

Knowledge, Attitude, and Practices on the Use of Hydroxychloroquine on COVID-19 Patients among Physicians in Government Tertiary Hospitals

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Abstract: - This study aimed to assess the knowledge, attitude, and practices on the use of hydroxychloroquine on COVID-19 patients among physicians in government tertiary hospitals as well as to provide a list of currently administered drugs, vitamins or therapy to COVID-19 patients in order to alleviate the symptoms caused by SARS-CoV-2. It involved 100 licensed physicians working in a government tertiary hospital in the Philippines. An online survey was utilized for the informed consent and questionnaire. The respondents were screened in order to confirm if they fit the inclusion criteria. The respondents were assessed based on their demographic profile and knowledge, attitude, and practice towards the use of hydroxychloroquine on COVID-19 patients. In addition, the respondents were also asked about other drugs that had been prescribed or administered aside from hydroxychloroquine. Majority (42%) of the respondents belonged to the 26-30 age group, 54% were male, 28% specialized in internal medicine and 91% dealt with COVID-19 patients. The survey revealed that the overall weighted mean in terms of the knowledge of the respondents towards the use of hydroxychloroquine on COVID-19 patients was 3.14 which implies that the respondents have a moderate knowledge on the use of hydroxychloroquine. There were no significant differences on the knowledge of physicians when group according to sex, age and whether they have dealt with COVID-19 patients; moreover, the computed p-values are .720, .984, and .246 respectively. On the other hand, there was a significant difference in the knowledge of physicians when group according to specialization ($p = 0.035$). The overall weighted mean of the attitude of the respondents was 2.20 implies a negative attitude towards the use of hydroxychloroquine but the respondents are interested in reading journal articles and/or cases that tackles the use and effects of hydroxychloroquine on COVID-19 patients. The attitude of the respondents were not significantly different when grouped according to sex ($p = 0.945$), age groups ($p = 0.554$), specialization ($p = 0.181$) and whether they have dealt with COVID-19 patients ($p = 0.874$). The overall weighted mean of practices was 2.23 which implies disagreement on the use of hydroxychloroquine. There were no significant differences on the practices of physicians when grouped according to sex ($p = 0.999$), age groups ($p = 0.958$), and whether they have dealt with COVID-19 patients ($p = 0.588$), whereas there was a significant difference when grouped according to specialization ($p = 0.006$). The other drugs prescribed or administered in response to COVID-19 are remdesivir and azithromycin. To conclude, the knowledge of the respondents on the new living guidelines by the World Health Organization directly influenced the attitude and practices of the physicians and other drugs that can be effectively used in response to COVID-19 should be further investigated.

Key Words: — SARS-CoV-2, COVID-19, Hydroxychloroquine, KAP Study.

I. INTRODUCTION

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Coronavirus disease 2019 or the COVID-19 is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) that is often compared to a flu but the difference is that it attacks the host's body differently. This disease is under the coronavirus group which can be structurally characterized by the presence of spike proteins

along the lipid envelope, enclosing viral RNA. It is transmitted through respiratory droplets from coughing and sneezing and contact with the mouth, eyes, or nose with contaminated hands. With the rapidly increasing morbidity and mortality of COVID-19, finding interventions for the disease becomes a global priority. Even with the presence of a vaccine, vaccination hasn't become an option in some countries which warrants a temporary solution to help the general public long enough for immunization options to become available in their respective countries [14]. The objective of this study is to come to a consensus on the utilization of hydroxychloroquine in government tertiary hospitals based on the responses of physicians on the use of hydroxychloroquine on COVID-19 patients.

Up to the present moment, there is no cure for COVID-19. Thus, the scientific community is actively exploring antiviral drugs and vaccines for the disease. To interrupt the spread of this virus, it relies both on the pharmacologic and nonpharmacologic interventions. Social distancing and proper hygiene are the habits that help in slowing down the spread of viruses among individuals. However, the foremost vital medicine interventions to stop SARS-CoV-2 infection should be vaccines, and an established medication for short-run prophylaxis is another. There are some specific antiviral drugs against COVID-19 that are already approved but the problem is it is still lacking that is why there are other drugs that are being explored [25].

This study provided a statistically relevant assessment of the responses of multiple healthcare workers, primarily physicians from government tertiary hospitals, on the utilization of hydroxychloroquine in hospitals. The assessment of this study is deemed to aid and assist researchers in their clinical research, as they discover different treatments to the COVID-19 patients.

