Perceptions and Attitudes of 4th Year Medical Students in Clinical Clerkship in the Era of the Coronavirus Disease 2019*

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ABSTRACT

Background: In the advent of coronavirus disease 2019 global crisis, hands-on patient care and in-hospital training of fourth year medical students were suspended across the globe and shifted to remote online education. The aim of this study is to assess the perception and attitude of the 4th year medical students about clinical clerkship training during the COVID-19 pandemic.

Methods: An online survey was sent to fourth-year medical students in three medical schools in Iloilo City, from July 2021 to October 2021. The survey questionnaire is a combined dichotomous, multiple-choice, and Likert response scale questions.

Results: Of the hundred sixty-eight students who completed the online survey, sixty-six percent did not experience hospital rotation. On average, students were very interested in COVID-19 (8.83) and willing to join in patient care if requested by a hospital or university to help during COVID-19 pandemic (8.65), but felt they were not ready (70%) due to a lack of the ability for clinical practice (90%). Most (82%) of the students expressed they wanted to maintain hands-on clinical practice education despite the pandemic. Overall, students who have experienced hospital rotation have a higher level of understanding of how much their life, behavior (9.30), and role as a medical student (9.74) were affected by the pandemic as compared to the rest of the students.

Conclusion: This present pandemic has affected the medical students as a whole in areas of their role as students, behavior, and life. Their lack of confidence despite willingness to help correlated to their inadequate clinical experience. Specific policy adjustments concerning the curriculum of clinical clerkship during this time of pandemic should be revisited to tailor fit the students'' needs for safe education to help them prepare to become a competent medical practitioner.

Keywords: COVID-19, Medical student, Medical clerkship, Perception, Attitude

INTRODUCTION

The ongoing coronavirus disease -2019 (COVID-19) pandemic caused by the novel severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) continues to be a global crisis with devastating effects across all sectors of society. In less than a year, the highly infectious SARS-CoV-2 virus has rapidly spread in all continents of the world infecting over 179 million persons resulting in approximately 3.8 million deaths Worldwide [(1)]. The Philippine situation was not different from other countries. As of June 2021, cases are still rising with 1.36 million confirmed cases, 23, 621 deaths nationwide, and approximately 5800 new cases every day [(2)]. Because of its high infectivity, new variants [(3)] and with this rate of increase of new cases, have left no one in doubt that the COVID-19

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pandemic is exerting enormous pressure on healthcare systems around the world [4].

In adherence to the disease spread control protocols, great impact on the social, political, economic, health and education were felt. Every aspect was slowed down and brought a threat of collapse. The health care system is severely challenged, not only the remaining front liners but also its future workforce quality was placed in jeopardy.

Clinical clerkship is an integral period in a medical student's life where they are allowed the opportunity to gain exposure to a variety of specialties and subspecialties while developing the clinical skills necessary to become a competent physician [5]. Because of the pandemic, this was disrupted. Last May 31, 2020, the Association of Philippine Medical Colleges (APMC), together with the Commission on Higher Education (CHED), suspended the face-to-face or in-person clinical rotations in hospitals of both clinical clerkship and internship programs and home-based flexible learning strategies shall continue to be implemented instead (APMC, May 2020). Due to this, medical students are experiencing this unique training environment for the first time during their clinical training. The impact of this situation on their acquisition of clinical knowledge and skills and how this may affect their future career choices remains unknown.

OBJECTIVES OF THE STUDY

To assess the perception and attitude of the 4th year medical students about clinical clerkship training during the COVID-19 pandemic.

Specific Objectives

Specifically, the study will aim to:

1. Determine the demographic characteristics of respondents in terms of age, medical school presently enrolled in, areas of rotation, and duration of hospital exposure.
2. Determine the students‟ perception of their roles as clinical clerks-on-training during the COVID-19 pandemic.
3. Determine the students‟ attitude toward clinical clerkship training during the COVID 19-pandemic.
4. Determine the impact of COVID-19 pandemic to 4th year medical students.

SIGNIFICANCE OF THE STUDY

Clinical clerkship is an important year, marking the final year of medical education. It is when students put to use the 3 years of medical knowledge they have garnered in medical school into clinical practice. It is also when they are exposed to the hospital setting and are allowed to handle patients with close supervision from their residents and consultants. Students are allowed to elicit patient histories, do a complete physical examination, interpret laboratory results, write progress notes, assist in surgeries and medical procedures, and where the correlation of theoretical knowledge and patient's clinical presentation is honed.

In circumstances such as COVID-19 pandemic, the safety of our 4th year medical students is a priority. But due to the present setup, students‟ clinical exposure and learning are greatly compromised, as they are restricted to mingle face-to-face and to be exposed in the hospital setting. In this scenario, and with the need to train our future doctors, it is important to understand their concerns and attitudes toward the clerkship training in a hospital setting. Moreover, the development of alternative clerkship programs that will provide high-quality medical education and new modes of student- patient interaction that will teach the core competencies for patient care is an important issue to address. This study aimed to assess the

perception of their role and attitudes of medical students about these changes to clinical clerkship training programs in Iloilo City, Philippines during the COVID-19 pandemic.

In line with this, the results of this study may be disseminated to the Medical Schools involved and to the Association of Philippine Medical Colleges (APMC) with the necessary permission.

DEFINITION OF TERMS

- **Clinical Clerk –** A fourth-year medical student undergoing rotation in a clinical department of a hospital such as internal medicine, family medicine, pediatrics, surgery, obstetrics and gynecology, ENT, etc.
- **Clinical Clerkship** - In medical education, refers to the practice of medicine by medical students during their final year of study, under the supervision of a health practitioner.
- **Perception -** in this study, it is defined as a medical student's mental impression or a way of regarding, understanding, or interpreting his or her role during COVID-19 pandemic.
- **Attitude –** in this study, it refers to a set of emotions, beliefs, and behavior of a medical student in her/his 4th year of medical education toward clinical clerkship during this time of the pandemic.
- **Covid-19 –** or coronavirus disease 2019 is a disease caused by a coronavirus that was first reported in 2019 a t Wuhan, China, and eventually became a pandemic.
- **Pandemic -** a disease that spreads over a whole country or the whole world.
- **Impact –** in this study, it is defined as the effect of COVID-19 pandemic on the medical students‟ lifestyle, psychological aspects, and medical education.

