 2.2. Practices of Health Workers in Handling Surgical Cases During Pandemic in terms of Intra-Operative Phase**

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. All known or suspected COVID-19 positive patients requiring surgical intervention are treated as positive until proven otherwise in order to minimize infection spread.	3.93	Highly Practiced	2
2. Designated COVID-19 operating areas are allocated to COVID-19 patients' urgent/emergent procedures.	3.95	Highly Practiced	1
3. All staff are specifically trained to don, doff, and dispose of personal protection equipment (PPE). Staff are oriented on the proper designated areas for donning and doffing procedure.	3.88	Highly Practiced	5
4. Handing-off or endorsement of patient from COVID-19 Unit/Ward to Perioperative Unit are done via telephone.	3.55	Highly Practiced	13
5. The post-operative destination of the patient is already determined and made known to the Unit to avoid delays in transports. Dedicated equipment for COVID-19 confirmed patients is identified (e.g., transport ventilators, stretchers, wheelchairs, incubators).	3.91	Highly Practiced	3
6. Surgical instrument sets, packs, essential items, and supplies shall be opened and covered with sterile drape before anesthesia induction.	3.87	Highly Practiced	6
7. The number of the surgical team and equipment inside the Operating Suite is minimized. Once the procedure is ongoing, the team makes all efforts to use what is available inside the OR suite to minimize foot traffic and prevent cross contamination.	3.90	Highly Practiced	4
8. The Time Out Process (WHO Surgical Safety Checklist) must be performed. No member of the surgical team shall go outside the OR suite. If one must leave the OR suite, he/she shall remove the PPE at the doffing area and don a new set of PPEs before going back to the OR suite.	3.75	Highly Practiced	11
9. The OR door is kept closed at all times. Personnel present in the OR during surgery must not leave the room. There is a "runner" nurse outside the OR suite who will attend to the needs of the surgical team and will be responsible for the documentation of the whole procedure.	3.80	Highly Practiced	8
10. Smoke evacuator when electrocautery is being used and available.	3.72	Highly Practiced	12
11. Soiled and pre-cleaned instruments are placed in a yellow plastic bag and proceed to designated area of decontamination.	3.84	Highly Practiced	7
12. All unused supplies and drugs brought inside the OR are discarded. Exposed equipment and machine which remain inside the OR shall undergo disinfection using UV light or chemical disinfection.	3.76	Highly Practiced	10
13. A physical barrier between the incubator and the patient is used to minimize exposure. An "aerosol box", consisting of a transparent acrylic box has been widely adapted for use in various ORs around the world, effectively shields a health provider's face from patient's airway.	3.77	Highly Practiced	9
<b>Composite Mean</b>	<b>3.82</b>	<b>Highly Practiced</b>	



Legend: 3.50 – 4.00 = Highly Practiced; 2.50 – 3.49 = Practiced; 1.50 – 2.49 = Moderately Practiced; 1.00 – 1.49 = Not Practiced

**Table 2.3. Practices of Health Workers in Handling Surgical Cases During Pandemic in terms of Post – Operative Phase**

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. PPE is properly removed and disposed of outside the OR in the dedicated doffing area. It is during breaks in the doffing process that a health care worker could get infected.	3.87	Highly Practiced	4
2. After surgery, the patient can either stay in a dedicated PACU for COVID-19 cases, or remain inside the theater for post-anesthetic care until safe transport to the regular unit is assured.	3.87	Highly Practiced	4
3. Once the room is vacated, meticulous environmental sanitation is being performed	3.91	Highly Practiced	1
4. The hospital has a step-by-step, well-defined path pre-allocating some corridors and elevators to COVID-19 patients.	3.78	Highly Practiced	9
5. Transport personnel use the same route/path from transport origin to destination.	3.81	Highly Practiced	7.5
6. The hospital also instructs the housekeeping services to sanitize the path/route of the infected patient.	3.85	Highly Practiced	6
7. The transport personnel sanitize hands before donning of new PPEs, (wear a surgical mask, disposable waterproof gloves, disposable cap, and shoe covers) during transport and minimize contact with other patients.	3.81	Highly Practiced	7.5
8. Transport personnel will doff and do hand hygiene after endorsement in the ward/ICU and the bed use for transport must be sanitized before going back to point of origin.	3.88	Highly Practiced	2
9. The perioperative nurse strictly implements infection control measures like using face mask at times, hand hygiene.	3.88	Highly Practiced	2
<b>Composite Mean</b>	<b>3.85</b>	<b>Highly Practiced</b>	

Legend: 3.50 – 4.00 = Highly Practiced; 2.50 – 3.49 = Practiced; 1.50 – 2.49 = Moderately Practiced; 1.00 – 1.49 = Not Practiced