In the early period of the pandemic, hydroxychloroquine and chloroquine have been eyed as a potential therapeutic option for patients that have COVID-19. Some publications have been examining these drugs for further evidence that will support their use in patients having COVID-19. Hydroxychloroquine is specifically used to prevent and treat malaria. Likewise, this drug is used to treat lupus and rheumatoid arthritis which are auto-immune diseases. Hydroxychloroquine belongs to a category of disease-modifying antirheumatic drugs (DMARDs) which can prevent swelling/ache in arthritis and reduce pores and skin problems in lupus [21]. Both hydroxychloroquine and

chloroquine share similar mechanisms of action which increase pH within intracellular vacuoles and alter processes such as protein degradation by acidic hydrolases in the lysosome, assembly of macromolecules in the endosomes, and post translational modification of proteins in the Golgi apparatus. Using the *in vitro*, hydroxychloroquine shows to restrict the replication of SARS-CoV-2 [10].

According to the study done by Meyerowitz *et al.* (2020) [19] the impact of hydroxychloroquine on cytokine production and suppression of antigen presentation may have immunologic consequences that hamper innate and adaptive antiviral immune responses for patients with COVID-19. There is an increasing number of COVID-19 patients that are treated with hydroxychloroquine and chloroquine which means that more data are gathered. However, there is still no significant clinical data that exhibit a clear benefit from the agents used.

In *in vitro* results, both hydroxychloroquine and chloroquine showed favorable results, still, its data in performance in *in vivo* studies have not been relevant. Most of the data in clinical trials that propose both hydroxychloroquine and chloroquine have benefits to COVID-19 patients are still in their preliminary stages. In addition, there were ongoing trials that have been canceled and the reason is not yet clear if it is due to the adverse effects of the drugs or its unsuccessful results [12].

There is increasing data about the use of hydroxychloroquine in COVID-19 patients, however, there is no evidence in the improvement of patients infected with COVID-19 using the randomized controlled trials or any single therapy of hydroxychloroquine. For the prophylaxis, post exposure prophylaxis, and treatment of hydroxychloroquine in patients with COVID-19, it is still under observation [18].

II. METHODOLOGY

A. Research Design

A descriptive-normative study was conducted in government tertiary hospitals. The researchers gathered data and assessed the knowledge, attitude, and practices of health workers specifically licensed physicians on the use of hydroxychloroquine on COVID-19 patients. In addition, demographic data was obtained in order to categorize the health workers based on their demographic profile.

B. Subjects and Study Site

The subjects of the study are the physicians working in government tertiary hospitals in the Philippines. In this study, the researchers were able to gather 114 respondents. However, 14 physicians were disqualified since two of them did not consent to participate, seven of them are not working in a government hospital, and five of them weren't able to answer whether they are currently working in a government tertiary hospital. Thus, in total, the data was derived from 100 physicians from tertiary government hospitals in the Philippines. The sample size complied with a 10% margin of error, 95% confidence level, and response distribution of 50% computed on the *Roasoft* calculator. The participants of this study were determined by implementing a purposive and convenience sampling technique for the purpose to effectively select representative samples. The study has been conducted throughout the academic year 2020-2021, at which the survey questionnaire was deployed to the respondents during the month of April of 2021 until May of 2021 through google forms. Participants were also given the liberty to withdraw from the study at any time.

Table.1. Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> Licensed physicians in the Philippines Age group ranging from 26 to 50 or above Currently employed in a government tertiary hospital 	<ul style="list-style-type: none"> Other licensed health workers Not employed in a government tertiary hospital

C. Data Measure/Instrumentation

The researchers utilized a questionnaire drawn out based on the previous studies reported in the review of related literature. This was divided into four categories which consist of demographic profile, knowledge, attitude, and practices of the respondents. Each part (knowledge, attitude, and practices) was used to address the objectives of the study, overall the questionnaire

contained 25 questions. The questionnaire was formulated through Google forms, an online tool used for research surveys. The survey questionnaires were disseminated via email and social media platforms such as Facebook, Twitter, Instagram, Messenger, Viber and Telegram which allow researchers to have easier access and communication in the data collection. Participants were physicians from the government tertiary hospitals.

The researchers utilized Cronbach's alpha to measure the reliability of a set of scales or the set of survey questions for validation before distributing the questionnaires to the participating physicians on the use of hydroxychloroquine on COVID-19 Patients. Cronbach's alpha is a measure on a test's internal consistency to ensure that said test is indeed reliable and valid enough to be given out [27].

Table.2. Reliability Test using Cronbach's Alpha

Cronbach's Alpha	N of items
.913	25

The validity index using Cronbach's alpha was computed to be .913.

In the collection of data, the researchers sent a request to participate in the study to the physician. An informed consent was given out for the respondents and was fully informed first regarding the subjects of the study before answering the survey provided by the researchers. The researchers respected the decision of every respondent on whether or not to get involved with the research. The respondents were given a choice to indicate their name or remain anonymous to consider privacy of information. The information gathered was held confidential and only be disclosed to the research team alone. The findings of the study were available to the respondents once the study was completed.