REVIEW OF THE RELATED LITERATURE

The coronavirus disease 2019 (COVID-19) pandemic has led to widespread uncertainty and affected every corner of the globe [6]. In the Philippines, it has had profound medical, political, and financial impacts [7,8,9]. While much study and talks surround the present and potentially persisting political, financial, and public health aftermath of the COVID-19 pandemic, the dialogue regarding how COVID-19 will affect undergraduate medical education (UME) and its long-term effect is somewhat unexplored [10].

Ideally, clinical clerk is part of the team as a learner who needs guidance in the field of clinical practice. Development of students‟ professional identity depends on teaching and role modeling in these settings as students learn to prioritize patients and their welfare. However, with the emergence of a highly contagious pandemic, students may transmit the virus unintentionally or even contract the disease. Other contributing factors that limit the role of students in this clinical environment include the high cost of COVID-19 testing available locally, lack of adequate personal protective equipment (PPE), diminished value of education with the cancelation of surgical procedures and routine appointments, and the transition of medical consultation to telehealth formats. During the initial emergence of COVID-19, and with the PPE shortage, students were excluded in the care of suspected or confirmed COVID-19 patients. Medical schools began to remove students from the clerkship environment as infection rates increased. On March 17, 2020, the Association of American Medical Colleges provided guidelines suggesting that medical schools support pausing clinical rotations for medical students [11]. In the Philippine setting, this was soon followed by the Association of Philippine Medical Colleges issuing a complete suspension of the internship program in the National Capital Region and eventually in the whole country from March 15 to April 12, 2020 [12] in compliance with the advisory of the Department of Health [13] and the World Health Organization [14].

Reasons for medical schools' cancellation of clinical clerkship at the start of the pandemic are (1) to flatten the curve, minimize face-to-face patient interaction to curtail the spread of COVID-19, (2) to decrease the risk of exposure of the medical students, and lastly, (3) to ensure adequate supply of personal protective equipment to the healthcare workers to protect themselves during this pandemic. The cancellation of clerkship has little changes on the didactics, as it may be replaced by recorded or live - stream lectures, but the loss of collaborative experience can be greatly impacted with subsequent effects on their preparedness and confidence as a clinician. Also, preparedness in the areas of teamwork, communication skills, clinical and practical skills, working in the hospital on the ward, paper works, working on-call, triaging of patients, management of acutely sick patients, prescribing, and good bedside manners are affected [15]. Because of the above reasons, it will be important to record and study the full extent of changes being made during this time, including in the aspect of medical education, to help ensure our medical students progress forward despite these challenges and uncover better ways to support them to transition into the healthcare workforce in the long-term [16,17].

METHODOLOGY

Study Design

This study utilized a cross-sectional survey research design with a web-based 3- fields/23-item questionnaire and was conducted from July 01, 2020 – October 31, 2021, and this evaluated the 4th year medical students'' perception and attitudes on clinical clerkship under the COVID-19 outbreak and the pandemic's psychological impact to the students and their medical education. This study was spread among a total of 295 fourth-year medical students enrolled in the 3 medical schools in Iloilo City, Philippines, namely, Central Philippine University - College of Medicine (COM), West Visayas State University – COM, and Iloilo Doctors College – COM.

STUDY SETTING

This research was conducted in the 3 medical institutions in Iloilo City, namely, Central Philippine University - College of Medicine (COM), West Visayas State University – COM, and Iloilo Doctors College – COM.

Study Period

This study was conducted from July 01, 2021, to October 31, 2021

STUDY POPULATION

Inclusion Criteria:

The study included all clinical clerks currently enrolled at Central Philippine University - COM, West Visayas State University – COM, and Iloilo Doctors Hospital – COM, who were willing to participate in the study and have given their consent.

Exclusion Criteria:

The study excluded clinical clerks currently enrolled at Central Philippine University - COM, West Visayas State University – COM, and Iloilo Doctors Hospital – COM, who were not willing to participate in the study.

Population Size:

Since the total population size was 295 participants for three groups, the computation of sample size used the population proportion. Wherein, the population size was known, the confidence level was 95% and the margin of error was 5%. The computation is shown below:

$n = N*X / (X + N - 1)$,

where

$X = Z_{\alpha/2}^2*p*(1-p) / MOE^2$,

and $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$

(e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), MOE is the margin of error, p is the sample proportion (0.5), and N is the population size.

X=((1.96)^2)*(0.5)*(0.5)/(0.05^2)=0.9604/0.0025=384.16
n=(295*384.16)/(384.16+295-1)=113,327.2/
678.16=167.1098265895954

The computed sample is 168 participants.

Group	Population Size	Proportional Allocation (Pop'n size/Total Pop'n size)	Monthly Sample Size (proportionXTotal sample size(168))	Final Monthly Sample Size
WVSU	120	0.406779661	68.33898305	68
Iloilo Doctors	92	0.311864407	52.39322034	53
CPU	83	0.281355932	47.26779661	47
Total Pop'n Size	295		Total Sample Size	168

Random samples from each stratum were taken in a number proportional to the stratum size when compared to the total population.

DATA COLLECTION PROCEDURE

After the approval of the Department of Internal Medicine Research Committee, St. Paul's Hospital Institutional Review Board, and West Visayas State University Unified Research Ethics Review Committee, letters were sent to different Deans of all Medical Schools here in Iloilo City for permission to conduct. Permission was granted. We have contacted the 4th year medical students‟ leaders/president of each medical school to obtain the email address of each student. Once the emails were obtained, a link to a self-administered questionnaire in google form was sent to all 4th year medical students of different medical schools in Iloilo, City, Philippines. Only one Google account under the name of one of the two researchers containing the questionnaire in google form was the sole destination of all the responses. Only the researcher who owns the google account had the authority to disseminate the questionnaire and only the researchers have the access to the electronic response and the data of the respondents. It only took approximately 20-30 minutes to completely answer the questionnaire. The questionnaire asked to answer regarding the student's demographic data and also, they were asked to complete the questionnaire adapted from the study of Hong J, et al. [18] in English, which was translated into the local dialect (Hiligaynon). Permission was given by the authors of the study for the questionnaire's use and its translation. The questionnaire was translated by 2 individuals, a writer in Hiligaynon with a Ph.D. in Filipino and a professor with a Ph.D. in Linguistics. Only one response to the questionnaire per person/ email address was permitted as programmed to the online platform (google forms). Participants were not paid for their participation, as stated on the informed consent.

