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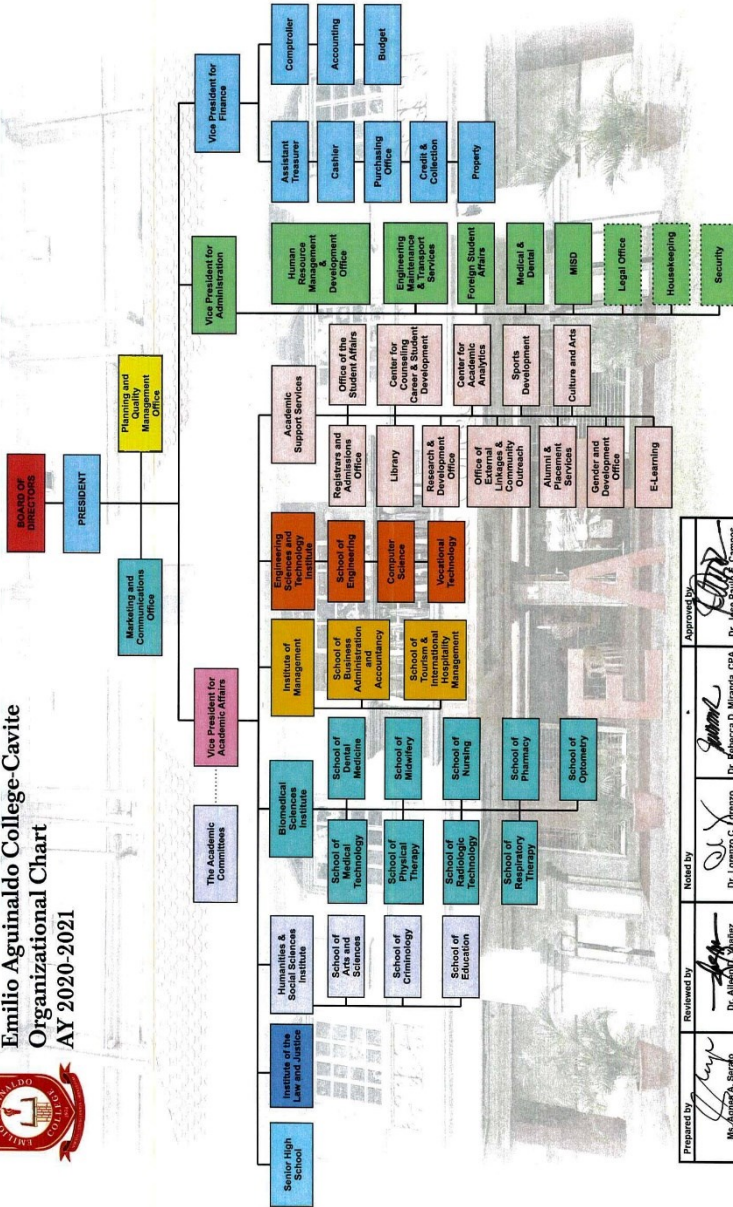
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EAC ORGANIZATIONAL CHART

Emilio Aguinaldo College-Cavite
Organizational Chart
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Brief History of Emilio Aguinaldo College

The beginnings of Emilio Aguinaldo College - Cavite are attributed to Dr. Paulo C. Campos, then President of the University Physicians Services Incorporated (UPSI), which acquired the Marian College in Manila in 1973. Eventually, the school became Emilio Aguinaldo College.

With the various socio-economic developments and related circumstances during the Marcos regime, UPSI decided to open a new campus in Dasmariñas, Cavite, which is the hometown of Dr. Campos. This is to support the government's policy on the dispersal and decongestion of the student population in Metro Manila, particularly in institutions of higher learning. The policy also aimed to introduce regional development and democratization of opportunities in the rural areas (Campos, 2008).

Emilio Aguinaldo College in Bagong Bayan, Dasmariñas, Cavite was opened on March 17, 1978. Its opening coincided with the efforts of the then President, Ferdinand E Marcos and wife Imelda Marcos, who was the Minister of Human Settlements and Community Development, to remove the slum dwellers from the streets and under bridges of Manila and relocate them to Cavite. Dr. Campos proposed to the government through the Secretary of Education, Juan L. Manuel, to offer a tertiary school in Dasmariñas, Cavite patterned after the Emilio Aguinaldo College that had been approved in Manila (Campos, 2008).

Consequently, a campus comprising 29 hectares was established. In 1976 to 1978, UPSI developed over a dozen school facilities including school rooms, laboratories, a library, social hall, an administration building, dormitories, an Olympic oval, a landscaped campus, and a man-made lake. They also built a network of roads that covered the whole campus and dormitories (Campos, 2008). A commitment to improve the lives of the underprivileged sectors of the community motivated EAC-Cavite to offer courses in Dressmaking, High Speed Machine Operation and Ceramics. All programs were structured either for six months or two years of intensive study and training.

In the following year, owing to the permit granted by Minister Juan Manuel of the Ministry of Education and Culture, EAC-Cavite opened the College of Criminology, listing among its students the police forces in Cavite as well as the members of the Philippine Constabulary and the security guards of the establishments in the vicinity. In addition, the Graduate Program leading to the degree of Master of Arts in Teaching was offered to provide the school teachers with professional and academic advancement and opportunities. Envisioned, too, were the programs for Master of Science in Nursing and Master of Arts in Education.

On October 21, 1979, General Emilio Aguinaldo Medical School Foundation Inc. (GEAMSF) was established in Dasmariñas, Cavite, thus giving birth to the Emilio Aguinaldo College- Cavite of Medicine with Dr. Lourdes E. Campos as Dean. In its first year of operations, the College had 150 students. The University Medical Center (UMC), which was built in 1980 and opened in 1983, served as the training center for the health science students of the College of Medicine and other health science courses.

In 1980, UPSI formed the Yaman Lahi Foundation, Inc. (YLFI) to manage and operate both Manila and Cavite campuses.

In 1986, when Dr. Paulo Campos was not in perfect health anymore, Brother Andrew Gonzales of the De La Salle University (DLSU) expressed the University's interest in acquiring the EAC College of Medicine and the University Medical Center (UMC). Since his UPSI colleagues were not ready to take over, Dr. Campos decided to transfer the ownership and responsibility to this worthy and credible institution.

It was in June 1987 when De La Salle University finally took over the management and the administration of two campuses from UPSI: the 29-hectare campus in Bagong Bayan, Dasmariñas and the 1.5 hectare Health Science Campus along Congressional Avenue. Included in the transfer were the two big buildings which had a length of 100 meters, 17-meter wide and seven levels of floor area with two elevators, including a basement, ground floor, and rooftop for water tanks and for viewing purposes. The 29-hectare property in Bagong Bayan had a dozen buildings that included classrooms, two administrative units, Olympic oval, network roads and a landscape that included a lake, teaching facilities, hospital equipment, a modest library and a historical museum. After that, the EAC Administration focused on the development of EAC-Manila.

EAC-Cavite reopened in 1996-1997 as a vocational technical school – Center for Technical Education and Skills Training (CTEST) - in a lot along Congressional Avenue (now Mangubat Avenue) which UPSI bought. In 1998, after the completion of five buildings, the voc-tech school became the EAC-Cavite campus and all academic courses were opened except medicine.

In 2001, under the leadership of Dr. Jose Paulo E. Campos, the first son of Dr. Jose Paulo E. Campos, the school administration strengthened the curricula of existing academic programs and opened new courses aligned with emerging trends. In 2003, the Commission on Higher Education (CHED) granted government recognition to AB Communication, Psychology, Business Administration, Accountancy, Computer Science, Secondary Education, and Hotel and Restaurant Management.

The other academic programs soon followed. In 2005, Elementary Education, Civil Engineering, Mechanical Engineering, and Diploma in Graduate Midwifery earned government recognition, followed by Nursing

and Criminology in 2006; Customs Administration in 2007; and Computer Engineering and Electronics and Communication Engineering in 2010.

In 2008, the Technical Education and Skills Development Authority (TESDA)-registered vocational-technical courses, namely, Automotive Servicing, Computer Hardware Servicing, Consumer Electronics Servicing, Machining, and Programming were offered. In response to the emerging trends on health sciences, real estate and tourism, the administration opened Medical Technology, Physical Therapy and Radiologic Technology in 2011, Doctor of Dental Medicine and Real Estate Management in 2012, and Bachelor of Science in Midwifery and Tourism Management in 2015.

In its quest to achieve excellent standards in higher education, the institution participated in the accreditation by the Philippine Association of Colleges and Universities Commission on Accreditation (PACUCOA), thus, receiving Level 1 Accredited Status in Nursing, Psychology, Criminology and Hotel and Restaurant Management programs in 2015 up to 2018. Likewise, Elementary Education, Secondary Education and Business Administration programs were granted Candidate Status until 2017.

Along with the commitment to innovate, the institution inaugurated the *Bulwagang Aguinaldo* in 2012, which was the replica of the Aguinaldo Shrine in Kawit, Cavite making it the ideal venue for the annual Philippine Independence Day Celebration held by the city government of Dasmariñas. The modernization of Buildings 3 and 4 which house the Life Science Institute, Engineering Science and Technology Institute, and School Library were completed in 2014. These developments sought to meet the needs of the growing student population.

In adhering to the call of the Department of Education (DepEd) headed by Secretary Bro. Armin Luistro to enhance the basic education program in the country, the institution earned the permit to implement the Senior High School programs in April 2015. This paved way for the restructuring of Building 5 for Senior High School and Building 6 which housed the new canteen and multi-purpose hall. The Senior High School started its operations and welcomed its pioneer batch in June 2016.

The institution strives to explore more avenues to serve its community and undertake worthwhile development programs towards its continuous transformation as a responsive and competent institution, as its Founders envisioned it to be.

Special acknowledgements are accorded to Dr. Lourdes E. Campos (co-Founder), Atty. Paulo E. Campos Jr. (Director, EAEC), Dr. Jose Paulo E. Campos (EAC President), Dr. Georgina B. Palmario (Vice President for Academic Affairs), Ms. Maria Teresa Santos (Chief Librarian) and Ms. Shelley Anne C. Martinez (Executive Assistant) for their contributions to this manuscript.

PHILOSOPHY

Emilio Aguinaldo College is a private, non-sectarian, co-educational institution of learning that fosters equal and fair opportunities for the holistic development of the persons conscious of their national identity and their roles in the global community.

VISION

Emilio Aguinaldo College envisions itself as an internationally recognized autonomous academic institution rooted in its nationalist tradition that consistently pursues the advancement and welfare of humanity.

MISSION

Emilio Aguinaldo College provides an outcomes-based education with relevant curricula geared towards excellent research, active industry cooperation and sustainable community extension.

CORE VALUES

Virtue

Emilio Aguinaldo College integrates knowledge and understanding among Emilians equipping them with wisdom to choose to do only the right thing.

Excellence

Emilio Aguinaldo College inculcates among Emilians the habit of doing only the best in all undertakings.

Service

Emilio Aguinaldo College develops among Emilians a strong sense of duty and responsibility of helping others for the school, community, country and Mother Nature.

QUALITY POLICY

We, the Employees and other stakeholders of Emilio Aguinaldo College are committed to:

Provide our students an exceptional educational experience delivered within all statutory and regulatory standards;

Provide consistent quality service to our students, parents, and other stakeholders;

Develop responsible students through relevant and quality education, able to independently lead and enhance their lives, and contribute to the development of our country and humanity; and

Continuously improve the educational experience of our students and other stakeholders by communicating the needs of our students and stakeholders to the entire organization, standardizing our institution's processes, enhancing our employees' competence, periodically reviewing and continually improving the institution's systems, and providing our students an exceptional educational experience.

QUALITY OBJECTIVES

The objectives of Emilio Aguinaldo College are to:

- Offer opportunities for quality and relevant education to all qualified students;
- Cultivate the intellectual, spiritual, moral, social, and physical aspects of our students;
- Instill an appreciation and pride in our students of their national identity; and
- Prepare graduates of global quality equipped with world class competencies in their fields of expertise.

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A CASE STUDY ON THE CHARACTERISTICS OF PLHIV (PEOPLE LIVING WITH HIV) MSM (MEN WHO HAVE SEX WITH MEN) PATIENT AND HIS UNDETECTABILITY

Authors: ¹Monterey, Deanne Clayne M., ¹Sucero, KC, ¹Balagosa, Wilhelmena V.

¹*School of Pharmacy, Emilio Aguinaldo College-Cavite
Gov. D. Mangubat Ave., Brgy. BuroI Main, Dasmarina's City, Cavite*

corresponding author: dcmmonterey.cvt@eac.edu.ph
contact number: 09618363405

KEYWORDS:

- HIV
- MSM
- Undetectable

Abstract. The purpose of this study was to determine the factors that make an MSM HIV patient undetectable. It includes health management behavior, support groups, early detection, financial situation, and sexual activity of the

respondent. The methodology used was a descriptive design, and the researcher used snowball sampling to gather information concerning the patients undetectability. Zoom meetings were the platform used to collect data on only one MSM HIV-positive patient, and an inclusion criterion was provided for the respondent's authenticity. The finding indicated that health management behavior towards taking the HIV maintenance medication, support groups, financial situation, and changes in sexual activity is considered as the factors that can make MSM undetectable. However, early detection awareness is not considered as a factor in making HIV undetectable according to patient. This study concluded that achieving and maintaining an undetectable viral load is not just about the medications but is also about the behavior of the individual, and support groups can be beneficial for people feeling vulnerable or anxious because of being HIV positive. Safe sex should be encouraged with people at the right age, especially people living with HIV.

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A CASE STUDY ON THE CHARACTERISTICS OF PLHIV (PEOPLE LIVING WITH HIV) MSM (MEN WHO HAVE SEX WITH MEN) PATIENT AND HIS UNDETECTABILITY

INTRODUCTION

The first two cases of Human Immunodeficiency Virus (HIV) in the Philippines were reported in 1984. Since then, the numbers of confirmed cases of HIV infection continue to climb (Salavana *et al.*, 2010). From 1984 to 2010, there were 15,000 diagnosed cases until it reached 77,000 in 2018. The HIV epidemic in the Philippines has rapidly increased by more than fivefold (Restar *et al.*, 2020). According to the World Health Organization, 38 million people were living with HIV globally at the end of 2019, and 0.7% were adults aged 15-49. As of April 2021, there have been 86,771 reported cases of HIV from 1984 in the Philippines, 94% of whom were male, and 6% were female, as stated by the Department of Health. The prevalence of HIV in the Philippines remains low, yet it has the fastest-growing HIV epidemic in Asia. Cases of HIV are continuously increasing therefore, deaths never stopped. From January 1984 to April 2021, there have been 4,814 reported deaths here in the Philippines. Last April 2021, there were 27 reported deaths and 26 of them were male and 1 is female (Department of Health, 2021).