D. Data Gathering Procedure

The data gathering procedure of this study utilized an online survey questionnaire through Google Forms due to the constraints brought by the COVID-19 pandemic. The online survey consisted of five parts; informed consent, demographics, knowledge, attitude, and practice. The demographic profile included the specialty of the physician and those who

responded with their subspecialties are included under their generalized specialties. Under the knowledge part, it included Chemical Structure and Pharmacokinetics of hydroxychloroquine, Benefits and Side Effects of hydroxychloroquine, Administration, Dosage, and Storage of hydroxychloroquine. For the attitude part, Interest and Opinion towards hydroxychloroquine and Inclination on prescription was included. Based on the limitations of the study, the criteria of respondents were licensed physicians from government tertiary hospitals were the coverage of this study.

The qualified respondents were asked for their informed consent before proceeding to the online survey questionnaire in accordance with standard ethical practice. In the informed consent, it included general details on the intent of the study and provided a substantial discussion of participants' rights, such as the right to privacy and confidentiality, the right to withdraw from the study, and the right to ask questions and to raise any concerns. After the completion of surveys, using the Google Forms application, survey results were compiled and were statistically analyzed.

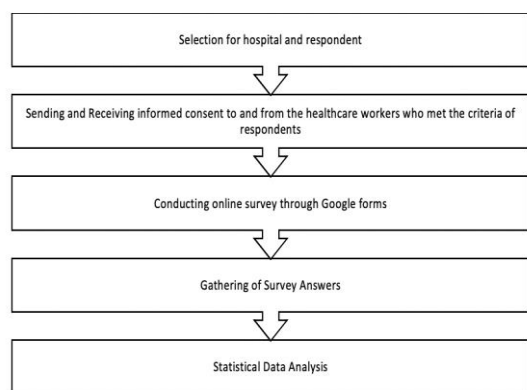


Fig.1. Data Gathering Procedure Flowchart

E. Ethical Considerations

In the study conducted, ethical considerations served as guidelines in fulfilling the truthfulness, knowledge and adherence of error in misinterpreting the data acquired. Ethical considerations entailed protection for both of the researchers and participants of the study. Furthermore, the researchers declared no conflict of interest along the course of study. The study protocol was approved by the Tondo Medical Center Research Ethics Committee and the Faculty of Pharmacy Research Ethics Committee.

In the collection of data, an informed consent was given out for the respondents and they were fully informed first regarding the subjects of the study prior to answering the survey provided by the researchers. The researchers respected the decision of every respondent on whether or not to get involved with the research. The respondents had given a choice to indicate their name or remain anonymous to consider privacy of information. The information that had been gathered were held as confidential and only be disclosed to the research team alone. The findings of the study will be available to the respondents once the study is completed.

F. Data Analysis

The analysis of data is necessary for proving the statistical significance of the data collected. The study aimed to describe the knowledge, attitude, and practices of physicians on the use of hydroxychloroquine on COVID-19 patients in tertiary government hospitals. A minimum of 100 total participants were needed based on an online sample size calculator from Rasoft inc. The survey was conducted through the use of Google forms and informed consent was required prior to starting the survey. To describe the data, the study used frequency count and weighted mean and interpreted the data using the following scale and verbal interpretation:

Table.3. Scale and Verbal Interpretation

Scale	Verbal Interpretation
4.20 – 5.00	Strongly Agree
3.40 – 4.19	Agree
2.60 – 3.39	Neutral
1.80 – 2.59	Disagree
1.0 – 1.79	Strongly Disagree

Note: The verbal interpretation for the assessment of knowledge is very highly knowledgeable, highly knowledgeable, moderately knowledgeable, somewhat knowledgeable, and not knowledgeable.

To determine the significance of the knowledge, attitudes, and practices of physicians on the use of hydroxychloroquine on COVID-19 patients in government tertiary hospitals when grouped according to their demographic profile, analysis of variance (ANOVA) testing was used. ANOVA testing is a method that is used to separate variances in order to determine what effect the independent variable has [11].

III. RESULTS AND DISCUSSION

A. Description of the Profile of the Respondents

The profile of the respondents was described using their age, sex, specialization, and whether they have dealt with or have been dealing with covid-19 patients.

Table.4 presents the description of the respondents as to their age, specialization, and whether they have dealt with or have been dealing with Covid-19 patients.

Table.4. Description Of The Respondents as to their Age, Sex, Specialization, and Whether They Have Dealt With Or Have Been Dealing With Covid-19 Patients.