**Table 2.4. Summary Table on the Practices of Health Workers in Handling Surgical Cases During Pandemic**

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Pre-Operative Phase	3.80	Highly Aware	3
2. Intra-Operative Phase	3.82	Highly Aware	2
3. Post – Operative Phase	3.85	Highly Aware	1
<b>Composite Mean</b>	<b>3.82</b>	<b>Highly Aware</b>	

Legend: 3.50 – 4.00 = Highly Aware; 2.50 – 3.49 = Aware; 1.50 – 2.49 = Moderately Aware; 1.00 – 1.49 = Not Aware

**Table 3. Comparison of Practices of Health Workers in Handling Surgical Cases Before and During Pandemic**

		Mean	t-value	p-value	Interpretation
Pre-Operative Phase	Before	1.19	56.98	0.000	Highly Significant
	During	3.80			
Intra-Operative Phase	Before	1.21	48.18	0.000	Highly Significant
	During	3.82			
Post-Operative Phase	Before	1.18	50.84	0.000	Highly Significant
	During	3.85			

Legend: Significant at p-value < 0.05

#### 4. DISCUSSION

**Table 1.1** present the practices of health workers in handling surgical cases before pandemic in terms of pre-operative phase. The composite mean of 1.19 indicates that the respondents are not aware on the above indicators. All items were assessed as not practiced. The results show that the above practices are not being observed back when the COVID-19 pandemic is not yet being discovered. On the least rank (1st), with a weighted mean of 1.08 indicates that the perioperative nurses are not likely having proper orientation and training on proper donning and doffing of PPEs including the areas to which it should be used before pandemic. It was observed by the researcher that prior to pandemic, the operating room nurses are only used to don gloves, wear a regular face mask and sterile gowns. Second to the least is patients are tested for COVID-19 prior to any procedure getting a weighted mean of 1.09 before pandemic. Testing for COVID-19 has not been implemented back then, only until few months after the virus being discovered in Wuhan China in December of 2020. In one of the institutions in Lipa City, their standard pre-operative test includes complete blood count, chest x-ray, blood typing and HBsAg screening. According to National Institute for Health and Care Excellence (2018), routine pre-operative test for people 16 years old and above who are having surgery are as follows; chest x-ray, ECG, full blood count, hemostasis, kidney function, lung function test and pregnancy test. While on the third least rank, with a weighted mean of 1.10, surgical team is in PPE-based risk stratification before the patient is brought into the operating room. This practice is not being observed since prior to pandemic, only the basic protections are being utilized by the healthcare provider. Wearing of clean scrub attire that fits well in restricted and semi-restricted are, also wearing of mask and head gear is advised according to American Society of Anesthesiologist Committee on Occupational Health, (2019).

On the other hand, ranking first in the pre-operative phase is Communication and coordination with the surgical team members is vital to the efficiency of the OR having a weighted mean of 1.39 while planning and mapping of OR rooms to be used during procedures in restricted area should be communicated to the team landed second with a weighted mean of 1.28. Both have a common denominator which is communication. Communication in health care setting is an essential process in building and maintaining situation awareness and coordination amongst the team members lead to achieving the common goal of the team. "Effective communication in the perioperative environment is a requirement for safe patient care delivery and an important element of teamwork", (L. Smith, et al 2017).

**Table 1.2** presents the practices of health workers in handling surgical cases before pandemic in terms of intra-operative phase. The composite mean of 1.21 indicates that the respondents are not aware on the above indicators. All items were assessed as not practiced. The table above show indicators that are not present during the time when COVID-19 is not yet known. An example of which, ranking least in the intra-operative phase with a weighted mean of 1.08, is the use of a physical barrier between the incubator and the patient to minimize the exposure. An "aerosol box" consisting of a transparent acrylic box has been widely adapted for use in various ORs around the world, effectively shields a health provider's face from patient's airway. The use of this aerosol box is not being considered yet in practice before the time of pandemic as observed by the researcher. According to the guidelines for surgical attire set by the Committee on Occupational Health of the American Society of Anesthesiologists (2019), use of face mask and head gear that fits well are suggested and did not mention about aerosol box for additional protection. It was also mentioned by Infection Prevention and Control of Vancouver Coastal health (2017) that a disposable bacterial filter should be placed on the patient's anesthesia breathing circuit at the endotracheal tube or expiratory side of the circuit. Another on the least with the same weighted mean of 1.08 is the use of designated COVID-19 operating areas are allocated to COVID-19 patients' urgent/emergent procedures. In one of the hospitals in Lipa City, even before pandemic they are already having an operating room allocated for dirty and infectious cases. Infectious patients to undergo operation are scheduled as last case of the day except otherwise emergency. Vancouver Coastal Health (2017) mentioned the use of an operating room with a negative pressure and an operating room with an attached anteroom

for patients with airborne precautions.