SURVEY QUESTIONS

Survey questions were developed by a team consisting of three medical students, three psychiatry residents, and three psychiatry professors from Korea[18]. The questions were modified and will focus on three domains of interest, namely, [1] the perception of 4th year medical students regarding their role during the pandemic era; [2] students‟ attitude toward clinical clerkship training during the COVID 19- pandemic; and lastly, [3] the impact of COVID-19 on medical students.

The first part has seven items that elicited information on the perception medical students have toward their duties during the pandemic. The following questions were asked: A1. How interested are you in COVID-19? (0: never–10: very interested); A2. How important is a social responsibility to medical students? (0: not important–10: very important); A3. In some countries, medical students work as frontline healthcare workers. Do you feel positive or negative about this? (0: very negative–10: very positive); A4. Do you think students are ready to be in the medical field in a pandemic situation? (0: never–10: definitely); A5. If you are requested by a hospital or university to help during the COVID-19 pandemic, are you willing to participate in patient care or assistance? (0: never–10: definitely); A6. Do you agree with having early graduation or being

awarded a temporary license in the event a new infectious disease situation occurs in the future and students are required to enter the medical field quickly? (0: disagree–10: agree); A7. Do you think you can practice medicine even though you are a trainee? (Yes or No)

Face-to-face education was interrupted and modes of teaching and learning were modified since the start of the pandemic. However, since clinical exposure and experience in the hospital is an integral part of the medical curriculum, the second part of the questionnaire assessed the attitude of medical students regarding the change in the mode of their clerkship training. Therefore, on the second part of the questionnaire, the following questions were asked: B1. Do you think that medical school education is working properly during the COVID-19 pandemic?; (0: disagree–10: agree); B2. Do you think you should graduate on schedule and practice medicine, even if your medical school training is not complete due to the ongoing pandemic situation? (0: never–10: definitely); B3. To what extent do you feel medical school education must change to fit into the new normal era? (0: not needed to be changed–10: definitely to be changed); B4. How should hands-on clinical practice education be reduced or replaced during the pandemic? (Needs to be reduced vs. maintained); B5. During COVID-19, how do you think patients will accept students who are trainees? (same as usual/positively/negatively)

The third part assessed the psychological impact of COVID-19 on medical students, their education, and their daily lives. Therefore, we asked the following questions: C1. How has your amount of study time changed compared to before the COVID-19 situation? (0: definitely reduced–10: definitely increased); C2. How has your level of academic-related stress changed compared to before the COVID-19 situation? (0: definitely reduced–10: definitely increased); C3. How much has the current COVID-19 situation affected your studies? (0: never affected–10: definitely affected); C4. Are you afraid of interacting with a typical patient (during clinical practice) as a medical student? (0: never afraid–10: very afraid); C5. Are you afraid of interacting with a suspected coronavirus patient as a medical student (during clinical practice)? (0: never afraid–10: very afraid); C6. Are you afraid of interacting with a confirmed coronavirus patient as a medical student (during clinical practice)? (0: never afraid–10: very afraid); C7. How much do you think the current COVID-19 pandemic affects your life and behavior? (0: never affected–10: definitely affected); C8. How much do you think the current COVID-19 pandemic affects your role as a medical student? (0: never affected–10: definitely affected).

Most of the questions were closed-ended to facilitate the categorization of the participants'' answers. We used a unipolar 10-point Likert-type scale (example 0: never affected–10: definitely affected) to measure the perception, attitude, and impact. Open- ended questions were also used to invite a variety of opinions from participants. Dichotomous questions were scored using a two-point scale. Questionnaires were sent via email or cellular phone number in the google form. The present study was approved by the Institutional Review Board of St. Paul's Hospital Iloilo and West Visayas State University Unified Research Ethics Review Committee.

ETHICAL CONSIDERATIONS

During this time of great change in modalities of training of our future doctors, it is important to understand their concerns and attitudes toward the clerkship training, so that problems identified will be addressed and modifications will be done appropriately, and that future medical practice tragedy will somehow be prevented.

Before conduction, this study was reviewed and approved by the Department of Internal Medicine Research Committee, St Paul's Hospital Institutional Review Board, and by the Unified Research Ethics Review, West Visayas State

University. To determine the student's willingness to participate, consent for the conduction of this study was placed on the 1st page of the google form sent to each student via email. It was programmed as "required" thus the study only proceeded when they were willing to join, indicated by ticking the "Yes" button at the bottom of the consent form. Students who chose not to participate indicated by ticking the "No" button, did not proceed with the study, and were directed straight to the end of the form. Researchers'' signature was not included in the informed consent due to the nature of the online survey. Student's confidentiality was treated with utmost importance. Once electronic responses were obtained, before the data processing, each response was printed and a unique number code was individually assigned to keep their identities anonymous and thus prevented accidental revelation of their names. Only the researchers have access to the electronic response and the data of the respondents. There shall only be minimal risk brought about by this study to the participants. Medical or psychosocial support shall be provided in case the need arises. Once researchers were notified by the affected participant, an arrangement for evaluation, counseling, or possible medical or psychosocial management will be done at the expense of the researchers. It was stated in the informed consent that she/he may withdraw or discontinue participating at any time without penalty or liability if he/she may feel uncomfortable joining the survey. Data gathered was fully encrypted and password-protected known only to the researchers. Access was granted only to the research team only for confirmation or validation purposes. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions. After the study, all collected records will be deleted after 2 years and we will ensure that no trace of information related to the subjects included in the study remains accessible.

A copy of the finished study will be given to each participating medical school and Association of Philippine Medical Colleges (APMC) with the necessary permission. It may be published or presented appropriately for educational purposes, but utmost confidentiality of the respondents' data will be ensured at all times such that no respondent will be singled out. No vulnerable participants will be included in the study.

STATISTICAL ANALYSIS

Data gathered were subjected to appropriate statistical analysis. For questions with answers of 0-10, T-test or ANOVA was used. The Chi-square was used to determine the relationship of demographic profile with attitude and perception. Mean, frequency and percentage were used to describe the demographics profile and level of attitude/perception and impact itself.