The Undetectable = Untransmittable (U = U) signifies that the persons who received Antiretroviral therapy (ART) and have achieved and maintained an undetectable viral load can no longer transmit the virus to others. On the other hand, the U = U concept's validity depends on achieving and maintaining an undetectable viral load in an individual with HIV, taking ART as prescribed is essential for achieving and maintaining an undetectable viral load (Eisinger *et al.*, 2019). A recent study conducted indicates thssat some MSM perceive that having an undetectable HIV load reduces the risk of HIV transmission and other studies stated that male who have sex with men (MSM) was more prone to engage in unprotected anal

intercourse (UAI) with their HIV-positive regular partner when they believed he had an undetectable rather than a detectable viral load. Most MSM considered first the HIV status of their partner before engaging in UAI, they have knowledge with regards to the undetectable viral load (Boom *et al.*, 2013). According to European Centre for Disease Prevention and Control, achieving and maintaining an undetectable viral load is a very effective prevention method to interrupt the existing transmission chain that applies to gay men and heterosexual couples.

The Joint United Nations Program on HIV/AIDS goal was to end the HIV epidemic by 2030, which was regarded as a public health issue, early initiation of antiretroviral therapy, and sustained undetectable viral load for most HIV infected individuals was part of its aspects. Antiretroviral therapy has been available since 1996, early initiation led to improved therapeutic response and reduced HIV transmission. Pacheco *et al.* (2019) stated that the prognosis of the patients infected with HIV has changed by ART. It reduces the viral load count to an undetectable level and reduces the incidence of infections, hospitalizations, and mortality.

The purpose of this study was to determine the factors that make an MSM HIV- positive patient undetectable. People living with HIV can live healthily and decrease the chance of developing HIV stage 3 through viral load suppression. Undetectability reduces the transmission of HIV and increases the life expectancy of PLHIV (Scaccia, 2020). This study may be useful to lessen HIV-related morbidity and mortality.

METHODOLOGY

A case study design was used to gather the participant's data to determine the factors that make an MSM HIV-positive patient undetectable. A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. It is used to narrow down the broad field of research into a researchable topic (Yin 2009). A respondent in this study is a PLHIV MSM patient. The researchers gather information from one (1) HIV positive. The researchers used snowball sampling originally to collect information/data from one HIV-positive MSM with an undetectable viral load, but the patient was already disclosed in his social media account where he shares his life experiences about HIV. An

interview guide was used on eliciting patients' beliefs and attitudes, and intentions regarding HIV. The questions which focused on the characteristics of PLHIV (people living WITH HIV) MSM (men who have sex with men) patient and his undetectability, respondent social background in terms of their sexual activities and financial situation, the importance of early detection as a factor in undetectability, the effect of health management in making HIV undetectable and how effective prevention programs and support system on undetectable patients in maintaining undetectable within a year.

The interview was conducted with 1 participant for 3 hours and was recorded anonymously via zoom. The questionnaire was given to the respondent a day before the interview so that the respondent can see clearly what the interview is all about, think about his willingness to share or participate, and it is better for him to be prepared to answer the questions. Especially if English is not his main language, knowing what will be asked can help him express his answers more effectively, which is good for him. The researcher sends a consent form to the respondent if he allows the researcher to record it before conducting the said interview. Only the research team and the thesis adviser can be able to view (listen) the recorded interview, and after the recording was transcribed by the researcher, it was deleted immediately. Transcripts of the interview might reproduce as part of the presentation or written product that would be the result of the study. The laboratory results and personal information such as name and address will remain confidential after the research team provides discussion. The topic guide for the discussion included: questions about their opinion on HIV services in the Philippines; the characteristics and procedure of undetectable; the regulation that protects HIV patients; the costs of medication; counseling services; and the linkage to health care following an HIV test. The figure below shows the flow of the research. After getting the approval of the EAC-C research ethics committee the researcher prepares for the interview. The interview was conducted via zoom for 3 hours and it was recorded. The researcher transcribes the recorded interview and then it was categorized according to its purposed and after that is was analyzed by the researcher.

Ethical Consideration

As part of the research, an ethics review identifies and points out ethical problems correlated in research. Apart from consent, confidentiality, as well as the involvement of ethical committees, there are other issues to consider. Research ethics principles, which attempt to defend individuals' right to refuse to participate in studies if that is their choice, also require the protection of vulnerable individuals who may lack the psychological or legal competence to do so (World Health Organization, 2013).

Research ethic review proposal was reviewed by Emilio Aguinaldo College- Cavite Ethics review committee and found free from ethical issues and shows data privacy and confidentiality. Copy of the ethics approval form can be found in the appendix part. Researchers provide informed consent for the respondent if he allowed the researchers to record the interview. Questions that were used in the research were also reviewed by an expert and showed no sensitive and personal questions.

RESULTS

The patient maintains being undetectable for almost five years. He was diagnosed with HIV in 2016 and considered as late detection of AIDS, normally the CD4 count is ranging from 500-600 cells/mm³, and the patient CD4 count was 7 cells/mm³ only, which indicates AIDS. The patient presents only the laboratory result he has and stated that he became undetectable 6 months after the diagnosis. The table presents his viral load count years after his diagnosis.

Table 1.

Viral load test result.

Date	Kit/ Reagent Used	Result
November 2017	Cobas Taqman	<34 copies/ml
April 2020	HIV-1 Test, v2	HIV-1 RNA not detected
	Cobas Taqman	
	HIV-1 Test, v2	

Based on the table above, the patient undergoes a viral load test, Cobas Taqman HIV-1 Test, v2 is the kit/ reagent used to determine his viral load. His viral load from November 2017 was less than 34 copies/ml which indicates that his viral load is undetectable, and last April 2020, there was no HIV-1 RNA detected and it also indicates that he has an undetectable viral load. The patient becomes undetectable 6 months after his diagnosis. The patient presents only the 2 available laboratory results he has since all of his laboratory results were kept on the HIV hub.

Health Management Behavior

Throughout the interview session, the participant described his experiences in taking medications and the effect of health management behavior (e.g., health management pattern, medication adherence, and therapy) towards taking the HIV maintenance medication in making his HIV viral load undetectable. Antiretroviral medicine, which is the Aluvia and Lamizido, has a big role in making his HIV undetectable, and it really improves his health since the illness started. The participant stated that ARV is 100% recommended:

“Of course, especially to those newly diagnosed clients that they need treatment. 100% recommended.” “I am taking ARV treatment which is Aluvia plus Lamizido.. That is the medicine I take that helps me to become undetectable. 3 tabs. In morning and evening, 2 tabs of Aluvia and 1 tab of Lamizido.”

He added that Efavirenz and Lamizido was the first medication prescribed to him, but he experienced some allergies, so his physician changed it to Aluvia and Lamizido:

“Before I take Efavirenz and Lamizido, but I got some rashes to it was switch into Aluvia and ‘Lamizido and until now that is my medication.”

Participants stated that he is healthy because of the medicine he takes, and he also avoids stress and removes the bad habits in his lifestyle:

“I’m going healthy and healthy because of the medicine that I take, especially the ARV treatment, and the number one

that I do to stay fit and healthy is avoiding stress, and sometimes I do an exercise and remove the bad habits that I did before.”

Drinking alcohol, smoking, and sleeping late or going home late at night were his bad habits before:

“I drink alcohol and smoke, sometimes I go out with my friends at night and coming home drunk.”

Based on his experience, following the proper time and dose of the medication also helps to achieve in becoming undetectable:

“Yes always, always 8 am to 8 pm. I really wanted to achieve adherence, though I am already UD. I really need to follow to achieve being UD every year. I need to take medicine on time and avoid being forgetful.”

When he took his medicine before, he experienced some side effects, which are headache and diarrhea, but as of now, he does not experience it anymore:

“Before, I had some headache and diarrhea, and it took one year, but so far I don't experience any side effects, and the result of ARV is really good to me”.

The participant takes nutritional supplements before, which is Ascorbic acid but now, he just eats healthy food and avoids food that have preservatives:

“Before, I take ng ascorbic acid when I was assigned in Malaybalay Bukidnon. They gave us ascorbic acid to boost more my immune system because they said that you wouldn't be infected if you have a strong immune system.”, “Just always eat healthy foods like vegetables and fruits and make it as part of your everyday meal because it is essential in our health.”

He added that he feels that vegetables made his CD4 count high than nutritional supplements and he felt that vegetables are healthier:

"I feel that nutritional supplements don't have any effects, but vegetable increases my CD4 count. Pure vegetable makes me healthier."

The researcher asked some additional questions on considering taking other medications for HIV, but the respondent failed to answer the questions.

Contribution of Support Group

HIV groups serve the purpose of sharing experiences, encouraging disclosure, reducing stigma and discrimination in HIV care (Bateganya *et al.*, 2015).

"I was a Community Outreach worker under young key populations. I always went to different Schools to promote HIV prevention. Mostly, I am giving information to junior high school and senior high school. After I discussed HIV, I will disclose myself."

Non-PLHIV positive individuals can provide companionship and support. The connections they make through relationships, places, or activities, can build a safety net for physical and mental health for PLHIV (Center for Disease Control and Prevention, 2019).

"When I was diagnosed, I became closer to my mother. She was the one who took care of me for almost two months. I appreciated her efforts because she proved that she loves me since our experience in the hospital was tough. Besides that, when it comes to my friends, I really believe that hard times will reveal true friends. I saw who my real friends were because they never left me since I was diagnosed with HIV. Since that day, my bond to my family and friends became stronger."

HIV groups are beneficial for PLHIV. The government group supports innovative startups and helps them grow.

"As of now, I am currently working as a case manager of Philippine National Foundation Incorporated. My nature of work is to handle a newly diagnosed HIV positive. I facilitated them in the treatment hub and to keep them"

updated in the daily intake of their medicine. We are under LOVE YOURSELF. In addition, we are supported financially by a government group called Philippine National Foundation."

Non-Government groups have been playing a critical role in addressing the HIV issue. They have been working as key partners for governments and international agencies not only in the prevention of the spread of HIV but also for its treatment and support for those living with the disease and working towards removing the stigma associated with it (Center for Disease Control and Prevention, 2019).

"I'm also a member of northern Mindanao Aids Advocate. Organizations are helpful because there was a time that I was in a coping mechanism stage. The members of the organizations are the ones who encourage me. Sometimes, they bring food to my house with other PLHIV and talk to my family. They became my support system to regain the things that I lost when I was infected and diagnosed with HIV."

Support groups such as HIV groups, non-PLHIV, government organizations, and non-government organizations are beneficial to the case of the respondent. The researchers asked questions about the online support groups that he had on this pandemic, but the respondent was not able to respond.

Early diagnosis and Undetectability

Early detection and maintaining medication adherence can lead to undetectability. Our respondent has become undetectable for almost 5 years, which he was always aiming for every time he gets tested for the CD4 test. CD4 test is a basic test that is required to the respondent, and it only used by the respondent if needed to check the CD4 count on his body.

"When I found out that I am undetectable, I am very happy. Every PLHIV goal is to become undetectable and to make sure that ARV treatment is effective."

He last tested for viral load test last April 2020, and his results turn out that HIV-1 RNA was not detected, which is UD = Untransmittable:

"Medication and healthy lifestyle became a big reason that I became undetectable."

Like other medications, HIV medication also has side effects, some are manageable, and some are serious. The respondent experiences irritation after he takes his medication. Sometimes he feels annoyed and fears that he will get sick even if he is taking medication, especially during this time of pandemic that he is always exposed to people because of his work. He also has suicidal thoughts when he knew that he was diagnosed with HIV:

"When I found out that I was diagnosed with HIV, it was already late, it called late detection, and when I went home, I think that I am useless, and I wished that I'd rather die."

Late detection or late diagnosis represents that the patient are already positive to HIV and the virus has already damaged the person's immune system. According to the respondent he was transferred to a provincial hospital, and after 2 months the doctor told him that he was late detected with HIV:

"Before I knew that I was diagnosed with HIV, I was admitted to the hospital because of Pneumonia and Tuberculosis."

For him, HIV programs in the Philippines are very effective. Education and practicing safe sex, according to him, is the most effective prevention that can be done against HIV:

"For me, they should give attention to this kind of disease. Everyone should be given the right information about HIV, not just selected places in the Philippines, but all places should be given. Especially HIV education among youth that is now becoming vulnerable to HIV."

He thinks that the public should talk more about HIV awareness because there are still a lot of people that are not known to HIV. The researchers attempt to ask the respondent via message like why he

chose ARV treatment and not Pre-Exposure Prophylaxis (PrEP). Unfortunately, the respondent did not respond.

Financial Aspects

Due to the high cost of HIV medicines, HIV patients, especially those PLHIV's who are financially deprived, do not have access to these lifesaving drugs. Some PLHIV is lucky that they were able to get a job, like the respondent in this study he is currently a case manager under Pilipinas Shell Foundation Inc., a government agency that also helps PLHIV:

"Actually, this is my second time applying for a job, before I was working under AIDS Society of the Philippines, I was a working student when I had my first job as a community outreach worker under young key population, and it is my first job also when I was diagnosed with HIV."

His contract has ended with AIDS Society of the Philippines, and he graduated college last June 2020 and got a job at DOH Northern Mindanao as a Community Health Outreach Worker and was assigned in Malaybalay, Bukidnon:

"After I graduated in college, the DOH northern Mindanao was hiring for a community health outreach worker. I applied for that position and thanked God I was hired, it's my second job."

His contract with DOH ended last December 2020. After that, he applied again to Pilipinas Shell Foundation Inc. as a Community Outreach Worker, but Pilipinas Shell Foundation Inc. offered him a higher position which is Case Manager:

"I was very lucky that I didn't have difficulty when applying for a job and I didn't expect that from a community worker they would give me a higher position which is a case manager. Major adjustment and it's a big responsibility for me."

He also states that he does not have a problem when it comes to finances because his family is always there to support his treatment.

His work also helps him financially which he regularly pays for Philhealth to access free medication:

"Actually, all medications are free, especially ARV, which is free in our treatment hub. That is the reason why it is my responsibility and commitment to take ARV treatment.", "Before, I am an indigent Philhealth, but now since I'm working, my company pays for it, so I have no problem when it comes to my meds." He added.

The researchers asked additional questions to the respondent that would be beneficial to this study. The questions were all about his monthly contribution to PhilHealth and if he has an idea on how much is the cost of ARV treatment in the Philippines. Unluckily, the respondent is unreachable, that is why the questions were not answered.

Sexuality and Post Diagnosis

Protected sex is the best way to prevent sexually transmitted infections (STIs) such as HIV during sex (including anal and oral). Condoms are the only method of contraception to protect against sexually transmitted diseases. The participant experienced not using a condom after he was diagnosed (Briadway Pharmacy, 2020).

"Currently, I have a boyfriend, and we were together for almost 9 months. We tried to use a condom for 6 months, but it did not satisfy our pleasure. It is different when we are not using a condom. I think last year we tried not to use a condom. As a trained community-based motivator, it is my first time, and we have only done it once since I was diagnosed."

There is this commonly held belief that condom use has sex feel less natural or pleasurable. In human sexuality, top, bottom, and versatile are sex positions or roles during sexual activity, especially between two men. Anal sex is the riskiest type of sex for getting or transmitting HIV. Being the receptive partner (bottom) is riskier for getting HIV than being the insertive partner (top). The bottom's risk of getting HIV is very high because the rectum's lining is thin and may allow HIV to enter the body during anal sex. The participant

shared his knowledge about roles during sexual activity (Center for Disease Control and Prevention, 2019).

"My boyfriend is top, and I am the bottom. If there is a penetration that is happening, there's a risk that top partner might get infected."