Moreover, the use of smoke evacuator when electrocautery is being used landed on top rank in the intraoperative phase having a weighted mean of 1.32. Smoke evacuator is used to properly channel the smoke produced when using electrocautery safely out of the operating room to prevent inhalation of carbon dioxide and other harmful chemicals which can cause eye irritation, respiratory distress and nausea. The researcher has observed in one of the health facilities the use of smoke evacuator even before pandemic but only during laparoscopic procedure. "Exposure to surgical smoke remains a potential occupational health concern to spine operating room personnel. Using a smoke evacuator is currently regarded as the primary means of protection". (N. Lui, et al 2019).

Soiled and pre-cleaned instruments are placed in a yellow plastic bag and proceed to designated area of decontamination, with weighted mean of 1.31, is second on the rank. Based on the researcher's experience, after the instruments being used in the surgery, it will then be brought to the washing area and will be soaked accordingly depending if the procedure was infectious or a clean case before pandemic. The use of yellow plastic bag is being utilized for the infectious waste product in accordance to WHO mandated hospital waste segregation. With the need to continuously address the need of patient for surgery, follows the need for taking care of the waste products after the operation. Soiled linens and drapes with blood products and the gloves that were used in the operation when not disposed properly may lead to risk for infection and contamination if not disposed properly. Since the time the updates on the human-to-human transmission of COVID-19 hit the world media, there was an unexpected flood sought after for veils, gloves, hand sanitizers, and other basic wares. The WHO demonstrated assessed a prerequisite of 89 million clinical covers for the COVID-19 reaction every month and 76 million assessment gloves, while worldwide interest for goggles remains at 1.6 million every month (WHO, 2020c).

In addition, with weighted mean of 1.31 for intra-operative phase is the handing-off or endorsement of patient from COVID-19 Unit/Ward to Perioperative Unit are done via telephone. Before COVID-19, the routine in one of the institutions is to transport the patient to and from the operating room unit and the nurse will personally do the hand over to the receiving nurse. Properly endorsing of patients to the receiving nurse will definitely ensure the continuity of care, yielding to better patient outcomes. If this is not done properly, nurses might omit some important intervention or procedure that may result to unimproved patient condition. The clinical handover is a complex area of advanced communication in medicine and is becoming increasingly recognized as a situation where good communication is needed to ensure patient safety, (McKechnie A. 2015).

**Table 1.3** presents the practices of health workers in handling surgical cases before pandemic in terms of post-operative phase. The composite mean of 1.18 indicates that the respondents are not aware on the above indicators. All items were assessed as not practiced. The researcher convicts that the above practices are not being observed before pandemic as they were all designed for the infection prevention measures concerning COVID-19.

Among the least with a weighted mean of 1.08; PPE is properly removed and disposed of outside the OR in the dedicated doffing area. It is during breaks in the doffing process that a health care worker could get infected. This practice is not being executed prior to pandemic as observed by the researcher. Sterile gowns and gloves used in the operation are removed and carefully disposed in the bins inside the operating room. There is also no dedicated doffing area being provided before COVID-19 was discovered. Same goes with the transport personnel sanitize hands before donning of new PPEs, (wear a surgical mask, disposable waterproof gloves, disposable cap, and shoe covers) during transport and minimize contact with other patients, having a weighted mean of 1.12. The practices mentioned above were the practices that were being implemented in the time of pandemic. Hence, they were among the least in the post-operative phase. In outbreak settings, appropriate personal protective equipment (PPE) should be used if possible such as; gloves, mask, gown, and eye wear to minimize infection risk, (Australian Government Department of Health 2010).

**Table 1.4** presents the practices of healthcare workers in handling surgical cases before pandemic in Pre-Operative phase (1.19), Intra-Operative phase (1.21) and Post-Operative Phase (1.18). The composite mean of 1.19 indicates that the respondents do not practice the indicators in the above phases. Most of the items in the indicators were specific to COVID-19 and were not relevant to the practice being utilized before pandemic. The above table also shows that the Operating Room prior to pandemic is not yet ready and capable of handling unexpected outbreak of the virus. The recent epidemic like Severe Acute Respiratory Syndrome in 2003 could have been an instrument for the Operating Rooms to be more ready and equipped in this time of crisis. The challenge might be that since it is not being experienced yet, that is why the operating room have not evolved to it just yet. Budget allocation for infrastructure development can also be in consideration that hindered the operating room to be ready.