RESULTS

A total of 168 medical clerks randomly selected out of 295 fourth-year medical students from the 3 medical schools in Iloilo City completed the online survey. The proportion of students coming from different schools was calculated by proportional allocation. Seven out of ten participants were male (74%). The average age of participants was 25 years old, 23 years old as youngest and 32 years old as oldest. *See Table 1*

Table 1. Demographic Profile

Profile	Category	N	%
Sex	Male	124	74%
	Female	44	26%
School	CPU	47	28%
	IDC	53	32%
	WVSU	68	40%
Age	Mean = 25yo Youngest = 23yo		
	Oldest = 32yo		

Sixty-six percent (66%) of the participants did not experience hospital rotation. The top four areas of rotation were Pediatrics (20%), Internal Medicine (19%), Surgery (17%), and Obstetrics & Gynecology (17%). The average length of stay of participants during rotation was 15 days, 14 days as shortest, and 100 days as longest. *See Table 2.*

Table 2. Area of Rotation and Length of Stay

Variable	Category	N	%
Experience Hospital Rotation	No	111	66%
	Yes	57	34%
Pedia	No	135	80%
	Yes	33	20%
Internal Medicine	No	136	81%
	Yes	32	19%
Surgery	No	140	83%
	Yes	28	17%
Obstetrics and Gynecology	No	140	83%
	Yes	28	17
Psychiatry	No	165	98%
	Yes	3	2%
Family Medicine	No	162	96%
	Yes	6	4%
ENT	No	165	98%
	Yes	3	2%
Anesthesia	No	165	98%
	Yes	3	2%
Ophthalmology	No	167	99%
	Yes	1	1%
Community	No	166	99%
	Yes	2	1%
Radiology	No	167	99%
	Yes	1	1%
Duration of Stay	Mean = 25 days, Min = 14		
	Max = 100 days		

Table 3. The Perception of 4th year Medical Students regarding their role during Pandemic Era

Question	Answer	n%	Mean	Interpretation
A1			8.83	Very Interested
A2			9.64	Very Important
A3			7.83	Very Positive
A4			6.06	Neutral
A5			8.65	Definitely
A6			5.77	Neutral
A7	No	118(70)		
	Yes	50(30)		
A7.a	Lack of ability for clinical practice	106(90)		
	Medical license issue	12(10)		
A8	Acting as an assistant for healthcare professionals	23(14)		
	Acting as an informer to neighbors about the COVID-19	17(10)		
	Actively learning about the COVID-19	8(5)		
	All of the above	6(4)		
	Be actively involved in clinical practice, if possible	26(15)		
	Focusing on medical education and learning as trainees	88(52)		

Table 4 shows the overall students' attitude toward clinical clerkship training during the COVID 19- pandemic. Students did not agree nor disagree that medical school education was working properly during COVID-19 pandemic (5.22). Also, students had a neutral thought that they should graduate on schedule and practice medicine even if their medical school training is not complete due to the ongoing pandemic situation (6.65). However, students thought that medical school education definitely should change to fit into the new normal era (8.60).

Almost all of the students wanted to maintain hands-on clinical practice education (82%) and half of them thought that medical students can gain clinical experience in the pandemic era through meeting the patients (56%). Education, patient care, and social accountability were the top three most important outcomes of medical education during the pandemic era. Lastly, almost half of students thought that patients will accept them as usual trainees (44%).

Table 4. Students' attitude toward clinical clerkship training during the COVID-19 pandemic

Question	Answer	n%	Mean	Interpretation
B1			5.22	Neutral
B2			6.65	Neutral
B3			8.60	Definitely to be change
B4	Needs to be maintained	138(82)		
	Needs to be reduced	30(18)		
B5	Via meeting the patients	94(56)		
	Via meeting standardized patients or medical models	60(36)		
	Online education	4(2)		
	Virtual reality	3(2)		
	others	7(4)		
B6	Communication and collaboration	25(15)		
	Education and research	41(24)		
	Patient care	38(23)		
	Professionalism	4(2)		
	Self-development	25(15)		
	Social accountability	35(21)		
B7	Negatively	61(36)		
	Positively	33(20)		
	Same as usual	74(44)		

Table 5 shows the overall impact of COVID-19 on medical students. On average, there was no amount of study time changed compared to before the COVID-19 situation (5.51). However, there was an increase in the level of academic-related stress (8.30) and it affected the studies of students (8.65). Students were neither never nor afraid of interacting with typical (4.58) or suspected coronavirus patients as medical students (5.96). Nevertheless, students were very afraid of interacting with confirmed coronavirus patients (6.74). Lastly, the life, behavior (9.00), and role as medical (9.10) students were definitely affected by the current COVID-19 pandemic.

Table 5. The Impact of COVID-19 on Medical Students

Question	Mean	Interpretation
1. How has your amount of study time changed compared to before the COVID-19 situation?	5.51	No change
2. How has your level of academic-related stress changed compared to before the COVID-19 situation?	8.30	Definitely increased
3. How much has the current COVID-19 situation affected your studies	8.65	Definitely affected
4. Are you afraid of interacting with a typical patient (during clinical practice) as a medical student?	4.58	Neutral
5. Are you afraid of interacting with a suspected coronavirus patient as a medical student (during clinical practice)?	5.96	Neutral
6. Are you afraid of interacting with a confirmed coronavirus patient as a medical student (during clinical practice)?	6.74	Very afraid
7. How much do you think the current COVID-19 pandemic affects your life and behaviour?	9.00	Definitely affected
8. How much do you think the current COVID-19 pandemic affects your role as a medical student?	9.10	Definitely affected

RELATIONSHIP OF PROFILE WITH PERCEPTION, ATTITUDE, AND IMPACT

I. Sex

Tables 6,7 and 8 show the result of the test of difference and relationship of *Sex* in terms of *Perception, Attitude, and Impact*. The test was only significant in terms of item #2 in "*The Impact of COVID-19 on Medical Students'* set questions (p=0.012). Hence, there was a significant difference in the level of stress change before and during the COVID-19 between male and female students. Male (8.49) students experienced a higher than average increase in stress compared to female (7.75) students, *see Table 8*. Furthermore, the rest of the tests were not significant. Therefore, the *Sex* variable had no significant relationship with the rest of the *Perception, Attitude, and Impact* questions.