Demographic Profile	f	%
Age		
26 – 30	42	42
31 – 35	38	38
36 – 40	4	4
41 – 45	9	9
46 – 50	4	4
>50	3	3
Sex		
Male	54	54
Female	46	46
Specialization		
Anesthesiology	9	9
Dermatology	10	10
Emergency Medicine	2	2
General Practice	1	1
Internal Medicine	28	28
OB-GYN	8	8
Ophthalmology	3	3
Pathology	2	2
Pediatrics	6	6
Radiology	2	2
Radiation Oncology	1	1
Rehabilitation Medicine	1	1
Surgery	23	23
Urology	2	2
Neurology	1	1
Otorhinolaryngology	1	1
Dealing or Having dealt with COVID-19 Patients		
Yes	91	91
No	9	9

As to Age:

Table 4 showed that almost half (42%) belongs to the 26-30 age group and 38% belongs to the 31-35 age group. According to the recent research brief by the University of the Philippines Population Institute or UPPI and Demographic Research and Development Foundation, Inc. or DRDF (2020) [29], sixty-five percent of health professionals are under the age of 35.

As to Sex:

Table 4 depicts that the majority of the respondents were male (54%) but based on the UPPI and DRDF (2020) the majority of the health professionals are females.

As to Specialization:

Based on Table 4, most of the respondents (28%) belonged to internal medicine as their specialization which has a very huge part in the ongoing pandemic. According to Johnson S.B., & Butcher F. (2020) [15], all of the medical doctors have a duty and limitations in handling patients especially during the pandemic since the degree of obligation varies between specialties within certain constraints.

As to dealing/ having dealt with COVID-19 patients:

Based on Table 4, 91% of the respondents are dealing or have dealt with COVID-19 patients since not all licensed physicians or specializations deal with patients diagnosed with COVID-19 and according to Johnson S.B., & Butcher F. (2020) [15] opting out of medical doctors is justifiable during the pandemic if it extends beyond their area of expertise.

Description of the Knowledge of Physicians on the Use of Hydroxychloroquine on COVID-19 patients

Table.5. delineates the knowledge of physicians on the use of hydroxychloroquine on COVID-19 patients.

Table.5. Knowledge of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients

Parameter	WM	VI
Chemical Structure and Pharmacokinetics of Hydroxychloroquine		

1. Hydroxychloroquine is derived from 4-aminoquinolines.	3.34	MK
2. Hydroxychloroquine belongs to the antiviral category of drugs and contains broad-spectrum antiviral effects.	2.61	MK
Benefits and Side Effects of Hydroxychloroquine		
3. Hydroxychloroquine can reduce the viral load of SARS-CoV-2.	2.21	SK
4. Hydroxychloroquine can cause adverse cardiac effects.	4.12	HK
Administration, Dosage, and Storage Hydroxychloroquine		
5. Hydroxychloroquine is orally administered.	4.44	VHK
6. The specific dose for Hydroxychloroquine in administering to COVID-19 patients is 400 mg once a day for about 5-15 days.	2.41	SK
7. Hydroxychloroquine can be administered with or without azithromycin.	2.85	MK
8. Hydroxychloroquine is stored at room temperature up to 25°C.	2.7	MK
9. As of December 17, 2020, strong recommendation against the use of hydroxychloroquine in patients with COVID-19 was included in the WHO guideline.	3.59	HK
Overall WM	3.14	MK

Note. VHK - Very Highly Knowledgeable, HK - Highly Knowledgeable, MK - Moderately Knowledgeable, SK - Somewhat Knowledgeable

Overall, as can be gleaned from Table 5 the overall weighted mean of 3.14 implies that the physicians have moderate

knowledge on the use of hydroxychloroquine. The Table 5 shows that respondents had highest knowledge that the drug hydroxychloroquine is orally administered with a 4.4 weighted mean while the respondents had lowest knowledge that hydroxychloroquine can reduce the viral load of SARS-CoV-2 with 2.21 weighted mean. According to Morrisette *et al.*, (2020) [20], hydroxychloroquine is orally given as a sulfate which is then absorbed in the upper intestinal tract. Faíco-Filho *et al.* (2020) [9] found no difference in viral load reduction among samples of patients using the same time score as other studies that looked at viral load clearance in different clinical presentations and concluded that there was no difference in viral load in vivo when hydroxychloroquine was used in non-critical hospitalized patients with COVID-19. Based on the website of World Health Organization on the Coronavirus disease (COVID-19) advice for the public updated last May 5, 2021 [33], hydroxychloroquine is being studied as a possible treatment for COVID-19 but according to current data, this drug does not reduce deaths among COVID-19 patients in hospitals, nor does it help people with moderate disease.

Description of the Attitude of Physicians on the Use of Hydroxychloroquine on COVID-19 patients

Table 6 presents the attitude of physicians on the use of hydroxychloroquine on COVID-19 patients.