**Table 2.1** presents the practices of health workers in handling surgical cases during pandemic in terms of pre-operative phase. The composite mean of 3.80 indicates that the respondents are aware on the above indicators. All items were assessed as highly practiced. Surgical team members are tested for COVID-19 prior to surgical procedure got the least rank with a weighted mean of 3.46, and all members of the surgical team are screened for COVID-19 symptoms and exposure, including body temperature prior to donning with a weighted mean of 3.59. One of the changes that happened in the operating room is

that the patient needs to have COVID-19 test first prior to undergoing elective procedure as advised by WHO, CDC, DOH, and depending on the institutional protocol. The staff are subjected to undergo triage before they can enter the hospital premises where their temperature is being taken and they were being assessed if they have symptoms. However, the researcher has observed that there is no guidelines or protocols about routine COVID-19 testing for the surgical team prior to assisting with the surgical procedure. According to Cimen C., et. Al., (2020), testing patients for SARS-CoV2 is a crucial component of patient evaluation for protecting both HCWs and patients. Moreover, in their study, they have arrived to five rules for elective surgical procedures during COVID-19 outbreak as which includes testing of asymptomatic patients before elective surgery but the testing of the staff to assist with the procedure was not mentioned. Meanwhile, third on the least for pre-operative phase having a weighted mean of 3.60 is the use of negative pressure in the Operating Room is being observed every time there is an ongoing aerosolized procedure. The installation of negative pressure in the operating room has been suggested by the Department of Health. "When rooms are not properly pressurized (negative or positive), airborne contaminants can escape putting the health of patients, staff, and visitors at risk" (Marco, J, 2020).

Moreover, perioperative nurses must have a proper orientation and training on proper donning and doffing of PPEs including areas of such procedures was assessed with a weighted mean of 3.92, ranked as the highest in the pre-operative phase. In a hospital in Lipa City, after the announcement of the pandemic, the management was able to create a module for donning and doffing of PPEs and was successfully able to cascade it to all employees. The staff of the hospital even had a return demonstration of the donning and doffing prior to them getting a schedule for work. "The nurse shall undergo orientation or training on donning and doffing of personal protective equipment prior to deployment", (DOH Memorandum 20200185).

In addition, Infection prevention & control protocols are strictly implemented and monitored (e.g., wearing of mask, social distancing, and proper hygiene) also was assessed with a weighted mean of 3.92 together with Communication and coordination with the surgical team members is vital to the efficiency of the OR. The researcher has observed in a hospital in Lipa City that the OR staff are strictly adhering to social distancing and wears face mask and face shield at all times. Hand hygiene is also well practiced including sanitizing of hands with alcohol and or hand washing. "Social distancing should be practiced in combination with other everyday preventive actions to reduce the spread of COVID-19, including wearing masks, avoiding touching your face with unwashed hands, and frequently washing your hands with soap and water for at least 20 seconds", (CDC 2020). It has also been observed that nurses are communicating well with the rest of the healthcare team to ensure smooth flow of the procedure and to improve patient outcome. Since practice of social distancing is being observed, meetings of the staff were shifted to online face to face meeting using applications for video conference. According to Whittlesey (2020), while the challenges of communicating responsibly during a pandemic environment are evolving, encouraging employees to ask questions, maintaining open lines of communications with employees and implementing best communication practices can help the organization communicate more effectively and responsibly, not only during a pandemic, but also during "normal times."

**Table 2.2** presents the practices of health workers in handling surgical cases during pandemic in terms of intra-operative phase. The composite mean of 3.82 indicates that the respondents are aware on the above indicators. All items were assessed as highly practiced. Handing-off or endorsement of patient from COVID-19 Unit/Ward to Perioperative Unit are done via telephone got the least weighted mean of 3.55 in the intra-operative phase. Based on the researcher's experience, most of the communications are done in a safe way for the patient and for the healthcare worker either by phone call and two-way radio system however some prefer handover being done still on a traditional way face to face with the receiving nurse depending on the institutional protocol. According to Australian Government Department of Health (2021), Health professionals can provide health care remotely through telehealth, but they can also provide care face to face as needed with precautions to protect themselves and their patients.

This table also shows that the use of smoke evacuator when using electrocautery was assessed highly practiced with a weighted mean of 3.72 but ranking second least. It was observed that in one of the hospitals in Lipa, the use of smoke evacuator is only practiced during laparoscopic procedures because it is costly but since pandemic started, most surgeons are using it already even in invasive aerosolizing procedures. "Currently, the best practice for mitigating possible infectious transmission during open, laparoscopic and endoscopic procedures is to use a multi-faceted approach, which includes proper room filtration and ventilation, appropriate PPE, and smoke evacuation devices with a suction and filtration system, as available", (EAES 2020).