Table 6. The perception of 4th year medical students regarding their role during pandemic era

Question	Answer	n%	Male		Female		P-value
			Mean	n(%)	Mean	n(%)	
A1			8.87		8.73		0.546
A2			9.72		9.43		0.097
A3			7.85		7.80		0.879
A4			6.02		6.18		0.663
A5			8.77		8.34		0.121
A6			5.82		5.61		0.681
A7	No	118(70)		88(75)		30(25)	0.727
	Yes	50(30)		36(72)		14(28)	
A7.a	Lack of ability for clinical practice	106(90)		79(75)		28(26)	0.702
	Medical license Issue	12(10)		10(83)		2(17)	
A8	Acting as an assistant for healthcare professionals	23(14)		18(78)		5(22)	0.641
	Acting as an informer to neighbours about the COVID-19	17(10)		11(100)		6(55)	
	Actively learning about the COVID-19	8(5)		6(75)		2(25)	
	All of the above	6(4)		3(50)		3(50)	
	Be actively involved in clinical practice, if possible	26(15)		21(81)		5(19)	
	Focusing on medical education and learning as trainees	88(52)		65(74)		23(26)	

Table 7. Students' attitude toward clinical clerkship training during the COVID-19 pandemic

Question	Answer	n%	Male		Female		P-value
			Mean	n(%)	Mean	n(%)	
B1			5.36		4.82		0.188
B2			6.76		6.36		0.340
B3			8.54		8.75		0.451
B4	Needs to be maintained	138(82)		101(73)		37(27)	0.695
	Needs to be reduced	30(18)		23(77)		7(23)	
B5	via meeting the patients	94(56)		72(77)		22(23)	0.504
	Via meeting standardized patients or medical models	60(36)		42(70)		18(30)	
	Online education	4(2)		4(100)		0(0)	
	Virtual reality	3(2)		2(67)		1(33)	
	others	7(4)		4(57)		3(43)	
B6	Communication and collaboration	25(15)		20(80)		5(20)	0.499
	Education and research	41(24)		32(78)		9(22)	
	Patient care	38(23)		30(79)		8(21)	
	Professionalism	4(2)		3(75)		1(25)	
	Self-development	25(15)		15(60)		10(40)	
	Social accountability	35(21)		24(69)		11(31)	
B7	Negatively	61(36)		44(72)		17(28)	0.921
	Positively	33(20)		25(76)		8(24)	
	Same as usual	74(44)		55(74)		19(26)	

Table 8. The impact of COVID-19 to Medical Students

Question	Male	Female	P-value
1. How has your amount of study time changed compared to before the COVID-19 situation?	5.57	5.32	0.564
2. How has your level of academic-related stress changed compared to before the COVID-19 situation?	8.49	7.75	0.012
3. How much has the current COVID-19 situation affected your studies?	8.70	8.50	0.496
4. Are you afraid of interacting with a typical patient (during clinical practice) as a medical student?	4.70	4.23	0.308
5. Are you afraid of interacting with a suspected coronavirus patient as a medical student (during clinical practice)?	6.14	5.45	0.117
6. Are you afraid of interacting with a confirmed coronavirus patient as a medical student (during clinical practice)?	6.90	6.30	0.201
7. How much do you think the current COVID-19 pandemic affects your life and behaviour?	9.04	8.89	0.431
8. How much do you think the current COVID-19 pandemic affects your role as a medical student?	9.11	9.05	0.754

II. Age

Tables 9, 10, and 11 show the result of a test of the relationship of *Age* with *Perception, Attitude, and Impact*. All of the tests were not significant. Therefore, *Age* variable had no significant relationship with the rest of the *Perception, Attitude, and Impact* questions.

Table 9. The perception of 4th year medical students regarding their role during pandemic era

Question	r-value	p-value
A1	-0.020	0.800
A2	-0.025	0.750
A3	-0.096	0.217
A4	-0.074	0.342
A5	-0.014	0.860
A6	-0.095	0.222
A7	0.044	0.570
A7.a	0.130	0.157

Table 10. The perception of 4th year medical students regarding their role during pandemic era

Question	r-value	p-value
B1	-0.0.55	0.482
B2	-0.102	0.187
B3	0.085	0.273
B4	0.122	0.115

Table 11. The impact of COVID-19 on Medical Students

Question	r-value	p-value
1. How has your amount of study time changed compared to before the COVID-19 situation?	0.061	0.432
2. How has your level of academic-related stress changed compared to before the COVID-19 situation?	-0.041	0.595
3. How much has the current COVID-19 situation affected your studies?	0.082	0.288
4. Are you afraid of interacting with a typical patient (during clinical practice) as a medical student?	-0.051	0.509
5. Are you afraid of interacting with a suspected coronavirus patient as a medical student (during clinical practice)?	0.076	0.324
6. Are you afraid of interacting with a confirmed coronavirus patient as a medical student (during clinical practice)?	0.097	0.210
7. How much do you think the current COVID-19 pandemic affects your life and behaviour?	0.066	0.398
8. How much do you think the current COVID-19 pandemic affects your role as a medical student?	0.102	0.190

III. School

Tables 12, 13, and 14 show the result of the test of difference and relationship of *School* in terms of *Perception, Attitude, and Impact*. The test was only significant in terms of item #6 in "*Students' attitude toward clinical clerkship training during the COVID 19-pandemic*" (p=0.003), item #3 (p=0.041) in "*The Impact of COVID-19 on Medical Students*" and item #8 in "*The Impact of COVID-19 on Medical Students*" set of questions(p=0.000). Hence, there was a significant relationship between the chosen important outcome of medical training

and the school of students. Also, there was a significant difference in the level of how much the studies and role as medical students were affected between schools. The important outcomes with the highest number chosen were education & research (both CPU and IDC) and social accountability (WVSU), (*see Table 13)*. On average, CPU students had the highest level of how much their studies (9.13) and role as medical students (9.74) were affected by the pandemic (*see Table 14)*. Furthermore, the rest of the tests were not significant. Therefore, *the School* variable had no significant relationship with the rest of the *Perception, Attitude, and Impact* questions.