Besides using protection (condom), A non-reactive HIV test is needed if someone is having sex with an HIV-positive person with an undetectable viral load. The participant mentioned that using HIV screening test to his boyfriend:

"Until now, I used to screen him for HIV almost every 2 weeks. Although it is not advisable that if you have an undetectable viral load, it means that you should not use a condom because aside from HIV, you can still get other infections. So far, last week, we did an HIV Screening test, and it appears non-reactive."

The development of safe and effective STD vaccines offers a potent tool for the control of STDs, including the prevention of HIV infection:

"Currently, I am not vaccinated by Syphilis, but I have been vaccinated by anti-Hepatitis, pneumococcal, and Flu vaccine."

The respondent was not able to answer some questions provided. Questions about how often they have sex, the respondent didn't answer in the virtual interview, and when the researcher tried to ask him again through messenger, he does not respond.

DISCUSSION

In the experience of the respondent, becoming undetectable 6 months after the diagnosis and being healthy today is the effect of health management behavior in taking the HIV medication. Consistently and correctly taking the ARV medication decreases the viral load of HIV infection. In the study of HIV, properly taking your HIV medication will help in keeping the viral load low and the CD4 count high. Taking the medication as

prescribed reduces viral load and makes the patient healthy and reduces the risk of passing the HIV to someone (HIV.gov, 2019).

Support groups are generally initiated and supported by government organizations, non-governmental organizations, HIV support groups, and non-HIV individuals. The participant is a member of a group called Philippine National Foundation Incorporated and Northern Mindanao Aids Advocate. His task in his work is to handle a newly diagnosed HIV-positive patient and to provide support to his other HIV-positive members. Also, the respondent improved his life because of the groups that supported him. Support groups for people living with HIV are likely to increase morbidity and retention in care, as well as quality of life and death. Support groups could allow people living with HIV to share their stories and become more involved in their care (Bategany *et al.* 2015).

In the respondent case, early detection awareness is not an important factor that leads to being undetectable. The patient is already in late detection when he found out that he was diagnosed with HIV, but with proper medication, a healthy lifestyle, and maintaining safe sex before he achieves undetectability. Regular testing and keeping the undetectable viral load are the best way to remain undetectable. A lot of people with HIV/AIDS receives late diagnoses. To minimize AIDS-related death, expanded testing is required to improve early HIV detection, and antiretroviral therapy should be prescribed to all diagnosed individuals as soon as possible (Tang *et al.*, 2018).

The financial situation is really a big part of being undetectable. The respondent line of work and paying Philhealth contribution regularly really helps him being undetectable. His parents also supported his treatment when he had a problem financially. Also, Philhealth provides free medications to their contributors, and the government pays for his Philhealth contributions that is why he does not have problems financially. Knowing that the government also provides free treatment, not all PLHIV are not able to access it, especially if you did not apply for Philhealth and you cannot access the benefits of it. Financial issues are one of the reasons that affect medication adherence, but with the law, RA 11166 or "Philippine HIV and AIDS Policy Act," access to medical service by indigent PLHIV shall not deprive with access to medical services, and DOH will support better access of ART and

provide financial assistance for indigent PLHIV (Philippines law and jurisprudence RA 11166).

Safe sex is having sexual contact while protecting yourself and your sexual partner against sexually transmissible infections (STIs), but the respondent would prefer not using a condom to his boyfriend because of unsatisfied pleasure, but he is a trained community-based motivator, so he recommended that even an HIV positive patient with undetectable viral load should have protected sex because aside from HIV they can still get other STIs. However, having some knowledge about early diagnosis opens the door to future care and treatment. It helps people to plan while they are still able to make important decisions on their care and support needs and on financial and legal matters. Early detection using HIV screenings and vaccines is more effective in preventing the transmission of disease. This would likely result in significant reductions in transmission as well as overall health costs and healthcare burden (Medscape, 2020).

Conclusion

Achieving and maintaining an undetectable viral load was the main goal of every HIV patient. Based on the participant's experiences, he became undetectable 6 months after his diagnosis, health management behavior, support groups, financial situation, and sexual activities are some factors that contributed to achieving undetectability. On the other hand, based on the participant's experiences, early detection awareness is not a factor that makes him undetectable.

Health management behavior helps the participant in becoming undetectable. Achieving and maintaining an undetectable viral load is not just about the medications, but it is also about the behavior of the individual. The participant makes sure that he properly follows the dosage and time of his medication. He also changes his lifestyle and removes his bad habits, with this behavior, he became healthy and maintained being undetectable. In the study of HIV gov properly taking your HIV medication will help in keeping the viral load low and the CD4 count high. Taking the medication as prescribed reduces viral load and makes the patient healthy and reduces the risk of passing the HIV to someone (HIV.gov 2019).

Support groups can be particularly useful for people feeling vulnerable or anxious because of being HIV positive. The participant's primary support system is his family, they helped him to feel less lonely and become optimistic. Other than the family, he is also part of the Mindanao AIDS Advocate Organization. This helps him to see his worth as a person and face the challenges in his life. The support groups that he has helps him become undetectable and they are not just a support system that gives companionship and support, but they are also given knowledge through the experiences of other people living with HIV. Support groups benefited those people living with HIV. It decreased negative perceptions of treatment and increased the number of patients with undetectable viral load (Sherman *et al.*, 2004).

Safe sex should be encouraged with people at the right age, especially people living with HIV. The participant maintained undetectable for 5 years and yet his sexual activity is still active, and it is fine to have sex, but they should use protection. He narrates that they used a condom for protection after his diagnosis, but they tried unprotected sexual intercourse once since it did not satisfy their pleasure which can put their health at risk. On the other hand, he is making sure that his partner undergoes an HIV test every 2 weeks. Therefore, protected sex is essential in maintaining the viral load undetectable and prevents the transmission of the disease to other people. The Center for Disease Control and Prevention states that making and maintaining your viral load undetectable prevents the transmission of HIV during sex. Condoms and Pre-exposure prophylaxis medicine can be an option to avoid getting the sexually transmitted disease and prevent the transmission of HIV (Center for Disease Control and Prevention, 2021).

People living with HIV always experience stigma and discrimination around the community, but it should not be normalized. The participants narrate how he was judged and discriminated by his own friends. He pitied himself and felt that he was useless. He experienced anxiety, depression, and some suicidal thoughts. All the challenges he experienced became his way to become a community-based motivator. He uses his experiences to inspire and encourage everyone to live and to become optimistic and that is his way to fight the stigma around the community. The participant uses his experiences to educate the people by speaking out facts about HIV.

Recommendations

The Department of Health (DOH) and partners from local government units through its Social Hygiene Clinics, public and private HIV treatment facilities, community-based organizations (CBOs), and advocacy groups are working together to ensure the sustained provision of HIV prevention, testing, treatment, care, and support services for key populations, with a special focus on PLHIV. The DOH advised key populations and all interested individuals to get tested and know their HIV status, emphasizing that HIV testing is free in Social Hygiene Clinics, Reproductive Health and Wellness Centers, and CBO-run community centers in order to ensure continued provision of HIV services. The DOH also urged all the PLHIV to take use of free HIV treatment and other services and to stick to their treatment plans (Department of Health, 2021).

Based on the results made in our study, the gaps are expensive HIV medications, expensive HIV screening test, lack of testing center and HIV education, the following recommendations are hereby suggested: the government should put more effort in improving access to HIV medication and provide more HIV treatment center so that more people will be aware of their statuses. In addition, HIV education should be more extent to enlighten the people who are not aware of the disease and to lessen the discrimination.

To help lessen the spread of HIV, pharmacist can play a vital role in educating patient about the optimal use of the medications, drug interactions and providing counseling on how to manage adverse reaction. Condoms can get from drugstores, if pharmacist can provide education about the proper use of condom more people will be sexually responsible.

This study should be broadened by other researchers to address the problems that HIV-positive people are facing. Our study has a few delimitations in that the nature of this study was focused strictly on descriptive aspects. It was limited to one HIV-positive person. Therefore, very broad generalizations cannot be made at this point from the results. Future researchers would be remarkable to do the same study while considering approaches with aspects like the problem of expensive tests of HIV and lack of testing centers. Other researchers might also focus on studying the program itself through observations of lessons to evaluate how

teachers deliver lessons about HIV because social implications of HIV/AIDS are manifest in the ways teachers address issues around stigma, discrimination and discourses of care, and many times lessons are delivered with discourses of sexuality ignored, overlooked, and silenced. All these would help inform policymakers and program planning and implementation in the future.

The researchers provided a care plan for the respondent to ensure that he receives continuity of care, safety, quality care and compliance. A care plan is useful for the patient to define their specific goals and to promote holistic treatment.

References

- AIDS Law Project of Pennsylvania. (2020, April 29). Confidentiality of HIV-Related Information. AIDS Law Project.
- Apa-Ap, R., & Tolosa, H. L. (2017). Forecasting the Monthly Cases of Human Immunodeficiency Virus (HIV) of the Philippines. *Indian Journal of Science and Technology*, 11, 1-10.
- Baral, S., Adams, D., Lebona, J., Kaibe, B., Letsie, P., Tshehlo, R., ... & Beyrer, C. (2011). A cross-sectional assessment of population demographics, HIV risks and human rights contexts among men who have sex with men in Lesotho. *Journal of the International AIDS Society*, 14(1), 1-8.
- Bateganya, M. H., Amanyeiwe, U., Roxo, U., & Dong, M. (2015). Impact of support groups for people living with HIV on clinical outcomes: a systematic review of the literature. *Journal of acquired immune deficiency syndromes (1999)*, 68 Suppl 3(0 3), S368–S374.
<https://doi.org/10.1097/QAI.0000000000000519>
- Calsyn, D. A., Cousins, S. J., Hatch-Maillette, M. A., Forcehimes, A., Mandler, R., Doyle, S. R., & Woody, G. (2010). Sex under the influence of drugs or alcohol: common for men in substance abuse treatment and associated with high-risk

sexual behavior. *The American journal on addictions*, 19(2), 119–127.
<https://doi.org/10.1111/j.1521-0391.2009.00022.x>

Commonwealth Regional Health Community Secretariat. 2002. HIV/AIDS voluntary counselling and testing: review of policies, programmes and guidelines in east, central and southern Africa. Arusha, Tanzania. Arusha: CRHCS.

de Lind van Wijngaarden, J. W., Ching, A. D., Settle, E., van Griensven, F., Cruz, R. C., & Newman, P. A. (2018). "I am not promiscuous enough!": Exploring the low uptake of HIV testing by gay men and other men who have sex with men in MetroManila, Philippines. *PloS one*, 13(7), e0200256.

Decoste, A. (2015). HIV/AIDS beliefs among MSM in the Philippines (Doctoral dissertation, Stellenbosch: Stellenbosch University).

DOH. (n.d.). *HIV/STI Prevention Program | Department of Health website*. Retrieved June 28, 2021, from <https://doh.gov.ph/national-hiv/sti-prevention-program>

Eisinger, R. W., Dieffenbach, C. W., & Fauci, A. S. (2019). HIV viral load and transmissibility of HIV infection: undetectable equals untransmittable. *Jama*, 321(5), 451-452.

- European Centre for Disease Prevention and Control.
(2018). The benefits of HIV treatment: undetectable means you do not pass on the virus.
<https://www.ecdc.europa.eu/en/news-events/benefits-hiv-treatment-undetectable-means-you-do-not-pass-virus>
- Farr, Anna & Wilson, David. (2010). An HIV epidemic is ready to emerge in the Philippines. *Journal of the International AIDS Society*. 13. 16. 10.1186/1758-2652-13-16.
- Friedland, B. A., Sprague, L., Nyblade, L., Baral, S. D., Pulerwitz, J., Gottert, A., Amanyeive, U., Cheng, A., Mallouris, C., Anam, F., Jackson, A., & Geibel, S. (2018). Measuring intersecting stigma among key populations living with HIV: implementing the people living with HIV Stigma Index 2.0. *Journal of the International AIDS Society*, 21 Suppl 5(Suppl Suppl 5), e25131. <https://doi.org/10.1002/jia2.25131>
- Gama, A., Martins, M. O., & Dias, S. (2017). HIV Research with Men who Have Sex with Men (MSM): Advantages and Challenges of Different Methods for Most Appropriately Targeting a Key Population. *AIMS public health*, 4(3), 221–239. <https://doi.org/10.3934/publichealth.2017.3.221>
- Gohil, J., Baja, E. S., Sy, T. R., Guevara, E. G., Hemingway, C., Medina, P. M. B., Coppens, L., Dalmacion, G. V., & Taegtmeier, M. (2020). Is the Philippines ready for

HIV self-testing? BMC Public Health, 20(1), 34.

Günthard, H. F., Saag, M. S., Benson, C. A., del Rio, C., Eron, J. J., Gallant, J. E., Hoy, J.

F., Mugavero, M. J., Sax, P. E., Thompson, M. A., Gandhi, R. T., Landovitz, R. J., Smith, D. M., Jacobsen, D. M., & Volberding, P. A. (2016). Antiretroviral Drugs for Treatment and Prevention of HIV Infection in Adults: 2016 Recommendations of the International Antiviral Society-USA Panel. *JAMA*, 316(2), 191–210. <https://doi.org/10.1001/jama.2016.8900>

Günthard, H. F., Saag, M. S., Benson, C. A., del Rio, C., Eron, J. J., Gallant, J. E., Hoy, J.

F., Mugavero, M. J., Sax, P. E., Thompson, M. A., Gandhi, R. T., Landovitz, R. J., Smith, D. M., Jacobsen, D. M., & Volberding, P. A. (2016). Antiretroviral Drugs for Treatment and Prevention of HIV Infection in Adults: 2016 Recommendations of the International Antiviral Society-USA Panel. *JAMA*, 316(2), 191–210. <https://doi.org/10.1001/jama.2016.8900>

Hinkin, C. H., Hardy, D. J., Mason, K. I., Castellon, S. A., Durvasula, R. S., Lam, M. N., & Stefaniak, M. (2004). Medication adherence in HIV-infected adults: effect of patient age, cognitive status, and substance abuse. *AIDS (London, England)*, 18 Suppl 1(Suppl 1), S19–S25. <https://doi.org/10.1097/00002030-200418001->

00004

HIVInfo.Nih. (n.d.). HIV Treatment Adherence.
<https://hivinfo.nih.gov/understanding-hiv/fact-sheets/hiv-treatment-adherence>

Kaiser K. (2009). Protecting respondent confidentiality in qualitative research. *Qualitative health research*, 19(11), 1632–1641.
<https://doi.org/10.1177/1049732309350879>

Khatri, S., Amatya, A. & Shrestha, B. Nutritional status and the associated factors among people living with HIV: an evidence from cross-sectional survey in hospital based antiretroviral therapy site in Kathmandu, Nepal. *BMC Nutr* 6, 22 (2020).
<https://doi.org/10.1186/s40795-020-00346-7>

Kumar, S., Mohanraj, R., Rao, D., Murray, K. R., & Manhart, L. E. (2015). Positive coping strategies and HIV-related stigma in south India. *AIDS patient care and STDs*, 29(3), 157–163.
<https://doi.org/10.1089/apc.2014.0182>

Magnani, Robert & Sabin, Keith & Saidel, Tobi & Heckathorn, Douglas. (2005). Review of sampling hard-to-reach and hidden populations for HIV Surveillance. *AIDS (London, England)*. 19 Suppl 2. S67-72. 10.1097/01.aids.0000172879.20628.e1.