On the other hand, ranking first on the list for the intra-operative face with a weighted mean of 3.95 with an assessment of highly practiced, is the use of designated Covid19 operating areas allocated to COVID-19 patients urgent/emergent procedures. In one of the hospitals, the researcher has seen that there is a detached Operating Room intended for patient subject for surgical procedures that are COVID-19 positive and or COVID-19 suspects. "New workflows were created for activation and use of the designated isolation OR", (Wong, J. et al 2020). They also mentioned about the use of negative pressure in the operating room is ideal to reduce dissemination of the virus beyond the OR.

**Table 2.3** presents the practices of health workers in handling surgical cases during pandemic in terms of post-operative



phase. The composite mean of 3.85 indicates that the respondents are aware on the above indicators. All items were assessed as highly practiced. With the weighted mean of 3.78, the hospital has a step-by-step, well-defined path pre-allocating some corridors and elevators to COVID-19 patients landed the least amongst the post-operative indicators. In a hospital in Lipa City, when the staff were oriented with donning and doffing, they were also oriented with the paths allocated for transport of COVID-19 patients such as corridors and allotted elevator. Same goes with the transport personnel use of the same route/path from transport origin to destinations which was assessed with a weighted mean of 3.81 and ranked as second least. “It is important to underline how all non-COVID-19 patients must be protected. Established separate pathways must exist to keep suspected/infected patients apart from non-COVID-19 ones”, (Coccolini, F. 2020).

Moreover, according to World Journal of Emergency Surgery (2020), a pre-defined direct path must be kept as short as possible and away from people and other patients within the hospital to reduce the risk of transmission of infection. Transport personnel also must be trained and equipped with PPEs and are knowledgeable with all precautionary measures such as disinfection of the all equipment utilized in the transfer of patients.

In addition, once the room is vacated, meticulous environmental sanitation is being performed was assessed with the highest score in post-operative indicators, weighted mean of 3.91. It has been a routine in the operating room to sanitize the theater every after surgical procedure. In an institution in Lipa City, the researcher has observed that after a COVID-19 positive patient procedure, the room is being decontaminated twice to ensure the theater is ready for the next usage while some are using UV light for disinfection. According to Cunha, A. G. et al. (2020), an hour should be provided between procedures for the patient transfer and cleaning as well as decontamination of all surfaces such as screens, keyboards, computers, cables, anesthesia machines and furniture.

**Table 2.4** shows the summary of practices of healthcare workers in handling surgical cases during pandemic. With a composite mean of 3.82, practices of nurses during pandemic were assessed as “highly aware” on all the indicators for Pre-operative, Intra-operative and post-operative phase. There has been a lot of changes that occurred in the operating room during COVID-19 pandemic including donning and doffing of PPEs (face shield, respirators, isolation gown, and hazmat suits), use of acrylic boxes during intubation, separation of operating room for COVID-19 suspects and COVID-19 tested positive, use of negative pressure, and the nurses have followed the guidelines set their respective institution to avoid the spread of infection. Thus, the results reflect the positive response of the operating room nurses to the changes that occurred in the operating room in response to COVID-19. With the above assessment, the researcher convicts that the Operating Room Nurses are ready and equipped to handle surgical cases in this time of pandemic.

**Table 3.** Based on the result,  $t(99) = 56.98, 48.18$  and  $50.84, p < 0.05$ . This mean that there was a significant difference exists. The result also concludes that there was a statistically significant improvement before and during the pandemic on the practices of health workers in handling surgical cases on the three phases.

The table shows that in three phases (Pre-Operative, Intra-Operative and Post-Operative) before pandemic, the OR Nurses are not equipped and not ready to handle the COVID-19. There is lack of strategies and protocols that will help them in delivering services during an outbreak of infection. The indicators in the Pre-operative, Intra-Operative and Post-Operative before pandemic are not being practiced since COVID-19 is not yet known to the OR Nurses. In the past, some countries have experienced epidemic such as Severe Acute Respiratory Syndrome (2003) and Middle East Respiratory Syndrome Coronavirus (2015) however this did not get the operating room ready to pandemic times since it has not affected the country unlike COVID-19, thus guidelines and protocols for the above mentioned were not implied.