Table 12. The perception of 4th year medical students regarding their role during pandemic era

Question	Answer	n%	CPU		IDC		WVSU		P-value
			Mean	n(%)	Mean	n(%)	Mean	n(%)	
A1			8.81		8.74		8.93		0.738
A2			9.66		9.64		9.63		0.989
A3			7.94		7.58		7.96		0.522
A4			6.11		5.60		6.38		0.142
A5			8.74		8.55		8.68		0.812
A6			5.64		5.47		6.09		0.477
A7	No	118(70)		30(25)		38(32)		50(42)	
	Yes	50(30)		17(34)		15(30)		18(36)	
A7.a	Lack of ability for clinical practice	106(90)		24(23)		36(34)		47(44)	0.092
	Medical license issue	12(10)		7(58)		3(25)		2(17)	
A8	Acting as an assistant for healthcare professionals	23(14)		11(48)		6(26)		6(26)	0.408
	Acting as an informer to neighbors about the COVID-19	17(10)		3(27)		8(73)		6(55)	
	Actively learning about the COVID-19	8(5)		3(38)		1(13)		4(50)	
	All of the above	6(4)		1(17)		1(17)		4(67)	
	Be actively involved in clinical practice, if possible	26(15)		7(27)		7(27)		12(46)	
	Focusing on the medical education and learning as trainees	88(52)		22(25)		30(34)		36(41	

Table 13. Students' attitude toward clinical clerkship training during the COVID 19 - pandemic

Question	Answer	n%	CPU		IDC		WVSU		P-value
			Mean	n(%)	Mean	n(%)	Mean	n(%)	
B1			4.32		5.26		5.81		0.003
B2			6.55		6.51		6.84		0.0705
B3			8.94		8.68		8.29		0.090
B4	Needs to be maintained	138(82)		38(28)		40(29)		60(43)	0.727
	Needs to be reduced	30(18)		9(30)		13(43)		8(27)	
B5	Via meeting the patients	94(56)		3(30)		22(23)		44(47)	0.130
	Via meeting standardized patients or medical models	60(36)		16(27)		24(40)		20(33)	
	Online Education	4(2)		0(0)		3(75)		1(25)	
	Virtual reality	3(2)		2(67)		1(33)		0(0)	
	Others	7(4)		1(14)		3(43)		3(43)	
B6	Communication and collaboration	25(15)		6(24)		7(28)		12(48)	0.003
	Education and research	41(24)		14(34)		18(44)		9(22)	
	Patient care	38(23)		11(29)		9(24)		18(47)	
	Professionalism	4(2)		2(50)		0(0)		2(50)	
	Self development	25(15)		8(32)		13(52)		4(16)	
	Social accountability	35(21)		6(17)		6(17)		23(66)	
B7	Negatively	61(36)		21(34)		17(28)		23(38)	0.682
	Positively	33(20)		7(21)		12(36)		14(42)	
	Same as usual	74(44)		19(26)		24(32)		31(42)	

Table 14. The Impact of COVID-19 on Medical Students

Question	CPU	IDC	WVSU	P-value
1. How has your amount of study time changed compared to before the COVID-19 situation	6.02	5.53	5.13	0.173
2. How has your level of academic-related stress changed compared to before the covid	8.32	8.19	8.37	0.844
3. How much has the current COVID-19 situation affected your studies?	9.13	8.64	8.32	0.041
4. Are you afraid of interacting with a typical patient (during clinical practice) as a medical student?	4.55	4.26	4.84	0.497
5. Are you afraid of interacting with a suspected coronavirus patient as a medical student (during clinical practice)?	5.62	5.85	6.28	0.345
6. Are you afraid of interacting with a confirmed coronavirus patient as a medical student (during clinical practice)?	6.68	6.64	6.85	0.898
7. How much do you think the current COVID-19 pandemic affects your life and behaviour?	9.23	8.81	8.99	0.163
8. How much do you think the current COVID-19 pandemic affects your role as a medical student	9.74	8.83	8.85	0.000

IV. Experience Hospital Rotation

Tables 15, 16, and 17 show the result of the test of difference and relationship of *Experience Hospital Rotation* in terms of *Perception, Attitude, and Impact*. The test was only significant in terms of item #7 (p=0.012) in "*The Impact of COVID-19 on Medical Students*" and item #8 in "*The Impact of COVID-19 on Medical Students*" set of questions (p=0.000). Hence, there was a significant difference in the level of how much the life, behavior, and role of medical students were affected between students who experienced hospital rotation and didn't. On average, students who had experienced hospital rotation had a higher level of how much their life, behavior (9.30), and role as medical students (9.74) were affected by the pandemic compared to students who did not experience hospital rotation (*see Table 17*). Furthermore, the rest of the tests were not significant. Therefore, *the School* variable had no significant relationship with the rest of the *Perception, Attitude, and Impact* questions.

Table 15. The perception of 4th year medical students regarding their role during pandemic era

Question	Answer	n%	No		Yes		P-value
			Mean	n(%)	Mean	n(%)	
A1			8.77		8.96		0.368
A2			9.60		9.72		0.471
A3			7.76		7.98		0.470
A4			6.03		6.12		0.786

A5			8.59		8.77		0.488
A6			5.70		5.89		0.684
A7	No	118(70)		79(67)		39(33)	0.712
	Yes	50(30)		32(640		18(36)	
A7.a	Lack of ability for clinical practice	106(90)		74(70)		33(31)	0.161
	Medical license issue	12(10)		5(42)		7(58)	
A8	Acting as an assistant for healthcare professionals	23(14)		12(52)		11(48)	0.780
	Acting as an informer to neighbors about the COVID-19	17(10)		2(109)		5(45)	
	Actively learning about the COVID-19	8(5)		5(63)		3(38)	
	All of the above	6(4)		4(67)		2(33)	
	Be actively involved in clinical practice, if possible	26(15)		18(69)		8(31)	
	Focusing on the medical education and learnings as trainees	88(52)		60(68)		28(32)	

Table 16. Students' attitude toward clinical clerkship training during the COVID 19-pandemic