Table.6. Attitude of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients

Parameter	WM	VI
Interest towards Hydroxychloroquine		
1. I am interested in reading journal articles and/or case reports about Hydroxychloroquine and its effects on COVID-19 patients.	3.58	A
Opinion regarding Hydroxychloroquine		
2. I think Hydroxychloroquine is safe.	2.96	N
3. I am convinced of its antiviral effects.	2.34	D
4. I am in favor of its use as prophylaxis for contacts or frontline health workers	1.70	SD

Inclination to its prescription		
5. I would recommend Hydroxychloroquine to a relative with COVID-19 if under the circumstances.	1.69	SD
6. I would personally take Hydroxychloroquine as medication for COVID-19 if under the circumstances.	1.62	SD
7. I would prescribe Hydroxychloroquine on patients with mild symptoms.	1.49	SD
Overall WM	2.20	SD

Note. A - Agree, N - Neutral, D - Disagree, SD - Strongly Disagree

Overall, as can be gleaned from Table 6 the overall weighted mean of 2.20 implies that the physicians believed that the use of hydroxychloroquine is still questionable and concrete evidence is needed. Aforementioned from Table 6, it is highlighted that a calculated mean of 3.58 from the respondents are willing to educate themselves supported by reliable resources upon the mechanism of the drug hydroxychloroquine in terms of COVID-19 treatment intervention. Abassi *et al.* (2020) [1] claimed that hydroxychloroquine/chloroquine are capable of affecting several cellular pathways and therefore may have several mechanisms of action against SARS-CoV-2 but additional studies examining hydroxychloroquine and chloroquine in preventing and treating COVID-19 are desperately needed. Additionally, based from the table above, it is deduced that the physicians highly regard hydroxychloroquine as safe to administer. Hydroxychloroquine nonetheless has a 65-year track record of safety when prescribed at recommended doses in populations with normal liver and kidney function and without preexisting cardiac arrhythmias [4]. U.S. Food and Drug Administration [32] cautions against use of hydroxychloroquine or chloroquine for COVID-19 outside of the hospital setting or a clinical trial due to risk of heart rhythm problems. In response to the question whether the physicians would prescribe hydroxychloroquine on patients with mild symptoms, a weighted mean of 1.49 has been found implying that physicians think that hydroxychloroquine has little impact in curing mild symptoms of COVID-19. Statement stated by the WHO (2021), clinical trials confirm that hydroxychloroquine does not prevent illness or death of COVID-19. Moreover, Bull *et al.*, (2020) [5] of CDC mandated that in prescribing hydroxychloroquine, patient's complete

medical and medication must be presented to evaluate risks by the nonroutine prescribers of hydroxychloroquine.

Description of the Practices of Physicians on the Use of Hydroxychloroquine on COVID-19 patients

Table.7. illustrates the practices of physicians on the use of hydroxychloroquine on COVID-19 patients.

Table.7. Practices of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients

Parameter	WM	VI
1. At one point in time, Hydroxychloroquine was one prescribed to COVID-19 patients as a practice.	2.65	N
2. As a practice, Hydroxychloroquine is currently prescribed to COVID-19 patients.	1.55	SD
3. As a practice, Hydroxychloroquine is prescribed at 400 mg once a day for about 5-15 days.	2.07	D
4. As a practice, Hydroxychloroquine is stored at room temperature up to 25°C before administration.	2.68	N
5. As a practice, there are existing policies in the hospital that tackle the use of Hydroxychloroquine for COVID-19 patients.	2.54	D
6. In line with the announcement of COVID-19 vaccines in the Philippines, changes were made in the guidelines of the hospital on the use of Hydroxychloroquine.	2.98	N

7. I have taken Hydroxychloroquine as prophylaxis for COVID-19	1.16	SD
8. Patients will lose their lives after being prescribed with Hydroxychloroquine	2.22	D
Overall WM	2.23	D

Note. A - Agree, N - Neutral, D - Disagree, SD - Strongly Disagree

Based on Table.7, the overall weighted mean of 2.23 implies that the physicians disagree when it comes to the use of hydroxychloroquine on COVID-19 Patients. The respondents were neutral when changes were made in the guidelines of the hospital on the use of hydroxychloroquine when the announcement of COVID-19 vaccines in the Philippines were made which have the highest weighted mean of 2.98. The respondents disagree that they have taken hydroxychloroquine as prophylaxis for COVID-19 with the lowest mean of 1.16. Based on the systematic review of Smit *et al.* (2021) [24] on the prophylaxis used for COVID-19, a number of COVID-19 prophylactic candidates are currently being tested in clinical trials in a variety of countries and settings. However, data from completed studies and randomized controlled trials, appear to indicate that hydroxychloroquine is ineffective. Public advisory by the Philippine College of Surgeons was also posted on their website on the use of hydroxychloroquine stating that patients who have not been confirmed positive for COVID-19 or who are otherwise healthy and want to avoid infection should not take these drugs. It also added that hydroxychloroquine or chloroquine taken incorrectly can cause vision loss.