Table 3 also shows significant improvement on the practices of health workers in handling surgical cases from before to during pandemic times. Since the beginning of pandemic, there has been a lot of changes that occurred in the operating room that enabled the OR Nurses to be ready and equipped to handle surgical cases during this time of crisis. A swab test is now required for the patients prior to having a surgical procedure to determine which operating will be used. In an institution in Lipa City, even before pandemic, the researcher has observed that there is an allotted room for infectious cases but it is still inside the operating room complex. Nowadays, a separate operating room is being utilized for COVID-19 positive and suspects to minimize the risk of contamination or spread of the virus. “New work processes were made for initiation and utilization of the assigned detachment OR.”, Wong, J. et al (2020). Before, it was observed that the use of sterile gloves, surgical face mask, head cap and sterile gowns are being used during a surgical procedure but now hazmat suits are being used together with double gloving, n95 mask or respirators, face shield and sterile gowns. An acrylic box or intubation drape have been a trend during the performance of intubation during this time of pandemic. Decontamination of the operating room every after case, use of negative pressure, use of smoke evacuators during an aerosolizing procedure are also being practiced during this pandemic times. The changes in protocols and guidelines for a safe procedure during COVID-19 was accepted and implied in the operating room, thus contributing to a statistically significant improvement as shown in the table above. “The surgical staff needs to keep abreast of the latest literature concerning safety measures to be taken during surgical procedures. Review articles can go some distance in helping in this educational process. This knowledge must evolve as new information comes to light”, (Prakash, L. et al 2020).

The changes in the Operating Room can be related to Adaptation Model of Sister Callista Roy wherein the stimulus is the COVID-19. The Operating Room has reacted to the stimulus which resulted to change physical set up of the OR theaters such as donning and doffing area has been created, isolation operating room was built, and negative pressure were installed in theaters. There were also changes in the work flow, patients are asked first to have COVID-19 test prior to procedure, donning of PPEs prior to entering the operating theaters, and roles function of the nurses were also modified. These has triggered positively the coping process resulting to an altered behavior, embracing the new normal in handling surgical cases.

### **Operating Room Model of Metamorphosis**

Healthcare in this time of pandemic has to evolve to be able to render safe and quality service to the patients, and so the Operating Room just like the biological process that occurs in an animal which results to a physical transformation through cell growth and differentiation also known as metamorphosis.

In the beginning of the pandemic, when COVID-19 was discovered in Wuhan China in December 2019 and abruptly spread across nations, the healthcare system was indeed caught off guard. The Operating Room Nurses at this point can be compared to the “Vulnerable Egg”. With a little knowledge of the virus the nurses are facing, comes fear and anxiety as stated in the answer of one of the participants; “whether we are going to work or working change the way we work, fear and anxiety about this disease and other strong emotions can be overwhelming”. The researcher as one of the perioperative nurses also experienced the fear of getting infected by the virus as they perform surgical procedure in the early part of the pandemic period. Back then, PPEs are not provided, there are no installed negative pressure in the operating theaters and no protocols yet are set in place. According to Rodriguez, B.O. (2020), human beings in general have a great resilience capability and adaptability to circumstances. However, as it is known, we require help from other persons to facilitate these processes. It is necessary to consider the skills that healthcare workers require to develop to be able to overcome the circumstances derived from the COVID-19 pandemic, as it has caused a considerable increase in the stress levels they are normally exposed to. The vulnerability together with fear and anxiety in regard to diminishing supplies and acquiring the disease has triggered the Operating Room and its Nurses to evolve to a “Striving Larva”. In this stage, the protocols and guidelines have been set in the Operating Room to be able to cater to the needs of pursuing surgical procedure. An institution in Lipa City had their staff attend to a training of proper donning and doffing procedures with a return demonstration at the end of the training. Staff were also oriented with the Infection and Prevention Control guidelines which includes wearing of appropriate PPEs, skeletal workforce implementation limiting the number of employees on shift, triage screening before entering the hospital premises, and other rules aligned with DOH and WHO standards. Changes in the operating has also been noticeable were there has been, a swab test is being required to the patients prior to a procedure, an Isolation Operating Room was also created for positive and suspected of COVID-19 patients. Negative pressure was also installed in the operating theaters. Donning and doffing areas were also created. The use of disposable drapes is being practiced and time allotment for scheduling of cases has also been implemented. These changes were evident as stated by one of the respondents; “Major changes happened this tough time, some theaters were vacated to transform into rooms needed to satisfy the protocols needed by the infection control such as donning and doffing. Newly built transition OR was opened to cater those patients who tested positive and awaiting swab results and needs to be attended immediately”. Another respondent added, “Allocation of area for donning and doffing, strict implementation of proper use of PPEs and infection control measures, installation of negative pressure room and aligning the policies/procedures/ protocol and guidelines based on WHO/DOH and other regulatory bodies to comply with the requirements to control the spread of the virus”. These responses corroborate with findings of Prakash, L. (2020) that the surgical team needs to be updated as to the latest protocols being used to ensure increased safety within the operation theatres to prevent the spread of the coronavirus outside the theatre and disease amongst the theatre personnel.