Question	Answer	n%	No		Yes		P-value
			Mean	n(%)	Mean	n(%)	
B1			5.36		4.47		0.056
B2			6.76		6.74		0.746
B3			8.54		8.86		0.120
B4	Needs to be maintained	138(82)		92(67)		46(33)	0.727
	Needs to be reduced	30(18)		19(63)		11(37)	
B5	Via meeting the patients	94(56)		59(63)		35(37)	0.109
	Via meeting standardized patients or medical models	60(36)		40(67)		20(33)	
	Online education	4(2)		4(100)		0(0)	
	Virtual reality	3(2)		1(33)		2(67)	
	Others	7(4)		7(100)		0(0)	

B6	Communication and collaboration	25(15)		18(72)		7(28)	0.433
	Education and research	41(24)		22(54)		19(46)	
	Patient care	38(23)		26(68)		12(32)	
	Professionalism	4(2)		2(50)		2(50)	
	Self-development	25(15)		17(68)		8(32)	
	Social accountability	35(21)		26(74)		9(26)	
B7	Negatively	61(36)		35(57)		26(43)	0.193
	Positively	33(20)		24(73)		9(27)	
	Same as usual	74(44)		52(70)		22(30)	

Table 17. The impact of COVID-19 on Medical Students

Question	No	Yes	p-value
1. How has your amount of study time changed compared to before the COVID-19 situation	5.35	5.81	0.265
2. How has your level of academic-related stress changed compared to before the COVID-19 situation?	8.29	8.32	0.921
3. How much has the current COVID-19 situation affected your studies?	8.47	9.00	0.052
4. Are you afraid of interacting with a typical patient (during clinical practice) as a medical student?	4.60	4.53	0.858
5. Are you afraid of interacting with a suspected coronavirus patient as a medical student (during clinical practice)?	6.11	5.67	0.275
6. Are you afraid of interacting with a confirmed coronavirus patient as a medical student (during clinical practice)?	6.77	6.68	0.852
7. How much do you think the current COVID-19 pandemic affects your life and behaviour?	8.85	9.30	0.012
8. How much do you think the current COVID-19 pandemic affects your role as a medical student?	8.77	9.74	0.000

V. Length of Stay during Rotation

Tables 18, 19, and 20 show the result of a test of the relationship of *Length of Stay during Rotation* with *Perception, Attitude, and Impact*. All of the tests were not significant except item #7 (p=0.012) in "*The Impact of COVID-19 on Medical Students*" and item #8 in "*The Impact of COVID-19 on Medical Students*" set of questions(p=0.000). Hence, there was a significant relationship between the level of how much life, behavior, and role of medical students were affected by pandemic and length of stay during rotation. Furthermore, the relationship was directly proportional. Longer/ shorter length of hospital stay during the rotation corresponds to a higher/lower level of how much the life, behavior (r=0.193), and role (r=0.272) of medical students were affected by pandemic (*see Table 20)*. In addition, the rest of the tests were not significant. Therefore, *the Length of Stay* variable had no significant relationship with the rest of the *Perception, Attitude, and Impact* questions.

Table 18. The perception of 4th year medical students regarding their role during pandemic era

r-value	p-value
0.111	0.153
0.045	0.562
-0.005	0.944
0.003	0.971
-0.016	0.836
0.029	0.705
0.024	0.754
0.050	0.592

Table 19. Students' attitude toward clinical clerkship training during the COVID 19-pandemic

Question	r-value	p-value
B1	-0.008	0.918
B2	0.093	0.229
B3	-0.012	0.878
B4	-0.036	0.641

Table 19. Students' attitude toward clinical clerkship training during the COVID-19 pandemic

Question	r-value	p-value
1. How has your amount of study time changed compared to before the COVID-19 situation	0.012	0.887
2. How has your level of academic-related stress changed compared to before the COVID-19 situation?	-0.070	0.366
3. How much has the current COVID-19 situation affected your studies?	0.085	0.275
4. Are you afraid of interacting with a typical patient (during clinical practice) as a medical student?	0.005	0.949
5. Are you afraid of interacting with a suspected coronavirus patient as a medical student (during clinical practice)?	0.029	0.706
6. Are you afraid of interacting with a confirmed coronavirus patient as a medical student (during clinical practice)?	0.041	0.601
7. How much do you think the current COVID-19 pandemic affects your life and behaviour?	0.193	0.012
8. How much do you think the current COVID-19 pandemic affects your role as a medical student?	0.272	0.000

DISCUSSION

Clinical exposure of 4th year medical students is a crucial part of their medical education but due to COVID-19 pandemic, this was abruptly disrupted like the other medical schools around the world [19]. This study aimed to assess what the medical students think their roles were during the time of the pandemic, their views of the new medical education delivery system, their lifestyle as a student, and the impact this pandemic had on them. The study focused on the clinical clerks of the 3 medical schools in the city of Iloilo. The results revealed that disruption of the clinical training of the students had brought impact on their confidence for clinical practice. They agreed that changes should be made in the clerkship training at this time of pandemic but are not sure if the

present educational methods of learning are effective. Lastly, in this study, it was perceived that there was an increase in students' academic-related stress.

The Role of Medical Students in the Pandemic Era

In this study, it revealed that despite the danger that this pandemic has brought to each life of the frontliners, especially on a medical doctor, the level of interest of clinical clerks in COVID-19 was high (8.83) which was a little bit higher (7.06) than the level of interest in COVID-19 of the students in Korea [18]. It was also noted that social responsibility was high among the medical students (9.64). Although, they are not equipped with the clinical experience, were not sure if they are ready to participate in patient care, and think that they should focus on medical education and learning for now, but if the need arises in the future, respondents were willing to participate or assist in patient care. In contrast to the previous statement, students were neutral regarding having their graduation early or receiving a temporary license to augment the medical workforce in the future infectious disease situation, due to their lack of clinical skill. In countries like the USA, UK, Italy, South Africa, and Brazil, due to a national emergency or anticipation of one, expedite graduation was awarded to medical students in the condition that they will serve as frontline physicians [5,20,21]. In line with this, confusion on what was the role of clinical clerks in times of pandemics was placed under mitigation. The threat to life this pandemic has and the uncertainty it has brought, the students' role differs from country to country. Medical clerks were indeed students, but at the same time were clinicians-in-training. The American Association of Medical Colleges (AAMC) suspended student clerkship and instructed medical schools that medical student involvement should be reserved for critical health care professional shortage only. Possible reasons for the suspension of clerkship were concerns about the risk of infection to patients and students, PPE shortage, and associated liability issues [22]. In the Philippines, APMC advised pulling out of clerks from their respective hospital rotations. In this study most of the clinical clerks had no hospital exposure at all and only a few of them have a very short clinical experience, as compared to what was required hours of hospital rotation pre pandemically. This affected their confidence in handling patients as reflected in this study. In an article, the authors stated that allowing medical students to serve in the current circumstance may improve the medical student's patient care skills long before the healthcare system reaches a personnel crisis and, in some cases may even help prevent such crisis from occurring [22]. This was one of the important things that the governing body that looks after the well-being of the medical students should consider in making policies.