Mateo R, Sarol JN, Poblete R. HIV/AIDS in the Philippines.

AIDS Educ Prev. 2004;16(3Suppl A):43–52.

McCombes, S. (2020, September 3). Descriptive research.

Scribbr.

<https://www.scribbr.com/methodology/descriptive-research/>

Morisky D.E., Tiglaio T.V., (2011). Educational and structural interventions and their impact on condom use and STI/HIV prevention for Filipina women and male customers. (3 Suppl):151S-158S. doi: 10.1177/1010539510373018

Newcomb, M. E., Mongrella, M. C., Weis, B., McMillen, S. J., & Mustanski, B. (2016). Partner Disclosure of PrEP Use and Undetectable Viral Load on Geosocial Networking Apps. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 71(2), 200–206.

<https://doi.org/10.1097/qai.0000000000000819>

Noroozi, M., Kadivar, M., Madani, M., & Salari, P. (2017). To Tell, or Not to Tell; Confidentiality in an Iranian HIV Positive Patient: A Viewpoint. *Journal of family & reproductive health*, 11(1), 50–55.

O'Brien, K., Nixon, S., Tynan, A. M., & Glazier, R. (2010). Aerobic exercise interventions for adults living with HIV/AIDS. *Cochrane Database of Systematic Reviews*, (8).

Okoli, C. (2021, February 1). Undetectable equals untransmittable (U = U): awareness and associations with health outcomes among people living with HIV in 25 countries. *Sexually Transmitted Infections*. <https://sti.bmj.com/content/97/1/18.info>

Okoli, C., Van de Velde, N., Richman, B., Allan, B., Castellanos, E., Young, B., Brough, G., Eremin, A., Corbelli, G. M., Mc Britton, M., Hardy, W. D., & de los Rios, P. (2020). Undetectable equals untransmittable (U = U): awareness and associations with health outcomes among people living with HIV in 25 countries. *Sexually Transmitted Infections*, *sextrans-2020*. <https://doi.org/10.1136/sextrans-2020-054551>

Phanuphak, N., Lo, Y.-R., Shao, Y., Solomon, S. S., O'Connell, R. J., Tovanabutra, S., Chang, D., Kim, J. H., & Excler, J. L. (2015). HIV Epidemic in Asia: Implications for HIV Vaccine and Other Prevention Trials. *AIDS Research and Human Retroviruses*, *31*(11), 1060–1076. <https://doi.org/10.1089/aid.2015.0049>

Pines, H. A., Wertheim, J. O., Liu, L., Garfein, R. S., Little, S. J., & Karris, M. Y. (2016). Concurrency and HIV transmission network characteristics among MSM with recent HIV infection. *AIDS (London, England)*, *30*(18), 2875–2883. <https://doi.org/10.1097/QAD.0000000000001256>

Power J, Dowsett GW, Westle A, Tucker JD, Hill S, et al. (2020) The significance and expectations of HIV cure research among people living with HIV in Australia. *PLOS ONE* 15(3): e0229733. <https://doi.org/10.1371/journal.pone.0229733>

Pringle, K., Merchant, R. C., & Clark, M. A. (2013). Is self-perceived HIV risk congruent with reported HIV risk among traditionally lower HIV risk and prevalence adult emergency department patients? Implications for HIV testing. *AIDS patient care and STDs*, 27(10), 573–584. <https://doi.org/10.1089/apc.2013.0013>

Protecting Others | Living with HIV | HIV Basics | HIV/AIDS | CDC. (2021). Center for Disease Control and Prevention. <https://www.cdc.gov/hiv/basics/livingwithhiv/protecting-others.html>

Remien, R. H., Stirratt, M. J., Nguyen, N., Robbins, R. N., Pala, A. N., & Mellins, C. A. (2019). Mental health and HIV/AIDS: the need for an integrated response. *AIDS (London, England)*, 33(9), 1411–1420. <https://doi.org/10.1097/QAD.0000000000002227>

Rendina, H. J., & Parsons, J. T. (2018). Factors associated with perceived accuracy of the Undetectable = Untransmittable slogan among men who have sex with men: Implications for messaging scale-up and

implementation. *Journal of the International AIDS Society*, 21(1), e25055.
<https://doi.org/10.1002/jia2.25055>

Restar, A., Ogunbajo, A., Adia, A., Nazareno, J., Hernandez, L., Sandfort, T., ... & Operario, D. (2020). Using structural equation modelling to characterise multilevel socioecological predictors and mediators of condom use among transgender women and cisgender men who have sex with men in the Philippines. *BMJ Global Health*, 5(7), e002463.

Salvana, E. (2010). The Philippine HIV-AIDS epidemic: A call to arms. *Acta Med Philipp*, 44(1), 60-2.

Sammut-Bonnici, T., & McGee, J. (2015, January 22). Case Study. ResearchGate.

Retrieved from
<https://www.researchgate.net/publication>

Sankaranantham M. (2019). HIV - Is a cure possible. *Indian journal of sexually transmitted diseases and AIDS*, 40(1), 1-5.
https://doi.org/10.4103/ijstd.IJSTD_112_15

Scaccia, A. (2020). Facts About HIV: Life Expectancy and Long-Term Outlook. Healthline. <https://www.healthline.com/health/hiv-aids/life-expectancy>

Sheckler, J. (2017). Health promotion and the individual. Slide Share.
<https://www.slideshare.net/mobile/JaceySheckler/h>

- Sherman AC, Mosier J, Leszcz M, Burlingame GM, et al. Group Interventions for Patients with Cancer and HIV Disease: Part III. Moderating Variables and Mechanisms of Action. *International journal of group psychotherapy*. 2004 20040701;54(3):347- 87
- Siedner, M. J., & Triant, V. (2018). Undetectable = Untransmittable and Your Health: The Personal Benefits of Early and Continuous Therapy for HIV Infection. *The Journal of Infectious Diseases*, 219(2), 173–176. <https://doi.org/10.1093/infdis/jiy445>
- Stangl, A. L., Earnshaw, V. A., Logie, C. H., van Brakel, W., C. Simbayi, L., Barré, I., & Dovidio, J. F. (2019). The Health Stigma and Discrimination Framework: a global, crosscutting framework to inform research, intervention development, and policy on health-related stigmas. *BMC Medicine*, 17(1), 31. <https://doi.org/10.1186/s12916-019-1271-3>
- Suttajit, M. (2007). Advances in nutrition support for quality of life in HIV/AIDS. *Asia Pac J Clin Nutr*, 16(1), 318-322.
- Taibi D. M. (2013). Sleep disturbances in persons living with HIV. *The Journal of the Association of Nurses in AIDS Care: JANAC*, 24(1 Suppl), S72–S85. <https://doi.org/10.1016/j.jana.2012.10.006>

Taking Your HIV Medication Every Day. (n.d.). HIV.Gov.
<https://www.hiv.gov/hiv-basics/staying-in-hiv-care/hiv-treatment/taking-your-hiv-medications-every-day>

The AIDS Institute. (n.d.). Where did HIV come from? AIDS Institute.
<https://www.theaidsinstitute.org/education/aids-101/where-did-hiv-come-0>

Toledano-Toledano, F., Rodríguez-Rey, R., Moral de la Rubia, J. et al. A Sociodemographic variables questionnaire (Q-SV) for research on family caregivers of children with chronic disease. *BMC Psychol* 7, 85 (2019).
<https://doi.org/10.1186/s40359-019-0350-8>

Tseng, A., Foisy, M., Hughes, C. A., Kelly, D., Chan, S., Dayneka, N., Giguère, P., Higgins, N., Hills-Nieminen, C., Kapler, J., La Porte, C. J. L., Nickel, P., Park-Wyllie, L., Quaia, C., Robinson, L., Sheehan, N., Stone, S., Sulz, L., & Yoong, D. (2012). Role of the Pharmacist in Caring for Patients with HIV/AIDS: Clinical Practice Guidelines. *The Canadian Journal of Hospital Pharmacy*, 65(2).
<https://doi.org/10.4212/cjhp.v65i2.1120>

Turan, B., Budhwani, H., Fazeli, P. L., Browning, W. R., Raper, J. L., Mugavero, M. J., & Turan, J. M. (2016). How Does Stigma Affect People Living with HIV? The Mediating Roles of Internalized and Anticipated

HIV Stigma in the Effects of Perceived Community Stigma on Health and Psychosocial Outcomes. *AIDS and Behavior*, 21(1), 283–291. <https://doi.org/10.1007/s10461-016-1451-5>

UNAIDS. (2012). Key programmes to reduce stigma and discrimination and increase access to justice in national HIV responses. *Guidance note*.

Van Den Boom, W., Stolte, I. G., Witlox, R., Sandfort, T., Prins, M., & Davidovich, U. (2013). Undetectable viral load and the decision to engage in unprotected anal intercourse among HIV-positive MSM. *AIDS and behavior*, 17(6), 2136–2142. <https://doi.org/10.1007/s10461-013-0453-9>

Ven, P. V., Mao, L., Fogarty, A., Rawstorne, P., Crawford, J., Prestage, G., Grulich, A., Kaldor, J., & Kippax, S. (2015). Undetectable viral load is associated with sexual risk taking in HIV serodiscordant gay couples in Sydney. *AIDS*, 19(2), 179–184. <https://doi.org/10.1097/00002030-200501280-00010>

WHO. (2021, June 9). *HIV/AIDS*. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/hiv-aids?fbclid=IwAR3sSpx0o5JwOIh0IbwqOVU_xw0jGl6NlyAGpgJut6fIX5U7O WNP3DcFwMM

World Health Organization. Regional Office for the Western Pacific. (2000). *100%Condom Use Programme in entertainment establishments*. World Health Organization.

Young, S., Wheeler, A. C., McCoy, S. I., & Weiser, S. D. (2014). A review of the role of food insecurity in adherence to care and treatment among adult and pediatric populations living with HIV and AIDS. *AIDS and Behavior*, 18, S505-S515. doi:10.1007/s10461-013-0547-4

Zhang, X. (2019b). Interventions to improve the HIV continuum of care in China. PubMed. <https://pubmed.ncbi.nlm.nih.gov/31776975/>

Building Coherence: Utilizing a Writing Prompt in Fostering a Reflective Paper

Authors: ¹Maricarl S. Austria Jr., ¹Patricia B. Dayrit

¹School of Education, Emilio Aguinaldo College-Cavite Dasmariñas City, Cavite

corresponding authors: maricarlaustria.jr@gmail.com,
patriciadayritcnd@gmail.com

contact number: 09926727894, 09083915680

KEYWORDS:

- Cohesive Devices
- Cohesion
- Writing Skills
- Writing Tool
- Writing Intervention

Abstract. Building coherence is easier said than done. From the first paragraph to the last, the writer should maintain the same concepts in writing an English essay, making Cohesion and Coherence the important features of texts in academic writing. Much of this Action Research has focused on developing the Coherence in writing a Reflection paper of the Junior High School students. Specifically, the utilization of Writing Prompt as the main intervention with the objective to spark the student's interest in a topic and urge them to write thoughtfully and creatively about it. With that, it enabled the students to write in a logically arranged manner in comparison to their previously submitted outputs, as the coherent presentation of ideas and presence of Cohesive devices became evident. In addition, the researchers performed a Documentary Analysis that objectively evaluated the progress of the student's writing skills in terms of Coherence which was reinforced by Focus Group Discussion where the assistance, idea generation, comprehension and remembering authenticated the essence of a Writing Prompt.

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Building Coherence: Utilizing a Writing Prompt in Fostering a Reflective Paper

INTRODUCTION

In Language Learning, one of the macro skills that is aimed to be developed is Writing. Hertiki et al., (2019) defined writing as a way to express one's thoughts, feelings and ideas to others through written signs. It is also considered as a process of expressing information and ideas in the written form that includes grammatical rules and rhetoric features. With this, Hasani et al., (2017) affirmed that writing is essential for learning. Thus, it is considered an integral part of the curriculum. In Philippine schools, written outputs were listed as one of the summative assessments for both Face-to-Face and Online Distance Learning for the Learning Area of Language according to the Annex B, Sample Summative Assessment Tools that Qualify as Performance Task in Various Learning Modalities of DepEd order no.31 s. 2020 (DepEd, 2020). In line with this, written activities in online classes are mostly utilized in the process of learning as the students' assessments most especially in Language Learning. These written outputs include blog posts; reaction or reflection papers; essays; graphs, charts or maps; problem sets; laboratory reports, and work designs based on the Basic Education Learning Continuity Plan of the DepEd order no.31 s. 2020 (DepEd, 2020). Specifically, Grade 7-10 students were expected to produce narrative writings and journals as an assessment for the subject area of Language as indicated on the essay types per key stage on the DepEd Classroom Assessment Resource Book (2018) as an enclosure for the aforementioned DepEd Order.

In the core subject of English, one of the frequently utilized written outputs is Reflection Paper. According to Daniel (2020), a reflection paper is a paper that requires one to write an opinion on a topic, supporting it with observations and personal examples. Reflection papers should have an academic tone, yet be personal and subjective. This type of paper requires one to analyze and reflect on how an experience, academic task, or article has formed one's perception and thoughts on a particular subject. Although this a subjective academic, Apsari (2018) explained that it is still expected to encompass several components that should be considered including vocabulary, use of appropriate grammar, syntax, mechanics, and coherent organization of ideas. According to the content and skills for assessing the students' written output, it is expected for the students to demonstrate the cognitive process of organizing which deals with the sequencing of ideas in logical or correct chronological order based on the fifth chapter of the DepEd Classroom Assessment Resource Book (2018). Unfortunately, there was a consistent problem in the students for committing grammatical lapses, and a lack of coherence which was evident in their outputs. Likewise, Che (2019) has concluded in her study, grammatical errors were seen to occur to a great extent in ESL learners' writing skills.

On the same gap seen by the researchers, this present study was anchored on the reflection paper submitted by the Grade 7 St. Mary students of Immaculate Conception Academy South campus on their Brightspace account for their Performance Task. This reflection paper was instructed to be done as a group in which each group was assigned with their respective documentary film that served as their topic for the reflection paper. As a Performance Task assessment during the first quarter, the Grade 7 students were expected to show the sequencing steps in writing and composition as a learning objective based on the English Curriculum guide of DepEd (2016). On the other hand, upon the evaluation of these reflection papers, the researchers have seen the students' declined skills on writing reflection paper with the following common errors among the submitted reflection papers:

1. Incoherent presentation of ideas and information
2. Redundancy in the manner of word choice and idea expression
3. Absence of Cohesive devices specifically the connectives
4. Improper usage of punctuation marks
5. Misspelled words
6. Incorrect Subject-Verb Agreement
7. Inconsistent utilization of Pronouns
8. Presence of contracted words
9. Absence of proper capitalization in proper nouns

The emphasized or focused problems were incoherent presentation of ideas and information, absence of cohesive devices specifically the connectives, and the inconsistent utilization of pronouns.

Action Research Questions

This study aimed to find out the development in the Reflection Paper of the Grade 7 English students after using a Writing Prompt. In order to make the study more focused, two research questions are formulated as follows:

1. How can students' reflection papers be described in terms of Coherence?
2. How did the Writing Prompt develops students' skills in writing Reflection Paper?