The Operating Room and its Nurses strived to meet the standards with all the policy and guidelines set in place and with all the changes in the infrastructure that occurred help them grow into an “Impermeable Pupa”. This stage is where hardening of shield and harnessing protective mind occurs by strictly complying with protocols and guidelines set in their respective institutions. The researcher has noticed the strict compliance of the operating room nurses with the appropriate PPE usage and other practices to prevent the spread of infection such as social distancing among the staff, taking turns while eating at the pantry, utilization of face mask and face shield at all times and being updated with the latest news regarding the pandemic. This was supported by a respondent saying “Being more diligent with daily hygiene like hand washing and putting alcohol is a big help to cope up during this time of pandemic. I always follow the protocols and made sure to keep myself updated with latest news regarding pandemic”. According to Br J Surg (2020), surgical staff needed accurate and critical guidance in terms of disseminating surgical services safely and effectively especially in time of pandemic. The spread of covid-19 is easier to transfer and infect patients under surgical services that is why an effective and critical guidance is crucial in order for the surgical personnel to balance and minimize the spread of the covid-19 virus.

Having surpassed the challenges, through strategic actions and proper allocation of manpower, PPE supplies, continuous training and proper motivation, the Operating Room has finally evolved to a “Strategic Butterfly”. The researcher has observed that there is a continuous change in the practices and protocols in the operating room aligning to the latest guidelines and protocols from DOH and WHO. Proper time allotment is being observed every after cases to facilitate sanitation and



sterilization of the theaters is being practiced, adequate supply of PPEs is secured for the use of staff. Although the Covid19 pandemic is not yet over, basing on the results of the quantitative analysis, there has been a statistically significant improvement in the practice of the operating room nurses from before to during pandemic (Table 3), the Operating Room is equipped and ready. This however can be fully assessed once the pandemic is over for sustainability.

This evolution in the Operating Room is related to Sister Callista Roy's adaptation model. Wherein, COVID-19 was the triggering factor or the stimuli to the Operating Room. This has enabled the changes in the protocols and policies in the operating room unit. The updates on the protocols were cascaded to the team members improving their interdependence and modifying their roles and functions thus resulting to positive changes in the way they handle surgical cases in this time of pandemic. In this figure however shows fear and anxiety that the nurses have experience which is not tackled in the Adaption Model of Sister Callista Roy.

Figure 1 represents the Operating Room Metamorphosis in this time of Pandemic.