Overall, the knowledge of physicians on the use of hydroxychloroquine on COVID-19 patients has the highest weighted mean compared to their attitude and practices. According to the latest guidelines of World Health Organization updated last December 2020, regardless of illness severity of COVID-19 in patients, they strongly do not recommend the use of hydroxychloroquine. It suggests that hydroxychloroquine is unlikely to minimize mortality or the need for mechanical ventilation, and they may not even shorten hospitalizations. In addition, there is further evidence that using hydroxychloroquine on COVID-19 patients increases the risk of diarrhea and nausea/vomiting. Furthermore, it also reviewed the use of hydroxychloroquine alone or with azithromycin and

there was no indication that adding azithromycin to hydroxychloroquine changed its effect on any result.

Test of Significant Differences on the Knowledge of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

Table.8. displays the test of significant differences on the knowledge of physicians on the use of hydroxychloroquine on COVID-19 patients when grouped according to their profile.

Table.8. Test of Significant Differences on the Knowledge of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

Profile Variable	F-value	p-value	Interpretation
Sex	.133	.720	NS
Age	.134	.984	NS
Specialization	1.98	.035	S
Treated COVID-19 patient or not	1.453	.246	NS

Note. NS - Not Significant, S - Significant

Table.8. exhibits the F-test results of the test of significant differences on the knowledge of physicians on the use of hydroxychloroquine on COVID-19 patients when grouped according to their profile. The computed p-values of .720, .984, .246 for sex, age, and whether they have treated COVID-19 patients, respectively are all greater than. Hence, there is enough statistical evidence to accept the null hypothesis and conclude that there is no significant difference on the knowledge of physicians on the use of hydroxychloroquine on COVID-19 patients when grouped according to their sex, age, and whether they have treated COVID-19 patients at 5% level of significance.

On the other hand, the computed p-value of .035 is less than. Hence, there is enough statistical evidence to reject the null hypothesis and conclude that there is a significant difference in the knowledge of physicians on the use of hydroxychloroquine

on COVID-19 patients when grouped according to their specialization.

Studies have shown that specialization plays a major role in terms of prescribing medication to patients. This is due to the fact that each specialization has different knowledge and competencies towards patient care. In terms of managing certain diseases such as COVID-19, studies have shown that internal medicine has the highest percentage in dealing with infectious disease patients compared to other specialties as they have greater skills or experience (Baptista *et al.*, 2020). However, Abou-Abbas *et al.* (2020) [3] presented that there is no significant difference in the knowledge of physicians when grouped according to their specialization. It was only noted that physicians with an experience of 10 years and above are more likely to have good knowledge and practices on COVID-19.

Test of Significant Differences on the Attitude of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

Table.9. shows the statistical values on the differences on the attitude of physicians on the use of hydroxychloroquine on COVID-19 patients based on demographic profile

Table.9. Significant Differences on the Attitude of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients based on demographic profile

Profile Variable	F-value	p-value	Interpretation
Sex	0.005	0.945	NS
Age	0.805	0.554	NS
Specialization	1.377	0.181	NS
Treated COVID-19 Patient or not	0.026	0.874	NS

Note. NS - Not Significant, S - Significant

Table.9. shows the F-test results of the test of significant difference on the attitudes of physicians on the use of hydroxychloroquine on COVID-19 patients when grouped according to their profile. The computed p-values of .945, .554, .181, and .874 for sex, age, specialization and whether they have treated COVID-19 patients, respectively are all greater than. Hence, there is enough statistical evidence to accept the

null hypothesis and conclude that there is no significant difference on the attitudes of physicians on the use of hydroxychloroquine on COVID-19 patients when grouped according to their profile at 5% level of significance.

Although there have been studies that state that there is a significant difference in the attitudes of physicians with different demographic profiles, such as the one made by Demour *et al.* (2020) [8] and Sürmelioglu *et al.* (2020) [26]. According to Demour (2020) [8], there were significant differences in the attitudes of physicians with different professional degrees as well as age. The differences were seen in age groups with large gaps such as those between 22-35 years old and 36-50 years old. This can be due to the fact that older physicians tend to have more experience in dealing with different situations than younger physicians hence the difference in attitudes. It is important to note that although this study does look at the demographic profile of physicians and their attitudes towards COVID-19 and its treatments, it doesn't discuss too much on the attitudes on the use of hydroxychloroquine.

Test of Significant Differences on the Practices of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

Table.10. presents the statistical values on the differences on the practices of physicians on the use of hydroxychloroquine on COVID-19 patients based on demographic profile.