Proposed Innovation, Intervention, and Strategy

The intervention foreseen to be implemented was utilizing Writing Prompts in which the incoherent presentation of ideas and information, and inconsistent usage of Pronouns were addressed. The content of the Writing Prompt has served as the asynchronous activity for Lesson 11 and the steps and procedure on the implementation of the Writing Prompt began with the discussion of the dramatic play titled "Sa Pula, Sa Puti" by Francisco Rodrigo, which was followed by a brief discussion of logical connectors and came the implementation of the writing intervention which the instruction for Reflection Paper along with the guide questions of the writing prompt were discussed. The

students were given a week to answer and compose their group-reflection paper in accordance with the school's policy on homework, the final reflection paper was submitted on their Brightspace accounts under the assignment tab.

This writing prompt was consists of guide questions that contained both objective information and subjective opinions and thoughts that expressed the students' perspective about the given topic. This set of questions that the students answered in a specific manner served as their guide on composing a coherent reflection paper.

To establish the introductory paragraph, the set of WH questions were asked:

1. What is the title of the story?
2. Who is the author of the story?
3. Who is the main character?
4. When and where did the story happen?
5. What is the story all about? What is the conflict in the story?

Upon answering the guide questions for introduction, the students were given follow-up questions to ponder which allowed them to express their thoughts and opinions:

1. Does the conflict in the story happen in reality?
2. How did you feel after reading the story?
3. What do you think is the most important event in the story? And why?
4. Have you had the same or similar experience to the plot of the story?
5. What do you think is the message of the story towards us as readers?

To wrap up their answers, the guide questions for conclusion followed:

1. What was the important lesson that the story teaches us?
2. How can we apply this lesson in our lives?

Once the students accomplished answering these guide questions as their prompt for reflective writing, their answers were constructed into a paragraph form by following the sequence of questions with usage of appropriate cohesive devices and linking words to observe proper sequencing, comparing and contrasting, as well as adding information to produce a coherent reflection paper.

METHODOLOGY

Participants / Other Sources of Data

The study focused on the Grade 7 St. Mary students with regard to organization of Coherence in their Reflection Paper in English 7 as their Performance Task for First Quarter who underwent Purposive Sampling Technique. Additionally, this existing problem seen upon the evaluation of the submitted Reflection Papers served as the basis for the given intervention to develop the writing skill fluency of students. The participants of the study were the Grade 7 St. Mary students of Immaculate Conception Academy South campus who solely utilized the Writing Prompts prepared by the researchers to successfully differentiate the development of their Reflection Papers. In addition, the researchers performed a Documentary Analysis (Coding Sheet) and Focus Group Discussion to further discuss the significance of the Writing Intervention.

Data Gathering Methods

This study was performed through five (5) stages. The first step was finding common problems in the written output of the ten (10) Grade 7 students which were primarily from the two (2) out of seven (7) groups participated in the Performance Task. This was followed by searching for online resources such as researches and academic journals with regard to the founded problem which was Incoherence in writing. The third step was the implementation of the writing intervention which was a Writing Prompt in guiding the students to logically arrange their ideas and sentiments to a written activity. The fourth step was the descriptive

process of Documentary Analysis and Focus Group Discussion to interpret and analyze the result of the intervention. Lastly was the presentation of the difference in Coherence from the output between using a Writing Prompt to not utilizing one.

Data Analysis Plan

This study utilized a Coding Sheet for the content analysis of the first set of submitted reflection papers and the intervened reflection paper of students for objective validity of data. On the first part of the data analysis, the researchers conducted a Focused Group Discussion with the students of the selected two groups as participants of the study to consolidate their sentiments with regard to their experience on utilizing a writing prompt in composing a reflection paper as a confirmation of the evaluated content analysis. The extracted sentiments of the participants were treated with equal value on each statement or piece of data for the plausibility of perspective known as Horizontalization.

RESULTS

1. How can students' reflection papers be described in terms of coherence?

Problem in Coherence Writing	No. of times
Incoherent presentation of ideas and information.	8
1. Failure to use repetition to link ideas, sentences, and paragraphs.	///
2. Not utilizing synonyms to link ideas and create variety.	//
3. Non appearance of parallel structures to link ideas, sentences, and paragraphs.	/
4. Exclusion of well-executed logical progression of ideas.	/
5. Unsatisfactory control over organizational features.	/

Absence of Cohesive devices	29
6. Not using transitional expressions to link ideas, sentences, and paragraphs.	/
6.1 Addition (furthermore, in addition, and, besides, etc.)	////////
6.2 Comparison (similarly, likewise, again, in comparison, etc.)	/
6.3 Contrast (in contrast, on the other hand, on the contrary, etc.)	
6.4 Concession (although it is, regardless, granted that, etc.)	
6.5 Exemplification (for example, for instance, such as, etc.)	/
6.6 Inference (if not, in that case, that implies, then, etc.)	/
6.7 Summary (therefore, in a nutshell, in conclusion, to sum up, etc.)	///
6.8 Result (as a result, consequently, hence, thus, etc.)	////////
6.9 Reformulation (in other words, put simply, basically, etc.)	//
6.10 Miscellaneous (Adverbs)	
7. Absence of time connectives. (first, second, finally)	/
Inconsistent utilization of Pronouns	9
8. Disagreeing usage of pronouns to link sentences.	//
9. Unparallel singular and plural pronouns.	/////
10. Incorrect usage and construction of reflexive pronouns (himself, herself, themselves)	/

Table 1. Coding Sheet for the submitted Reflection Paper

The Reflection Paper submitted by the participants manifested issues in the Coherent presentation of ideas and

information, specifically the **failure to use repetition** to connect sentences and paragraphs, **not utilizing synonyms** to link ideas and create variety, and **non-appearance of parallel structures** to link ideas, sentences, and paragraphs. Moreover the Documentary Analysis revealed alarmingly numerous lapses in terms of Cohesive devices in **addition, exemplification, connectives, comparison, inference, summarization, result, and reformation**. Lastly, other errors were reported in **utilization of pronouns** particularly in **disagreeing usage of required pronouns** and mostly in **paralleled pronouns** and **incorrect usage of reflexive pronouns**.

Textural Theme

Theme 1: Construction of a Precise Grammar

- “Grammar and putting additional information / explanation on each paragraphs”
- “Grammar and delivering a clear and concise sentence”
- “Answers are not connected to the question asked”

Theme 2: Subjective Presentation of Ideas

- “It should be on correct grammar but grammatical lapses could still be acceptable as it can still be corrected with the help of my groupmates/ peers”
- “For me, it is acceptable as long as the grammar presented was understandable”

Theme 3: Adhering a Perfect Grammar

- “It should have a perfect grammar”
- “It should have a perfect grammar to make the ideas clear and understandable for the readers”

Structural Theme

Theme 4: Lack of Peer Cooperation

- “Late submissions of assigned parts in reflection papers”
 - “Wrong answers submitted such as “yes” “no” answers on questions that require expounded answers”
-

Theme 5: The link in between the sentences

- “Used to draw connections between sentences”
- “Used to link the sentences and ideas that are composed by my groupmates to make it look coherently connected in a paragraph”
- “It helped us to stitch sentences and texts together”
- “Used to show relationship between the sentences and paragraphs”
- “Adding words that are related to the sentences to make it clear”

Table 2. Horizontalization from Focus Group Discussion for the submitted Reflection Paper

The Focus Group Discussion disclosed that the challenges encountered upon composing a reflective paper revolved on **lack of peer cooperation** and **construction of a precise grammar** particularly the Cohesive devices. As the reflection paper was instructed as a collaborative activity, students are expected to be involved upon creating the written output by which some students have failed to do. This has led the members of their group to experience difficulty in both consolidation of the answers for each question assigned to a student and gathering a set of closed question answers on the items that require an expounded answer. As a result, the challenge in grammar construction took place for the students in which the absence of connection between the sentences and paragraphs that explain their sentiments occurred. This problem included answers that were not relevantly connected to the question, appropriate adding of information and explanation in between the sentences and paragraphs, and structuring a concise sentence. However, the participants were able to acknowledge the purpose of cohesive devices in a reflective paper as a tool to draw the **link in between the sentences**. Despite this, the consolidated perspectives of the participants still showed the content analysis of their reflective papers which depicted an incoherent presentation of ideas and disagreeing usage of pronouns. Moreover, the participants confessed that the reason behind this dilemma was that they were not always aiming to construct their paper with a correct grammar as they were after the **subjective expression of ideas** as long as they perceived it as comprehensible for readers. Although, some

students disagreed with this perspective as they preferred to compose a reflective paper with correct grammar constructions and mostly focused on **adhering a perfect grammar** on their paper. Nevertheless, these factors encountered have still resulted in failure to compose a coherent reflective paper.

The affirmed statements of the participants clearly explained the reason behind the encountered challenges upon the composition of their reflective paper in a collaborative manner. One of the students stated *“The problem that I had was late submissions of assigned parts in reflection papers”* which another student added, *“There are also wrong answers submitted such as “yes” “no” answers on questions that require explanations”* by which the students have recognized as the cause of encountering difficulties in constructing a coherent expression of their ideas along with relevantly expounded answers. Although, a student had recalled his knowledge regarding the usage of cohesive devices in writing as *“the words used to show relationship between the sentences and paragraphs”* incoherence and grammatical lapses were still seen on their reflective papers. In line with this, a student admitted *“For me, it is acceptable as long as the grammar presented was understandable”* which explained their subjectivity on composing a reflective paper with the advantage of collaboration as an avenue to correct grammatical errors that the other students commit, *“grammatical lapses could still be acceptable as it can still be corrected with the help of my peers”*. On the other hand, one of the students has expressed a contradiction, *“it should have a perfect grammar to make the ideas clear and understandable for the readers”* as the essence of the reflection paper was to develop their competence in coherent writing.

2. How did the writing prompt develop students’ skills in writing a coherent Reflection Paper?

Problem in Coherence Writing	No. of times
Incoherent presentation of ideas and information.	1

1. Failure to use repetition to link ideas, sentences, and paragraphs.

2. Not utilizing synonyms to link ideas and create variety. /
3. Non appearance of parallel structures to link ideas, sentences, and paragraphs.
4. Exclusion of well-executed logical progression of ideas.
5. Unsatisfactory control over organizational features.

Absence of Cohesive devices	11
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6. Not using transitional expressions to link ideas, sentences, and paragraphs.

6.1 Addition (furthermore, in addition, and, besides, etc.) ////

6.2 Comparison (similarly, likewise, again, in comparison, etc.)

6.3 Contrast (in contrast, on the other hand, on the contrary, etc.) /

6.4 Concession (although it is, regardless, granted that, etc.)

6.5 Exemplification (for example, for instance, such as, etc.)

6.6 Inference (if not, in that case, that implies, then, etc.)

6.7 Summary (therefore, in a nutshell, in conclusion, to sum up, etc.) //

6.8 Result (as a result, consequently, hence, thus, etc.) ///

6.9 Reformulation (in other words, put simply, basically, etc.)

6.10 Miscellaneous (Adverbs)

-
7. Absence of time connectives. (first, second, finally)

Inconsistent utilization of Pronouns	
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8. Disagreeing usage of pronouns to link sentences.
 9. Unparallel singular and plural pronouns.
 10. Incorrect usage and construction of reflexive pronouns (himself, herself, themselves)
-

Table 3. Coding Sheet for the submitted Intervened Reflection Paper

One of the ways in increasing the writing quality is through a Writing Prompt, the submitted intervened paper of the participants reflected an improvement in writing skills as the presence of Cohesive devices became evident. In comparison to the first submitted outputs of the participants where numerous lapses were documented, the documentation analysis now indicated selected instances where a Cohesive device should have been used specifically in **addition, contrast, summary** and **result**. Other than that, there was no error nor oversight in terms of coherent presentation of ideas and utilization of pronouns.

Textural Theme

Theme 1: A Challenging Set to Answer

- “It was difficult because it was not easy to find answers for the difficult questions”
- “It was exhausting and difficult. It seems like you really need to think critically to answer the questions”
- “Some questions were easy and some were difficult to answer”

Theme 2: Operating Text Comprehension

- “Most of the questions are not difficult to answer but there are some questions that cannot be answered by the texts written in the story. At the first place, I thought that ‘maybe I could find the answers on the book which resulted me in reading the book repeatedly until I realized that the answers for those questions are not in the story”
 - “It was both easy and difficult. For the easy questions, you can answer it easily without any work to do, but for the difficult questions you really need to understand it to complete it”
-

Structural Theme

Theme 3: Providing Assistance in Writing

- “The guide questions helped us to compose our reflection paper easier”
- “It helped us to determine which information should be included in the introduction, body, and conclusion part of the paper”
- “It was helpful for us especially it was done by group in a way that the questions could be assigned to my groupmates which made our composition easier for us”

Theme 4: Challenge of Unfamiliarity

- “It was difficult because some questions were unfamiliar and it cannot thought of any correct answer for it”
- “It was okay yet challenging because of the difficult questions”
- “Same experience with my classmate”
- “It was difficult and easy.”

Theme 5: A Tiring Collaborative Activity

- “It was tiring because aside from the part that you need to do in the reflection paper, you also need to do the parts that were not submitted by the assigned group members and edit those with irrelevant and wrong answers”
- “It is tiring especially when I encountered late submissions which left me with no choice but to do those unsubmitted parts”

Theme 6: Claimed as an Idea Generator

- “The guide questions for each part of the paper helped us to come up with the answers that are relevant to each part and all we need to do is to connect those in order to compose the paragraphs“
- “It also helped me to think for ideas”
- “It helped us determine which answers should be included on our reflection paper”

Theme 7: Usage of Remembering Level in Learning

- “I was able to answer the questions easily because we included it in our class discussion”
 - “I answered the questions easily based on our discussions and the things that I noted during our class”
-

Table 4. Horizontalization from Focus Group Discussion for the submitted Intervened Reflection Paper

The evaluated development on the students' composition of reflective paper with the utilization of the writing prompt as an intervention has demonstrated an effectivity with regard to enhancing the writing skills of the students. Generally, the students expressed a positive experience on utilizing a writing prompt in writing a reflective paper. The students claimed that utilizing the writing prompt has provided an **assistance in writing** with regard to the identification of which information should be included in each paragraph of the paper, namely the introduction, body, and conclusion through answering the guide questions designated on each of the parts of the reflective paper. These guide questions have served as their springboard in composing the paragraphs of the paper as **claimed as an idea generator** that answers the questions that they should mend in a logical manner to produce a coherent reflective paper. However, the students also confessed that the experience of answering these guide questions have brought them **challenges of unfamiliarity** with the presence of strange and new words and questions with regard to the given literary selection. The students explained that there were questions that cannot be easily answered by the help of the internet and their academic book as a reference, because these questions require their **operation of text comprehension** and the usage of critical thinking to generate the most appropriate answers. Aside from this, the students have also experienced a **challenging set to answer** and **tiring collaborative activity** on complying with the guide questions with peers which resorted to the group leaders to answer the questions that are assigned to the members of the collaborative group and correct the mistakes of answers that re irrelevant in order to accomplish their collaborative reflection paper. Regardless of the aforementioned problems in answering the guide questions within the writing prompt, the students concluded that they were able to answer the guide questions easily through the **usage of remembering level in learning and text comprehension** in accomplishing a coherent reflection paper.