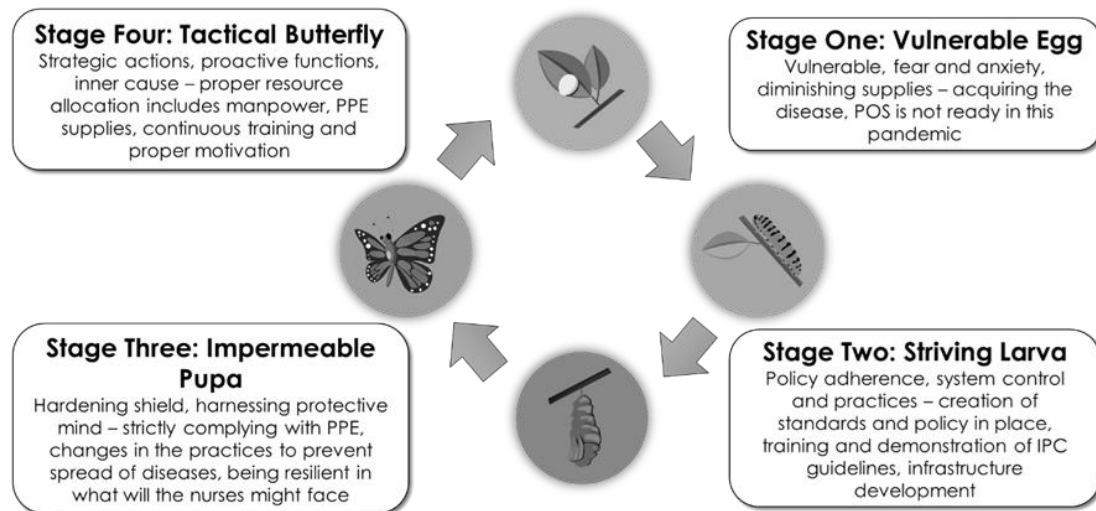


Figure 1. Operating Room Metamorphosis in this Pandemic

## 5. CONCLUSION AND RECOMMENDATION

1. The Operating Room should embrace the new normal in handling surgical cases to ensure quality standards and the safety of both health workers and patients are preserved. The lessons that were learned from the COVID-19 pandemic shall lead to new strategies for a substantial rearrangement of the routine in surgical practice.
2. There is a statistically significant improvement from the practices of the Operating Room Nurses in handling surgical before pandemic to the practices during pandemic in the pre-operative, intraoperative, and post-operative phases with a p value of 0.000..The Operating Room was able to apply the protocols and guidelines from CDC, WHO and DOH, training about donning and doffing procedures were cascaded to the staff as well as the new work flow in the Operating room were discussed to the surgical team, support from the institution as evident by supply of PPEs and other essential needs of the operating room including the creation of an isolation operating room and negative pressure installed in each theater, all these have contributed to a highly significant scores on all the indicators across pre-operative, intra-operative and post-operative phases. This indicates that the Operating Room is ready in this pandemic times.
3. The Adaptation Model of Sister Callista Roy that was used in the research was indeed helpful in gauging how well the operating room has changed upon reacting to the stimuli which is the COVID-19 pandemic. The Operating room positively responded to the stimuli resulting to modification of the infrastructures such as isolation OR has been made to cater positive and suspected COVID-19 patients and installation of negative pressure in OR theaters. Workflow in the Operating Room has also been adjusted. This includes requirement of swab test for COVID-19 for the patient prior to the procedure, routine sanitation of the theaters after cases, and use of PPEs are also have been a requirement for the surgical team. These factors have led to a change in the behavior as the results of the quantitative data shows highly significant improvement on the practices in the operating room in Pre-Operative, Intra Operative and Post-Operative phase during pandemic. The open-ended questions part also has capture emotions that were felt by the respondents like fear and anxiety that was not discussed in Roy's Model of Adaptation.
4. An Operating Room Metamorphosis Model was developed to assess the level of practice in the Operating Room inspired by Roy's Adaptation Model. This model can be utilized to further assess if there are changes in the protocols or guidelines

that needs to be facilitated in the unit to match with the phase of the current situation. Therefore, a tailored fit guidelines or protocol can be coined and applied appropriately to the Operating Room.

5. Furthermore, the researcher has come up with a practice-based guideline using the Operating Room Metamorphosis Model and incorporating the results of the Quantitative data analysis. Although the results are showing highly significant in all indicators for pre-operative, intra-operative and post-operative, the researcher would like to focus on the items with the least scores for sustainability.

The researcher recommends the following:

1. As this study is conducted in Private Tertiary Hospitals in Batangas, this can be replicated in a bigger scale going regionals and or can be done in governments hospitals to assess their adaptation in the new normal of handling surgical cases. In addition, in this study, a descriptive method was used in identifying the practices of nurses in handling surgical cases before and during pandemic. The next researcher may use a correlational method with identified variables to explore more of the readiness of the Operating Room in handling surgical cases in this pandemic times. Furthermore, below is the proposed guidelines for handling surgical cases can also be utilized in the hospitals of similar level in the country.

### **Recommended Guidelines in Handling Surgical Cases During COVID-19 Pandemic**

#### **A. Mental Health Awareness**

- Debriefing of staff by the end of shift or post shift huddle
- One-on-one coaching, or focused group discussion amongst the staff where they can voice out their emotions and feelings towards work
- Individual counselling for staff as needed

#### **B. Training**

- Conduction of up-trainings with the latest updates in the policy and protocols including return demonstration as necessary
- Inclusion of the transport personnel and housekeeping in the trainings for institutional protocols as they are essential part of the team
- Re-evaluation of the existing policies and procedures to the staff on a regular basis

#### **C. Policy and Procedures**

- All surgical team members are tested for COVID-19 prior to surgical procedure
- All members of the surgical team are screened for COVID-19 symptoms and exposure, including body temperature prior to donning
- Relatives or companion of the patient during hospitalization are tested for COVID-19 prior to entering the hospital premises

#### **D. Equipment and Infrastructure**

- Use of Negative pressure in the Operating Room is being observed every time there is an ongoing aerosolized procedure
- Smoke evacuator when electrocautery is being used and available
- Fitting of masks and hazmat suits for the staff for everyday usage

#### **E. Communication**

- Handing-off or endorsement of patient from Covid-19 Unit/Ward to Perioperative Unit are done via telephone
  - Any changes or updates in the policy or protocols are promptly cascaded to the staff
  - Inventory of PPEs is monitored strictly and the staff are made aware of any deficiencies and shortages
2. The researcher would like to recommend the utilization of the Operating Room Model of Metamorphosis to further assess the level of practice in the operating room of different hospitals. This model can be used as a decision-making tool during this pandemic period and if in the future the Operating Room might encounter another pandemic or epidemic.
  3. Gaps that were identified, such as limited resources, lack of manpower, lack of evidenced-based literature providing

clinical and organizational guidelines for surgery in this time of pandemic, can be further explored and addressed in the future research.

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**Conflict of interest:**

"The authors declare that there is no conflict of interest

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