Table.10. Test of Significant Differences on the Practices of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

Profile Variable	F-value	p-value	Interpretation
Sex	0.000	0.999	NS
Age	0.207	0.958	NS
Specialization	2.392	0.006	S
Treated COVID-19 Patient or not	0.307	0.588	NS

Note. NS - Not Significant, S - Significant

Table.10. shows the F-test results of the test of significant difference on the practices of physicians on the use of hydroxychloroquine on covid-19 patients when grouped according to their profile. The computed p-values of .999, .958, .588 for sex, age, and whether they have treated COVID-19 patients, respectively are all greater than $\alpha = 0.05$. Hence, there is enough statistical evidence to accept the null hypothesis and conclude that there is no significant difference on the practices of physician on the use of hydroxychloroquine on covid-19 patients when grouped according to their sex, age, and whether they have treated COVID-19 patients at 5% level of significance.

On the other hand, the computed p-value of .006 is less than $\alpha = 0.05$. Hence, there is enough statistical evidence to reject the null hypothesis and conclude that there is a significant difference in the practices of physicians on the use of hydroxychloroquine on covid-19 patients when grouped according to their specialization.

According to the study of Davari et.al. (2018) [7], the attributes of the physicians including their specialty, clinical experience, and their continuous professional development and practice decision were among the prescriber related factors that are commonly mentioned. The article also shows that the influence of the specialist physicians could greatly affect their prescribing decisions. Specialist physicians influence the drug prescription especially on more complex conditions and on patients that have more specific disease like autoimmune disease and infectious disease. Almost all of the general practitioners, in terms of prescribing new medicine, depend on the advice of the specialists.

Description of Other Drugs, Vitamins, or Therapy Prescribed or Administered by Physicians in Response to Covid-19

Table.11. reveals the description of other drug/s/vitamins/therapy prescribed or administered by physicians in response to COVID-19.

Table.11. Description of other Drug/s/Vitamins/Therapy Prescribed or Administered by Physicians in response to COVID-19

Drug/Vitamins/Therapy	f	Rank
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Chloroquine	2	10
Remdesivir	73	1.5
Lopinavir-ritonavir	5	8
Favipiravir (Avigan)	17	6
Oseltamivir (Tamiflu)	14	7
Azithromycin	73	1.5
Vitamin C (Ascorbic Acid)	65	3
Corticosteroids	52	4
Sirolimus	2	10
Tocilizumab	49	5
Anakinra	2	10
Hemoperfusion	1	15.5
Cefuroxime	1	15.5
Ceftriaxone	1	15.5
Meropenem	1	15.5
Enoxaparin	1	15.5
Multivitamins + Zinc	1	15.5

Cefixime	1	15.5
Lianhua Qingwen	1	15.5
None	13	8

Table.11. Shows the list and the ranking of other drugs/vitamins/therapy prescribed or administered by the physicians in response to COVID-19 wherein drugs that tied were ranked based on their computed mean. Thus, 1.5th place serves as the highest ranking since 2 drugs tied for the first spot while 15.5th place serves as the lowest ranking since the 12th up to the 19th spot tied. The list includes various pharmacological agents and such as antiviral agents (chloroquine, remdesivir, lopinavir-ritonavir, favipiravir, and oseltamivir), supporting agents (azithromycin, vitamin C, corticosteroids, sirolimus, tocilizumab, and anakinra), and traditional herbal medicine such the Lianhua Qingwen, which are all mentioned in a 2020 article [35]. Other drugs (enoxaparin, cefuroxime, ceftriaxone, meropenem, multivitamins + zinc, cefixime, and hemoperfusion) are also included in the list, which can also be observed to place last on the ranking along with Lianhua Qingwen. Some physicians also opted to prescribe none to COVID-19 patients.

According to the data gathered, it can be observed that remdesivir and azithromycin were equally deemed to be the most prescribed by physicians. This supports the claim of Sanders *et al.* [23] in 2020 stating that remdesivir is perceived to be the most promising therapy in combating COVID-19 symptoms. National Institutes of Health (NIH) in October 2020 [30] also reported remdesivir as an effective treatment for they have shown a quicker recovery period of an average of 10 days compared to that of 15 days observed from other treatments. Azithromycin, on the other hand, was described to not only have antiviral activity but also conduct immunomodulatory effects as well [6]. Moreover, azithromycin is also reported by studies that they perform synergistically along with other antiviral agents such as hydroxychloroquine [16]; [22].