The verbal expression of the students' experience on utilizing the writing prompt for developing a coherent reflection paper has apparently mirrored the development of their paper on the content analysis of their intervened reflection paper. One of the students affirmed, "*The guide questions for each part of the paper helped us to come up with the answers that are relevant to each part and all we need to do is to connect those in order to compose the paragraphs*". Although, some students expressed their contradiction with their perception that answering the guide questions on the writing prompt was difficult by this given statement, "*it was difficult because some questions were unfamiliar and I cannot think of any correct answer for it*". Primarily, this instance depicted the need for the students to use their critical thinking skills which made their formulation of answers as laborious. Nonetheless, the students have successfully answered the guide questions as stated by one of them, "*For the easy questions, you can answer it easily without any work to do, but for the difficult questions you really need to understand it to complete it*" that emphasized the value of comprehension as affiliated with the critical thinking skills of students that was solely used upon accomplishing the writing prompt to develop a coherent reflective paper.

DISCUSSION

1. How can students' reflection papers be described in terms of coherence?

The aforementioned exposition manifested rational factors affecting the Coherent writing composition of the students. A collaborative activity demands cooperation of the students acknowledging the accurate answers to provide a beneficial output towards the main goal, and instances such uncooperative members and its incorrect contribution hamper the common goal of a reflective paper. In the context, the intra-text connectivity and the contextual appropriateness of the ideas, in order to make the texts more comprehensible becomes unattainable due to the external aspect affecting the student's writing composition.

These instances were supported by Veramuthu (2020) claiming that collaborative learning may not always be effective to utilize as it decreases the chance of the students' involvement to the maximum level. On the contrary, Yu (2019) expressed the integration of the 4C's of 21st Century Skills namely Communication, Collaboration, Creativity, and Critical Thinking to help the ESL learners to improve their English writing skill. Likewise, students were able to produce organized writing specially through peer guidance which was done by collaboration. Hence, the quality of writing can be improved through collaborative writing activities because group members contribute in correcting the grammatical errors in constructed sentences.

2. How did the writing prompt develop students' skills in writing a coherent Reflection Paper?

A Writing Prompt presents and concentrates on the idea and concept of writing and the development in the students' reflective writing authenticated the assistance brought by a Writing Prompt. The account from the Documentary analysis as well as the Focus Group Discussion exhibited valuable insights in the implementation and utilization of a Writing Prompt which was one of the tools essential in honing the writing skills. The effectiveness of the writing intervention implemented likewise involved some critical thinking skills as mentioned by the participants which substantially open the interdisciplinary effect of the utilization of Writing Prompt to student's scholastic performance.

A study by Yu et. al., (2019) stated that students were able to generate writing ideas more smoothly after participating in interventions in groups as they were able to think critically and creatively through inquiries with keywords like who, how, and why. This was supported by Carter (2020) that students should learn processing inquiry, learning, and thinking more than just accumulating skills and information, which the Writing Prompt was able to have an effect on. A reinforcement to the mentioned study was done by Wang and Seepho (2017) that in order to make this possible, effective questioning and use of inquiry as a pedagogical practice should be applied to support the development of students' critical thinking skills. Moreover, the totality of these Writing and Critical thinking skills was explained by Iljazi (2021) that the

students from a guided writing group can demonstrate higher progress in writing exercises with a given specific instruction. Thus, they recognize a number of sentence structures and patterns by practicing guided writing activities during the instruction. Lastly, Schneider (2018) revealed that students have a stronger reflective writing through utilizing a guided format with the proper construction of the paragraphs that consist of the text which supported the student's claims towards the guidance received in utilizing a Writing Prompt.

CONCLUSION

This present study has demonstrated some evidence on the effectiveness of Writing Prompt in developing student's writing performance. First, the student's paper described as incoherent writing in account for the lapses committed in the logical presentation of ideas by means of Repetition, Synonyms, Parallelism, as well as the numerous absences of Cohesive devices and inconsistent utilization of Pronouns reflected in the coding sheet reinforced by the respective Focus Group Discussion. Following the gap unearthed by the researchers, another set of writing composition was provided to the students with the guidance of a writing intervention. With that, the Writing Prompt increased the presence of Cohesive devices in the writing composition and the elimination of incoherent presentation of ideas as students were able to utilize Repetition, Synonyms, Transitional devices and Pronouns in their writing which is a manifestation of development in their writing skills.

RECOMMENDATIONS

- The Pre-Service Teachers and Researchers of this study encourage the English Highschool Teachers to continue the practice of utilizing a writing prompt as a part of the students' composition of reflective paper to pursue the coherent writing skills development of the students in accordance to their learning competencies and

performance standards in the five sub-strands of Language and Literacy Domains.

- Future Researchers are encouraged to conduct further studies with a different writing intervention to contrast the effectivity of the present study on utilizing writing prompt in developing the students' coherence on composing a reflective paper.

Overall Essence

Writing is regarded as one of the essential literacy skills in Language learning that is expected to be enhanced on the learners through the application of various branches of linguistics. On this fundamental branch, the learners should acquire the capability to compose a set of sentences with logically arranged ideas to perceive coherence on writing composition most specially for secondary level learners. Unfortunately, there is an existing lapse in the development of writing skills of learners. Thus, calls for an immediate action, and it is the time to develop it in the form of a writing prompt. The writing prompt was given to mend the existing gaps of the learners composition of coherent writing because obviously, without coherence a written composition would be difficult in understanding the ideas presented. With this, the present study was conducted as a contribution to the body of knowledge in developing the students' writing skills using a writing prompt to accordingly meet their grade level and expected learning outcomes based on the given learning objectives and competency in the English curriculum.

Plans for Dissemination and Utilization

The researchers are planning to offer the study in the realm of linguistics particularly in academic writing: reflective paper. This will be done through publication in peer reviewed journals to serve as a reference for English Teachers in secondary level and academic institutions with regard to the aid of writing prompts in resolving the students' lapses in coherent writing. Apart from this, the study is also foreseen to be presented on various research conferences and colloquiums by the researchers to

provide a comprehensive view towards the academic personnel and other researchers concerning further studies for an expounded perspective in line with this present study that aims to develop the students' coherent writing skills of a reflective paper.

REFERENCES

- Carter, A., (2020) Developing critical thinking skills in the ESL classroom | Contact. (2020, November 30). Teslontario.org. <http://contact.teslontario.org/developing-critical-thinking-skills-in-the-esl-classroom/#:~:text=ESL%20teachers%20can%20foster%20critical,thinking%20are%20presented%20and%20discussed>.
- Hasani, A., Hendrayana, A., & Senjaya, A. (2017). Using Project-based Learning in Writing an Educational Article: An Experience Report. *Universal Journal of Educational Research*, 5(6), 960–964. <https://doi.org/10.13189/ujer.2017.050608>
- Hassan, C., Mohammad, N., Rosly, R., Zakaria W., (2019) View of ESL Learners' Language Errors in a Reflective Writing Assessment. (2022). Unimas.my. <https://publisher.unimas.my/ojs/index.php/ILS/article/view/1291/784>
- Hertiki, H. -, & Juliati, J. (2019). IMPROVING STUDENTS' WRITING SKILLS USING COOPERATIVE LEARNING AT SMPN 2 SUKODONO. *Journal of English for Academic and Specific Purposes*, 2(2), 36. <https://doi.org/10.18860/jeasp.v2i2.7853>
- Huh, M.-H., & Lee, J. (2018). Task Complexity and Writing Prompts and Performance in EFL High School Students' Narrative Writing. *English Teaching*, 73(4), 55–72. https://eric.ed.gov/?q=Writing+prompts&ff1=dtySince_2018&id=EJ1306461
- Jehona Rexhepi Iljazi. (2021). EFFECTS OF DIFFERENT APPROACHES TO WRITING ON THE IMPROVEMENT OF STUDENTS' WRITING PERFORMANCE. *KNOWLEDGE - International Journal*, 48(4), 653–658. <https://ikm.mk/ojs/index.php/kij/article/view/4885>

K to 12 Curriculum Guide ENGLISH (Grade 1 to Grade 10). (2016). <https://www.deped.gov.ph/wp-content/uploads/2019/01/English-CG.pdf>

October 2, 2020 DO 031, s. 2020 – Interim Guidelines for Assessment and Grading in Light of the Basic Education Learning Continuity Plan | Department of Education. (2020). [Deped.gov.ph. https://www.deped.gov.ph/2020/10/02/october-2-2020-do-031-s-2020-interim-guidelines-for-assessment-and-grading-in-light-of-the-basic-education-learning-continuity-plan/](https://www.deped.gov.ph/2020/10/02/october-2-2020-do-031-s-2020-interim-guidelines-for-assessment-and-grading-in-light-of-the-basic-education-learning-continuity-plan/)

Pn, D., (2020) How to Write a Reflection Paper: Guide with Example Paper | EssayPro. (2021). [Essaypro.com. https://essaypro.com/blog/reflection-paper](https://essaypro.com/blog/reflection-paper)

RahmtAllah, E. A. E. (2020). EFL Students' Coherence Skill in Writing: A Case Study of Third Year Students of Bachelors in English Language. *English Language Teaching*, 13(8), 120. <https://doi.org/10.5539/elt.v13n8p120>

Schneider-Cline, W. (n.d.). Guided vs. Open-Ended Journals: A Comparison of Two Reflective Writing Models for Undergraduate Service-Learning Experiences. <https://files.eric.ed.gov/fulltext/EJ1193200.pdf>

Tan Xin Yu, & Mohammad, M. (2019, September 9). Integration of 21st Century Learning Skills (4C Elements) in Interventions to Improve English Writing... *ResearchGate; Redfame Publishing*. https://www.researchgate.net/publication/335718806_Integration_of_21st_Century_Learning_Skills_4C_Elements_in_Interventions_to_Improve_English_Writing_Skill_Among_3K_Class_Students

Veramuthu, P., & Md Shah, P. (2020). Effectiveness of Collaborative Writing among Secondary School Students in an ESL Classroom. *Creative Education*, 11(01), 54–67. <https://doi.org/10.4236/ce.2020.111004>

Wang, S., & Seepho, S. (2017). Facilitating Chinese EFL Learners' Critical Thinking Skills: The Contributions of Teaching Strategies. *SAGE Open*, 7(3), 215824401773402.
<https://doi.org/10.1177/2158244017734024>

Yanuarti Apsari. (2018, August 4). REFLECTIVE READING JOURNAL IN TEACHING WRITING. ResearchGate; University of Kuningan.
https://www.researchgate.net/publication/326991651_REFLECTIVE_READING_JOURNAL_IN_TEACHING_WRITING

Efficacy of Ultrasound and Magnetic Resonance Imaging (MRI) in the Assessment of Axillary Lymph Nodes' Status in the Early Stage of Breast Cancer

¹Loren Jacel M. Hernandez, ¹Khurt Gerard Young, ¹Nonie M. Batao, and ²Glenda V. Sangalang

¹*School of Radiologic Technology, Emilio Aguinaldo College, City of Dasmariñas, Cavite*

²*School of Physical Therapy, Emilio Aguinaldo College, City of Dasmariñas, Cavite*

*Corresponding author: ljmhernandez.cvt@eac.edu.ph
Contact number: 09606821995

KEYWORDS:

- Axillary Lymph Nodes
- Ultrasound
- Magnetic Resonance Imaging
- Breast Cancer
- Axillary Lymph Nodes' Status Assessment

Abstract. Breast cancer is a significant health concern, and early detection is one approach to preventing or reducing the illness's spread. Early identification leads to earlier treatment, preventing the disease from developing into a metastatic state, which is more challenging to treat. The study's authors aim to characterize the diagnostic accuracy of ultrasound and magnetic resonance imaging (MRI), as well as the factors that impact their efficacy. **Methods:** To

find articles for inclusion, researchers searched PubMed, Science Direct, Springer Link, the American Cancer Society, Google Scholar, the Journal of Clinical Oncology (JOC), and the

European Journal of Radiology (EJR). Three researchers independently assessed the comprehensive search results and abstracted data from included studies. **Results:** The researchers reviewed and evaluated ten papers—all articles published between January 2010 and March 2022 and fulfilled the inclusion criteria. The ten retrospective studies addressed the sensitivity and specificity of ultrasonography and MRI in determining the axillary lymph node status in breast cancer. **Conclusion:** The methods employed in each experiment define the sensitivity, specificity, PPV, and NPV of the modality. This review also discovered that, while ultrasound and MRI are comparable, both imaging modalities could not distinguish between pN1 and pN2-3. As a result, this analysis shows that ultrasound and MRI should be complementary rather than competitive for a more accurate evaluation of axillary lymph nodes, as the accuracy rate of a combined modality is higher than using them separately.

Efficacy of Ultrasound and Magnetic Resonance Imaging (MRI) in the Assessment of Axillary Lymph Nodes' Status in the Early Stage of Breast Cancer

INTRODUCTION

Breast cancer, a global health concern with an estimated 1,384,155 new cases, already has 459,000 mortalities as of 2015 (Tao et al., 2015). Its pathology is exceedingly variable, with some cases exhibiting moderate growth with an excellent prognosis and others having aggressive tumors. The mortality rate of breast cancer did not change significantly from the 1930s to the 1970s, which resulted in a high mortality rate. In the 1980s, early detection programs with different treatment options for breast cancer were adopted by several countries, which helped eliminate the invasive illness and increased the survival rates.

Early detection is one approach to combating or slowing the spread of the disease and leads to earlier treatment to prevent the disease from progressing to a metastatic state, which is more challenging to treat. The World Health Organization estimated that 2.3 million women would be internationally diagnosed with breast cancer in 2020, with 685,000 casualties. While, 7.8 million women have been diagnosed with breast cancer in the preceding years, as of 2020, making it the highest cancer incidence globally. Cancer rates rise in all countries as women reach any age after puberty.

Today, a wide choice of diagnostic interventions is available based on an individual's required test. Imaging tools, which give a clear picture of what is happening internally in the body, can now be used to diagnose and treat a specific ailment. Medical imaging tools come in many varieties, each with its capabilities.

Medical imaging tools are beneficial in the healthcare profession since they are fundamental in diagnosis, leading to a well-planned intervention in addressing the disease based on its course. Roy and Saikai (2016) stated that cancer is one of the most feared diseases of the twentieth century, and its prevalence is increasing. Cancer currently has no precise cure. It is, however, treatable if detected early.

Moreover, the researchers aim to describe ultrasound and Magnetic Resonance Imaging (MRI) in terms of their diagnostic accuracy, describe the factors influencing the efficacy of the mentioned diagnostic interventions, and assess axillary lymph nodes in the early stage of breast cancer. However, no imaging or diagnostic interventions are significantly superior to another. Each has its scope and limitations.

METHODOLOGY

Study Design

The scoping review provides a well-defined subject of an investigation that includes establishing the research objective, searching for published studies, choosing studies, charting data, and collecting, summarizing, and reporting the findings. This review typically takes topics from new public policy or clinical practice concerns, and it is the sort of research design demonstrated in this work.

The researchers used this research approach to encompass a variety of study designs and explore concerns other than treatment efficacy. While there are some parallels between a scoping review and a systematic review, the scoping review typically does not include quality assessment and conclusions narratively.

The study used the explicit scoping review technique to include and omit studies. The researchers defined, analyzed, and synthesized all existing studies on ultrasound's diagnostic accuracy and efficacy. Magnetic Resonance Imaging (MRI) Scans in assessing the status of axillary lymph nodes in patients with early-stage breast cancer.