Students' attitude toward clinical clerkship training during the COVID-19 Pandemic

Medical students around the world experienced a sudden shift from bedside rounds education to e-learning. In one study in Libya, students were concerned about how e-learning could be applied to provide clinical experience, especially since the final year of medical education depends heavily on bedside teaching [19]. Different educational platforms for non-contact lectures have been made available for this purpose to somehow fill the loss of access to physical hospital exposure. This rapid transition had left us with so many concerns, the result of which would be evaluated in the near future; as the products of this kind of educational modality proceed to further residency training and or clinical practice after their national board examination. In this study, respondents have a neutral response regarding the question that if that medical school education was working properly during COVID-19 pandemic [5,22]. In Korea, students favorably viewed the current online education system, but their professors and graduates who valued clinical practice expressed doubts about its effectiveness [18]. Moreover, participants in this study thought that medical school education should be

changed to fit into the new normal era (8.60). However, almost all of the students wanted to maintain the hands-on clinical practice education (82%) and thought that medical students can gain clinical experience in the pandemic era through patient encounters (56%) compared to other modalities; in contrast with the study done by Hong et al at University of Ulsan College of Medicine. Students in this university preferred simulated patients and models, online learning, and virtual reality over that of meeting an actual patient. Almost half the medical students here in Iloilo city thought that patients would accept them as usual trainees (44%) despite the ongoing pandemic in contrast to the Korean and Japanese studies that the students worried that they would be perceived as COVID-19 transmitters [18,22,23]. Lastly, education, patient care, and social accountability were the top three most important outcomes of medical education during the pandemic era. Of note, there was a significant relationship between chosen and important outcomes among students coming from a private and government school. The important outcome with the highest number chosen was education & research from students in private schools and social accountability from a public school.

Impact of COVID-19 on Medical Students

On average, there was no significant change in the study time among 4th year medical students as compared before the COVID-19 situation (5.51) the same result was obtained among other medical students in Asia [18]. Although the current situation provides more free time to students because there was a cancellation of extracurricular activities, only a few of the students were spending more time studying. Free time was invested in other activities like developing new hobbies and new habits such as reading, cooking, playing instruments, painting, etc. [24]. However, in this study, there was a perceived increase in the level of academic-related stress (8.30) and this definitely affected the studies of students (8.65). Academic stress has been long recognized as a predictor of poor mental health in medical students [25]. The drastic change in the methods of learning may be a trigger for students who are already susceptible to high levels of academic stress [26], especially for those transitioning from a student to a doctor [27]. Between male and female students, male (8.49) students experienced a higher increase in stress level compared to female (7.75) students. There are inconsistencies reported in different studies done in the past regarding gender -related stress. This was attributed to the differences in the social and educational environment[28,29,30,31,32]. Medical students in the city were neither not afraid nor afraid of interacting with typical (4.58) or suspected coronavirus patients (5.96) but were very afraid of interacting with confirmed coronavirus patients (6.74). The same reaction was observed with the other medical students in the previous study [5]. Lastly, the life, behavior (9.00), and their role as medical (9.10) students were definitely affected by the current COVID-19 pandemic. The students who were able to participate in in-hospital patient care and had a longer duration of stay had a greater understanding of the effect of COVID-19 pandemic had on their training, role as a student, behavior, and life as a whole.

Limitations

Our study has limitations. Firstly, our study was conducted in only one city here in the Philippines, therefore the results might not be reflective of the national medical education condition as results may vary from different schools and regions. Secondly, there is not enough published literature in this area for comparison and contrast with our findings. To our knowledge, no study has been made yet in our locality. However, despite the above limitations. We are hopeful that our findings will be able to provide valuable information about the perceptions and attitudes of clinical clerks during the time of the pandemic.

CONCLUSIONS

In conclusion, the respondents were predominantly male, with a mean age of 25 years old. Less than half of them were able to experience in-hospital clinical exposure. The areas that they were to rotate were Pediatrics, Internal Medicine, Surgery and Obstetrics and Gynecology respectively with the mean duration of 15 days total hospital exposure. Most of the students perceived that during this pandemic they cannot participate in patient care due to lack of clinical experience despite their willingness to help. They still see their goal at this time is education and to learn more as trainees. They agreed that medical education at this time should change to tailor fit their needs for safe education but on the other hand expressed their desire to maintain and be able to experience hands-on in-hospital patient care. This study also revealed that the present pandemic has affected the students as a whole in areas of their role, behavior, and life.

RECOMMENDATIONS

The researchers would like to recommend the following:

1. A similar study on a national scale should be conducted for the gathering of information regarding the challenges our clinical clerks are experiencing so that a program or policy should be made to improve the medical education during the pandemic crisis in the present time and the future.

2. Alternative teaching approaches (virtual medical interviews, electronic health records, electronic problem-based learning, etc.) for a clinical clerkship with regular evaluation of its effectiveness should be explored so that the best method tailored fit to the needs of the students will be formulated.

3. Despite the present pandemic, medical clerks who are willing to experience clinical rotation should be allowed with strict compliance to health safety precaution guidelines with consent from the student's family.

4. In line with the above recommendation, if clinical clerks would be allowed to experience clinical exposure, rigorous training of putting on a personal protective suit should be done with a regular repeat performance in front of their clinical instructor for checking and evaluation to ensure their safety.

5. Regular psychological assessment should be done on the medical students so that appropriate support will be given on time.

6. Coping strategies should be explored and taught to these students to help them cope with their personal daily stresses.

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