On the ranking, remdesivir and azithromycin are then followed by vitamin C, corticosteroid, and tocilizumab, respectively. According to Abobaker *et al.* [2], vitamin C plays a role in managing COVID-19 as it provides nutrition support for the

body that is safe and shows no major side effects [34]. Though corticosteroid ranked 4th, it is currently not recommended by few journals [28]; [23] and is considered non beneficial to both severe and critical COVID-19 patients [34]. However, in an NIH issuance [31], corticosteroids such as dexamethasone were strongly recommended particularly for COVID-19 patients with respiratory conditions since improvements on patients were observed. Lastly, the obtained result on tocilizumab supports the consistent reports regarding its safety and effectiveness in improving symptoms derived from COVID-19 especially to patients requiring respiratory support [13].

As for Lianhua Qingwen, which is considered as traditional Chinese medicine, although its use has been prevalent in China and has shown favorable results with its antiviral, anti-inflammatory, and immunoregulatory effects in COVID-19 patients [17], it is still ranked as one of the least prescribed by the physicians. This might be in accordance with an April 2021 DOH issuance regarding the initial banning of Lianhua Qingwen, wherein it was clarified that Lianhua Qingwen is only registered in FDA in the Philippines as traditional herbal medicine and not as a medication for COVID-19.

IV. CONCLUSION

A. Profile of the Respondents

Based on the respondent's profile, most of them are within the 26 - 30 year old bracket, which is the age norm of healthcare professionals taking residency training or have specialization. Meanwhile, the majority of the respondents were male. Results also show that most of the physicians belong to internal medicine followed by surgery which evidently show that specialization influences medication prescription to COVID-19 patients as they are more knowledgeable in handling infectious disease. Furthermore, most of the respondents are dealing with COVID-19 patients since almost all licensed physicians opt to handle patients even if it is not included in their area of specialization.

Knowledge of Physicians on the Use of Hydroxychloroquine on COVID-19 patients

The total number of physicians with specializations has moderate knowledge on the use of hydroxychloroquine as a pharmacologic therapy for COVID-19 patients. The respondents revealed that the drug's route of administration is

oral, and its mechanism of action, having the lowest knowledge from the participants, can reduce the viral load of SARS-COV-2.

Attitude of Physicians on the Use of Hydroxychloroquine on COVID-19 patients

The use of hydroxychloroquine as a medical treatment for COVID-19 patients is still questionable. Most of the respondents are willing to read journal articles and/or case reports about the drug's mechanism of action towards COVID-19. However, some of them are not willing to give hydroxychloroquine but would rather choose drugs such as remdesivir, azithromycin, vitamin C, corticosteroid, and tocilizumab as the drug of choice. Studies have shown that the use of hydroxychloroquine is no longer recommended regardless of the severity of the disease as it may show side effects in patients such as diarrhea, nausea or vomiting and eye damage when given in high doses.

Practices of Physicians on the Use of Hydroxychloroquine on COVID-19 patients

Most of the physicians are neutral when it comes to the use of hydroxychloroquine on patients due to the change of guidelines for the treatment of COVID-19. Moreover, new studies have shown that the use of hydroxychloroquine is revealed to be ineffective in the treatment of COVID-19 and if taken incorrectly will have side effects such as vision loss.

Knowledge of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

The study reveals that physicians' profiling based on their specialization contributes to how much they know about the use of hydroxychloroquine as a pharmacologic aid in treating COVID-19 patients. This is because different medical specializations deal with distinct branches of the medical field, as a result, physicians under certain specializations such as internal medicine are more knowledgeable and familiar with medicine prescriptions to COVID-19 cases compared to others.

Attitude of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

With the gathered result, it can be concluded that the demographic profile of physicians did not play a role in the

attitude of physicians towards the use of hydroxychloroquine on COVID-19 patients. Physicians' age, sex, specialization, and whether they have treated COVID-19 patients were all negligible in how they view hydroxychloroquine as a COVID-19 regimen.

Practices of Physicians on the Use of Hydroxychloroquine on COVID-19 Patients when grouped according to their profile

The obtained result suggests that the practice of physicians on the use of hydroxychloroquine on COVID-19 patients is notably influenced by their specific medical specialization for the reason that certain specialties are more experienced in handling COVID-19 cases while other specializations are rarely exposed to this type of case.

Other drugs, vitamins, or therapy prescribed or administered by physicians in response to COVID-19

COVID-19 regimen may vary depending on the severity of the symptoms. Nevertheless, drugs that are mostly prescribed by physicians working in tertiary government hospitals in the Philippines were remdesivir, azithromycin, vitamin C, corticosteroid, and tocilizumab mostly due to the sufficient evidence of their effectiveness and safety when administered to COVID-19 patients. The effectiveness and adverse effects of the listed plausible treatments to manage COVID-19 are also constantly updated, as a result, the use of some drugs, such as hydroxychloroquine, are being discontinued to be prescribed to COVID-19 patients. However, there are still a number of other therapies being administered by physicians and some are under clinical trials to help combat the symptoms derived from COVID-19.

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