Participants of the Study

This review comprised all papers primarily acquired by the researchers on medical professionals' assessments and viewpoints on the diagnostic accuracy and efficacy of ultrasound and Magnetic Resonance Imaging (MRI) Scans in determining the status of axillary lymph nodes in early-stage breast cancer, that made the review open-ended and adaptable.

Procedure

The PRISMA flow diagram is used as the basis for this study's systematic search; it primarily aids in assessing the benefits and harms of a health care intervention. Researchers collected data based on how relevant the data is to the research and its effectiveness.

From January 2010 to March 2022, original peer-reviewed publications published in English language articles were gathered by systematic searches of seven electronic databases, including PubMed, Science Direct, Springer Link, American Cancer Society, Google Scholar, Journal of Clinical Oncology, and European Journal of Radiology.

Any detected records from the systematic search were transferred to Google Sheets, the researcher's reference management program and all duplicates and titles in other languages were removed. After selecting articles, the studies were examined to see if they met the inclusion criteria.

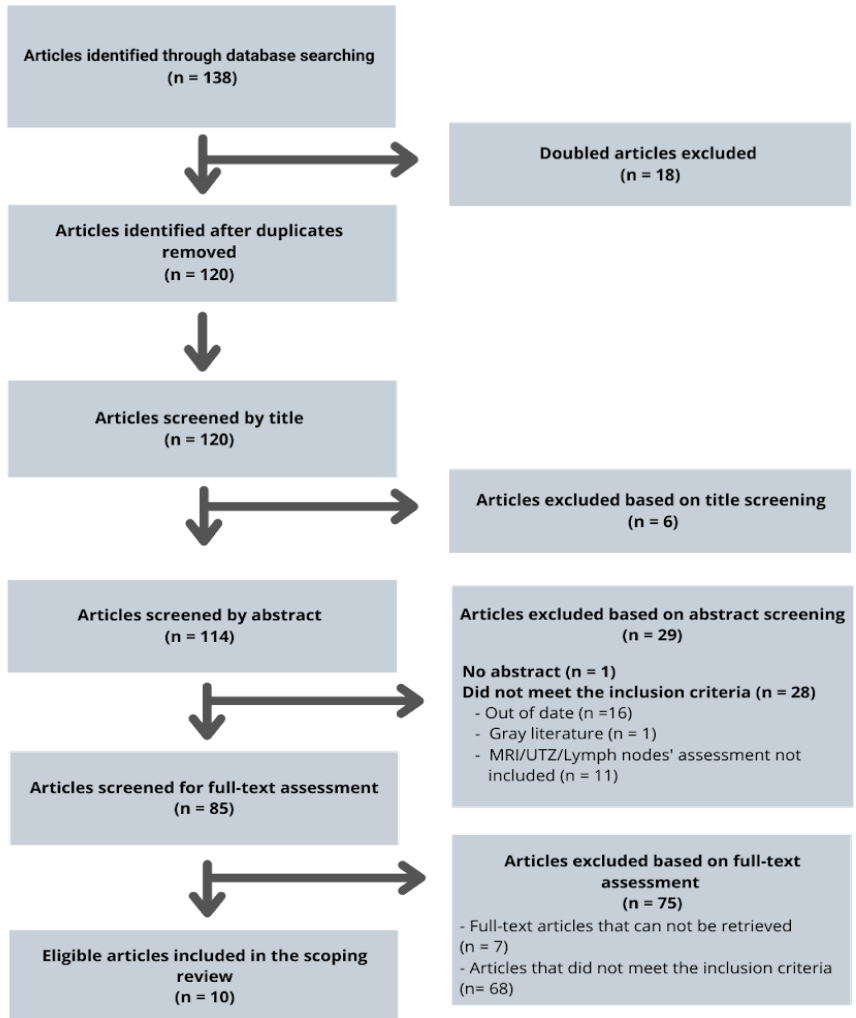
By analyzing the study, the researcher contributes to determining whether the article is appropriate for the scoping review. If the original article failed to match the inclusion requirements, it would be deleted, and the reason for exclusion will be recorded.

RESULTS

Search Results

Figure 1

Flow Chart of the Identification and Selection Process of the Articles



In the figure shown above, it is shown that the seven electronic databases yielded a total of one hundred thirty-eight (138) articles (PubMed: 63, Science Direct: 30, Springer Link: 6, American Cancer Society: 3, Google Scholar: 12, Journal of Clinical Oncology: 1, and European Journal of Radiology: 5), resulting in one hundred twenty (120) titles and abstracts that were reviewed after duplicates were removed. Based on the various online libraries, the researchers retrieved a total of one hundred twenty (120) articles that underwent the title screening stage. After the title screening, six (6) articles were excluded from the scoping review. A total of one hundred fourteen (114) articles underwent the abstract screening stage.

The abstract screening stage yielded a total of one hundred fourteen (114) potentially relevant articles for the scoping review. Following the abstract review, more papers were removed for the reasons outlined in the flowchart (Fig. 2). The eighty-five (85) potentially relevant studies were assessed again for their eligibility. As a result, ten (10) articles were included in the final collected data, quality rating, and narrative summary processes. The review includes all ten (10) eligible retrospective publications. The patients in the trials mentioned above were diagnosed with invasive breast cancer, with a sample size ranging from 49 to 1017 individuals.

Table 1

Summary of the ten (10) eligible articles included in the scoping review

TITLE & AUTHOR	STUDY DESIGN	MODALITY	SAMPLE SIZE	PATHOLOGIES	FINDINGS	LIMITATIONS	CONCLUSION
Accuracy of Axillary Lymph Node Staging in Breast Cancer Patients: An Observer-Performance Study Comparison of MRI and Ultrasound Hiroyuki Abe, MD, David Schacht, MD, Kirti Kulkarni, MD, Akiko Shimauchi, MD, Ken Yamaguchi, MD, Charlene A. Sennett, MD, Yulei Jiang, Ph.D.	Retrospective (Observer-Performance) Study	US MRI	50 Patients	Invasive Breast Cancer	US SE= 84.0% SP= 81.0% MRI SE= 90.0% SP= 73.0%	In the US studies, 5 instances with Metastatic Axillary LN(S) were not detected out of 50. The research included a modest number of patients. The combined sensitivity of MRI and US appears to be less than that of MRI and US alone.	In breast cancer patients, observer performance for ipsilateral axillary lymph nodes staging is comparable between ultrasound and MRI. When both MR and ultrasound are positive for metastatic lymph nodes, the specificity and PPV improve significantly compared to either MR or ultrasound alone. The findings of this study suggest that MR and ultrasound are complementary for detecting metastatic lymph nodes and that in cases where the axillary ultrasound is not initially performed, MRI could serve as the initial imaging method for axillary staging.

Accuracy of Predicting Axillary Lymph Node Positivity by Physical Examination, Mammography, Ultrasonography, and Magnetic Resonance Imaging	Stephanie A. Valente, DO, Gary M. Levine, MD, Melvin J. Silverstein, MD, Jessica A. Rayhanabad, MD, Janie G. Weng-Crumley, MD, Lingyun Ji, Ms., Dennis R. Holmes, MD, Richard Spotto, PhD, and Stephen F. Sener, MD	Retrospective Study	Physical Examination, Mammography, US, MRI	244 Patients	Invasive Breast Cancer	<p>PHYSICAL EXAMINATION N SE= 35.5% SP= 98.4% A=82.4%</p> <p>MMG SE= 21.0% SP= 99.5% A=79.5%</p> <p>US SE= 43.5% SP= 98.2% A=82.8%</p> <p>MRI SE= 37.1% SP= 98.7% A=81.8%</p>	<p>The data demonstrate that no imaging modality or combination of modalities presently has an accuracy level as high as the gold standard of surgical SLNB or that consistently distinguishes a subset of patients with a negative evaluation in whom sentinel node biopsy may be safely skipped. However, preoperative PE and axillary imaging with subsequent percutaneous biopsy if needed, enabled 42 percent of patients with axillary metastases to be informed of their lymph node involvement before surgery. A surgical procedure is necessary.</p> <p>The difficulty in ascertaining the precise correlation of specific axillary lymph nodes observed by various imaging modalities.</p> <p>Since the Percutaneous Lymph Node Needs Biopsy only samples a section of a Lymph Node, it is possible that a Cluster of Tumor cells present elsewhere in the Lymph Node will be missed.</p>
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TITLE & AUTHOR	STUDY DESIGN	MODALITY	SAMPLE SIZE	PATHOLOGIES	FINDINGS	LIMITATIONS	CONCLUSION
Diagnostic performance of breast ultrasonography and MRI in the prediction of lymph node status after neoadjuvant chemotherapy for breast cancer	Retrospective Study	MRI, US, MRI + US	157 Patients	Invasive Breast Cancer	<p>MRI SE= 57.33% SP= 72.09% A=82.71%</p> <p>US SE= 60.0% SP= 90.47% A=80.17%</p> <p>MRI + US SE= 68.33% SP= 90.47% A=83.56%</p>	<p>First, patients with negative fine-needle aspiration findings at the time of their initial diagnosis were not evaluated, which might have resulted in a selection bias.</p> <p>Second, statistical analysis was done on the number of axilla rather than the number of lymph nodes; thus, node-to-node comparison was not done.</p> <p>Finally, because of the short follow-up time, we did not examine postoperative axillary lymph node recurrence.</p>	<p>Breast ultrasonography, MRI, and their combination predict axillary lymph node status with moderate sensitivity and specificity in breast cancer patients receiving NAC. These imaging modalities, however, lack the sensitivity and specificity necessary to rule out the necessity for sentinel lymph node biopsy or to assess the requirement for axillary dissection.</p>
Diagnostic Performance of Axillary Ultrasound and Standard Breast MRI for Differentiation Between Limited and Advanced Axillary Nodal Disease in Clinically Node-Positive Breast Cancer Patients	Retrospective Study	US, MRI Reader 1, MRI Reader 2	40 Patients	Invasive Breast Cancer	<p>US SE= 97.0% SP= 12.5% A= 69.4%</p> <p>MRI READER 1 SE= 84.8% SP= 43.8% A=71.4%</p> <p>MRI READER 2 SE= 84.8% SP= 50.0% A=73.9%</p>	<p>The analyses were based on a small number of patients, which might have resulted in clinically significant discrepancies in diagnostic performance being undiscovered.</p> <p>The diagnostic performance metrics were calculated on a patient-by-patient basis rather than a node-by-node basis.</p>	<p>Preoperative axillary US and conventional breast MRI perform equally well in clinically node-positive breast cancer patients, and neither imaging modality can adequately differentiate between pN1-3 and pN<4. When ultrasonography indicates 1-3 axillary lymph nodes, only 80.0-84.5 percent of individuals have pN2-3 accurately diagnosed. According to this research, preoperative normal breast MRI had no extra clinical utility for discriminating between pN1 and pN2-3 in patients with positive axillary US.</p>

Diagnostic Value of Axillary Ultrasound, MRI, and 18F-FDG-PET/CT in Determining Axillary Lymph Node Status in Breast Cancer Patients	Retrospective Study	Axillary US MRI 18F-FDG-PET/CT	336 Patients	Invasive Breast Cancer	<p>AXILLARY US SE= 83.0% SP= 62.0% A=79.1%</p> <p>MRI SE= 88.1% SP= 75.0% A=85.3%</p> <p>18F-FDG-PET/CT SE= 78.0% SP= 53.0% A=72.5%</p>	<p>Imaging data was obtained from different imaging centres</p> <p>Lack of Standardisation was inevitable</p> <p>AUS is an operator-dependent modality, which has poor interobserver agreement.</p>	<p>According to the findings, MRI showed somewhat superior diagnostic performance than AUS and 18F-FDG-PET/CT. The accuracy rate was more remarkable when combined imaging modalities than when they were utilised independently. Imaging modalities should be complementary rather than competing for the proper assessment of axillary lymph nodes.</p>
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Efficacy of US, MRI, and F-18 FDG-PET/CT for Detecting Axillary Lymph Node Metastasis after Neoadjuvant Chemotherapy in Breast Cancer Patients	Retrospective Study	US MRI 18F-FDG-PET/CT F18-FDG-PET/CT + MRI US + MRI US + F18-FDG-PET/CT US + F18-FDG-PET/CT + MRI	171 Patients	Invasive Breast Cancer	<p>US SE= 50.42% SP= 82.36% A=68.17%</p> <p>MRI SE= 35.67% SP= 77.78% A= 82.08%</p> <p>18F-FDG-PET/CT SE= 47.50% SP= 76.67% A=80.0%</p> <p>F18-FDG-PET/CT + MRI SE= 40.0% SP= 91.87% A=69.38%</p> <p>US + MRI SE= 41.18% SP= 84.82% A=90.0%</p> <p>US + F18-FDG-PET/CT SE= 57.89% SP= 100.0% A=74.19%</p> <p>US + F18-FDG-PET/CT + MRI SE= 50.0% SP= 100.0% A=88.18%</p>	<p>Axillary Biopsy was not required in patients who were clinically considered to have Axillary Metastasis in the previous guidelines available at the time of the study</p> <p>Clipping of Axillary Lymph Nodes with Metastasis was not routinely recommended because Sentinel Lymph Node or Targeted Biopsy was not routine after Neoadjuvant Treatment at that time.</p>	<p>According to the findings, the US has the highest sensitivity and specificity for detecting ALN metastasis after NAC. Furthermore, ALND may be preferred for these patients over SLNB if both examinations show lymph node metastasis in the post-NAC assessment with US and F-18 FDG-PET/CT, whereas SLNB may be preferred if both examinations show a complete response.</p>
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TITLE & AUTHOR	STUDY DESIGN	MODALITY	SAMPLE SIZE	PATHOLOGIES	FINDINGS	LIMITATIONS	CONCLUSION
Use of Axillary Ultrasound, Ultrasound-Fine Needle Aspiration Biopsy and Magnetic Resonance Imaging in the Preoperative Triage of Breast Cancer Patients Considered for Sentinel Node Biopsy	Retrospective Study	US US + FNAB Axillary MRI	620 Patients	Invasive Breast Cancer	<p>US SE= 53.0% SP= 97.0%</p> <p>US + FNAB SE= 45.0% SP= 100.0%</p> <p>AXILLARY MRI SE= 38.0% SP= 98.0%</p>	<p>For the most part, the CMRI and PET/CT specialists were aware of the AUS results.</p> <p>The knowledge might have influenced the CMRI and PET/CT outcomes.</p> <p>Since CMRI and PET/CT have their own clinical criteria for ALNM that are unrelated to Ultrasonographic findings, AUS may not have a conclusive influence on CMRI and PET/CT outcomes.</p>	<p>The ALNM is an important factor in the assessment of BC and has a substantial impact on therapy choices. There are no conclusive techniques to substitute the SLNB in the evaluation of ALNM in T1 breast cancer patients. Despite being more reliable than AUS and CMRI, PET/CT is inadequate for judgment.</p>
Antonio Garzi a, Fernandez, M, Fraile, N, Gimenez, A, Rene, M, Torres, L, Canales, J, Torres, I, Barco, S, Gonzalez, E, Veloso, C, Gonzalez, L, Ceresa							

TITLE & AUTHOR	STUDY DESIGN	MODALITY	SAMPLE SIZE	PATHOLOGIES	FINDINGS	LIMITATIONS	CONCLUSION
Use of Axillary Ultrasound-Fine Needle Aspiration Biopsy and Magnetic Resonance Imaging in the Preoperative Triage of Breast Cancer Patients Considered for Sentinel Node Biopsy	Retrospective Study	US US + FNAB Axillary MRI	520 Patients	Invasive Breast Cancer	US SE= 53.0% SP= 97.0% US + FNAB SE= 45.0% SP= 100.0%	For the most part, the CMRI and PET/CT specialists were aware of the AUS results. The knowledge might have influenced the CMRI and PET/CT outcomes. Since CMRI and PET/CT have their own clinical criteria for ALNM that are unrelated to Ultrasonography findings, AUS may not have a conclusive influence on CMRI and PET/CT outcomes.	The ALNM is an important factor in the assessment of BC and has a substantial impact on therapy choices. There are no conclusive techniques to substitute the SLNB in the evaluation of ALNM in T1 breast cancer patients. Despite being more reliable than AUS and CMRI, PET/CT is inadequate for judgment.
Antonio Garoi a Fernandez, M. Fraile, N. Gimenez, A. Rene, M. Torras, L. Canales, J. Torres, I. Barco, S. Gonzalez, E. Velooso, C. Gonzalez, L. Cirera					AXILLARY MRI SE= 38.0% SP= 98.0%		
Value of Axillary Ultrasound After Negative Axillary MRI for Evaluating Nodal Status in High-Risk Breast Cancer	Retrospective Study	Axillary US MRI	219 Patients	Invasive Breast Cancer	AXILLARY US SE= 90.1% SP= 15.4% A=90.7% MRI SE= 87.4% SP= 15.4% A=80.1%	It lacks quantitative concealment. Histologic Golden Standard was discontinuous and available from both ALND and SNB. The outcome might have been impacted by significant clinical data and prior imaging.	In order to establish its evidence while minimizing the risk of false negatives, ultrasound evaluation of the axilla should be included in the presurgical workup of patients suspected of receiving SNB treatments; it has the potential to affect the clinicopathologic aspects of axillary ultrasound in the diagnosis of axillary nodes metastases in breast cancer patients.
Tarío Almeray, MD, Diego Villacreses, MD, Zhuo Li, MS, Bhavika Patel, MD, Michelle McDonough, MD, Tamimeza Gibson, Pa-C, Santo Maimone, MD, Richard Gray, MD, Facs, Sarah A Molaughlin, MD, Facs					AXILLARY US SE= 44.6% SP= 88.7% A=77.1%		
The Comparative Study of Ultrasonography , Contrast-Enhanced MRI, and (18)F-FDG PET-CT for Detecting Axillary Lymph Node Metastasis in T1 Breast Cancer	Retrospective Study	Axillary US Contrast-Enhanced MRI (18)F-FDG PET/CT AUS + CMRI AUS + (18)F-FDG CMRI + (18)F-FDG PET/CT	1017 Patients	Invasive Breast Cancer	(18)F-FDG PET/CT SE= 44.5% SP= 94.2% A=81.1% AUS + CMRI SE= 41.3% SP= 93.4% A=78.7% AUS + (18)F-FDG PET/CT SE= 35.9% SP= 97.7% A= 81.4% CMRI + (18)F-FDG PET/CT SE= 35.1% SP= 98.8% A=83.1%	The small number of patients Selective population The blinded re-review of the MRIs	This study suggests that MRI IS highly sensitive in detecting ALN metastases; also, MRI should be considered as an equivalent axillary staging modality to AUS.
Seung Ook Hwang, Sang-Woo Lee, Hye-Jung Kim, Wan Wook Kim, Ho Yong Park, Jin Hyang Jung							

SE: Sensitivity; SP: Specificity; A: Accuracy; ALND: Axillary Lymph Node Dissection; SNB: Sentinel Node Biopsy

Thirty-three (33) to eighty-three (83) years old, fifty consecutive patients with breast cancer underwent breast MRI and ultrasound examinations of the ipsilateral axilla. There were 34 cases with no metastatic lymph nodes and 16 cases with one or more metastatic lymph nodes in the ipsilateral axilla. The MRI and ultrasound images were analyzed by five professionals with two to seven years of professional experience in medical diagnostics, including two to seven years of professional expertise in breast MRI and breast ultrasound. Each observer reviewed the pictures twice: once for MRI and once for an ultrasound. There were no statistically significant improvements in sensitivity, specificity, PPV, or NPV comparing MRI and ultrasound. However, when the two were combined, there were significantly huge improvements in specificity and PPV (Abe H et al., 2013).

Of 264 instances, 62 (25%) of 244 women with invasive breast cancer had positive axillary lymph nodes on final histopathologic evaluation. If any one or more test protocols were questionable, the sensitivity for predicting axillary metastases was 56.5 percent. The specificity for predicting axillary metastases was 100 percent if any three or more tests were questionable. At the time of surgery, 14 percent of individuals who tested negative for all four modalities were found to have histologically positive nodes (Valente S et al., 2012).

Between January and December 2010, 157 patients had preoperative breast ultrasonography and MRI prior to NAC. The sensitivity of ultrasonography, MRI, and their conjunction in post-NAC axillary imaging was 60.00%, 57.33%, and 65.33%, respectively; the specificity was 60.47%, 72.09%, and 60.47%, respectively. The most substantial positive predictive value was seen in MRI (78.18%). Imaging can predict axillary lymph nodes' status in individuals receiving NAC. However, skipping sentinel lymph node biopsy or axillary lymph node dissection for staging in node-positive women is dangerous (Ha S.M. et al., 2017).

Radiology residents with three years' expertise in breast imaging were blinded to each other's observations. They did not know the ultimate pathological axillary lymph node status of 49 invasive breast cancer patients. The 49 patients varied in age from 34 to 79, with 17 being MMC and 32 being MUMC+. Histopathology was thought to be the gold standard. In clinically node-positive breast cancer patients, preoperative axillary ultrasound and conventional breast MRI had equivalent diagnostic

performance, and neither imaging modality can discriminate between PN1 and PN2-3 (Samiei S., 2019).

The 528 individuals included 336 patients with axillary ultrasound, MRI, and 18F-FDG-PET/CT imaging. Patients who did not have proven histological or cytopathological axillary lymph nodes by FNAC, SLNB, or ALND were excluded from the research. The 336 patients were separated into two groups: those who got NAC (100) and those who underwent surgery following their diagnosis (236). False negativity was identified in 19 of 132 patients (false negativity, 14.3%) who had negative axillary ultrasonography, MRI, and 18F-FDG-PET/CT findings. Although MRI performed somewhat better in diagnostic performance than axillary ultrasonography and 18F-FDG-PET/CT, the study suggests that imaging modalities should be complementary rather than competing for the accurate evaluation of axillary lymph nodes (Aktaş A et al., 2021).

The study involved 171 female patients. 120 of the 171 people who completed the NAC were evaluated using ultrasound, and 48 were evaluated using MRI. According to the findings, ultrasonography had the best sensitivity and specificity for identifying axillary lymph node metastases following NAC. Furthermore, if post-NAC ultrasonography and F-18 FDG-PET/CT scans reveal lymph node metastases, ALND may be preferred to SLNB in these patients (Turan U et al., 2021).

Between January 2012 to November 2014, 191 patients with breast cancer who received NAC before surgery were studied retrospectively. The sensitivity of ultrasonography, MRI, and PET/CT was 50% (48/96), 70% (70/97), and 22% (16/73), respectively. Ultrasound, MRI, and PET/CT specificity were 77 percent (30/39), 54 percent (21/39), and 85 percent (22/26), respectively. The combination of ultrasound and PET/CT had the highest Az value (0.634), followed by ultrasound (0.626) and ultrasound, MRI, and PET/CT (0.634). (0.617). The combination of these three imaging modalities offered the best sensitivity for assessing axillary lymph node metastases following NAC, whereas PET/CT had the highest specificity. The ultrasound/PET/CT combination provides the highest positive predictive value. (You S et al., 2015).

507 of the 840 breast cancer patients were included in the research. Thirteen (13) cases with bilateral illness were

investigated and accepted, with all 520 patients aged 25 to 95. When assessed for final axillary histology, ultrasound fine-needle aspiration demonstrated a positive predictive value of 87%, a negative predictive value of 82%, a sensitivity of 53%, and a specificity of 100%. To demonstrate such an indication while reducing the risk of false-negative sentinel node biopsy, ultrasound examination of the axilla, together with fine-needle aspiration when needed, must be included in the presurgical workup of patients undergoing sentinel node biopsy. Preoperative workup was not aided by axillary magnetic resonance imaging (MRI)(Fernandez A et al., 2010).

From 2007 through 2015, the research involved 219 breast cancer patients who underwent AxUS and a breast MRI before starting neoadjuvant treatment. Two breast specialists re-reviewed all breast MRIs, blind to clinical, pathologic, and AxUS results, concentrating on axillary nodal features. In 219 patients, 88.6 percent (194) have invasive ductal carcinoma, 11.4 percent (25) have invasive lobular carcinoma, 199 (91%) have T2 to T4 disease, and 131 (60%) seemed to have a detectable lesion at presentation. When employing breast MRI to stage the axillary lymph nodes, the study revealed that axillary lymph nodes and MRI were concordant in 88 percent of the patients. The data show that MRI is particularly sensitive in identifying axillary lymph node metastases (Almercy T et al., 2019).

The majority of the 1,017 consecutively operated on breast cancer patients at Kyungpook National University Hospital were eliminated, and 349 patients were evaluated preoperatively using axillary ultrasonography, cMRI, and PET/CT, as well as the pathological examination of axillary lymph nodes with SLNB and AD (Hwang S et al., 2019).

Table 2

Diagnostic Performance of Ultrasound, MRI, and other Modalities

<i>Study</i>	<i>Modalities</i>	<i>Sensitivity Rate</i>	<i>Specificity Rate</i>	<i>PPV</i>	<i>NPV</i>
[1]	Ultrasound	54.0%	81.0%	58.0%	79.0 %
	MRI	60.0%	79.0%	59.0%	81.0 %

Study	Modalities	Sensitivity Rate	Specificity Rate	PPV	NPV
[2]	Ultrasound	43.5%	96.2%	79.4%	83.3 %
	MRI	37.1%	96.7%	79.3%	81.95
	Mammography	21.0%	99.5%	92.9%	78.7 %
	Physical Examination	35.5%	98.4%	88.0%	81.7 %
[3]	Ultrasound	60.0%	60.47%	72.58%	46.43 %
	MRI	53.33%	72.09%	78.18%	49.21 %
	MRI + US	65.33%	60.47%	74.24%	50.0 %
[4]	Ultrasound	97.0%	12.5%	69.9%	66.7 %
	MRI Reader 1	84.8%	43.8%	75.5%	58.3 %
	MRI Reader 2	84.8%	50.0%	77.8%	61.5 %
[5]	Axillary Ultrasound	83.0%	62.0%	59.2%	54.8 %
	MRI	86.1%	75.0%	68.5%	51.6 %
	¹⁸ F-FDG-PET/CT	78.0%	53.0%	56.2%	51.4 %
[6]	Ultrasound	59.42%	82.35%	82.0%	60.0 %
	MRI	36.67%	77.78%	73.33%	42.42 %
	¹⁸ F-FDG-PET/CT	47.50%	76.67%	73.08%	52.27 %
	¹⁸ F-FDG-PET/CT + MRI	40.0%	91.67%	88.89%	47.83 %
	US + MRI	41.18%	84.62%	77.78%	52.38 %

<i>Study</i>	<i>Modalities</i>	<i>Sensitivity Rate</i>	<i>Specificity Rate</i>	<i>PPV</i>	<i>NPV</i>
	US + F18-FDG-PET/CT	57.89%	100.0%	100.0%	60.0%
	US + F18-FDG-PET/CT + MRI	50.0%	100.0%	100.0%	53.33%

There was no large discrepancy in any of the MRI and ultrasound findings in the study by Abe et al. (2013). However, there was a clinically meaningful increment in specificity and PPV from MRI to "MRI and ultrasound combined" and from ultrasound to "MRI and ultrasound combined," as well as a statistically substantial reduction in specificity and PPV from MRI alone to "MRI or ultrasound." A statistically substantial reduction in the specificity of this discovery implies that MRI and ultrasound can be used in tandem to detect aberrant lymph nodes.

The findings demonstrate that 50 patients had debatable lymph nodes discovered preoperatively by PE, MMG, US, or MRI. Ultrasound examination alone has a sensitivity of 43.5 percent for detecting abnormal lymph nodes. Using one or more modalities to suspect someone was considerably more sensitive than using ultrasound alone. Despite their high sensitivity, one or more modalities had significantly decreased specificity (91.8%) than any of the other approaches analyzed (Valente S et al., 2012).

Breast ultrasonography and MRI had moderate sensitivity and specificity in predicting persisting nodal pathology; the sensitivity of ultrasonography, MRI, and their combination was 60%, 57%, and 65%, respectively, while the specificity was 60%, 72%, and 60%. It reveals that axillary nodes with micrometastases or solitary tumor cells are unlikely to be resolved with ultrasonography or MRI alone. Using all three modalities (ultrasonography, MRI, and PET-CT) together may increase diagnostic performance. On the other hand, PET-CT assesses metabolic activity, whereas ultrasonography and MRI employ morphological data, which may result in discrepancy across the modalities (Ha SM et al., 2017).

Reader 1's breast MRI was comparable to ultrasound in terms of sensitivity (84.8% vs 97.0%), PPV (75.7% vs 69.6%),

NPV (58.3% vs 66.7%), and accuracy (58.3% vs 66.7%). Reader 1's breast MRI had higher specificity (43.8% vs. 12.5%) when compared to ultrasound. The sensitivity (84.8% vs 97.0%), PPV (77.8% vs 69.6%), NPV (61.5% vs 66.7%), and accuracy of reader 2's breast MRI were comparable to ultrasound (73.5% vs 69.4%). Reader 2's breast MRI also demonstrated higher specificity (50.0% vs. 12.5%) compared to ultrasound. Regarding accuracy, breast MRI was comparable to ultrasound (MRI reader one vs. ultrasound, 71.4% vs. 69.4%; MRI reader two vs. ultrasound, 73.5% vs. 69.4%). pN2–3 was found in 30.4% of suspicious lymph nodes on ultrasound (PPV 69.6%) and 22.2–24.3% on MRI (PPV 75.7–77.8%). pN1 was found in 33.3% of 4 suspicious lymph nodes on ultrasound with a negative predictive value (NPV) of 66.7% and 38.5–41.7% on MRI (NPV 58.3–61.5%) (Samiei S., 2019).

The sensitivity, specificity, PPV, NPV, and accuracy of axillary ultrasound for detecting axillary lymph node metastases were 83%, 62%, 59.2%, 54.8%, and 79.1%, respectively. These values were 86.1%, 75%, 68.5%, 51.6%, and 85.3% for MRI, and 77.8%, 53%, 56.2%, 51.4%, and 72.5% for 18F-FDG-PET/CT. On histopathological examination, axillary lymph node metastases were found in 188 cases (56%), with benign axillary lymph nodes in 148 cases (44%). The accuracy of axillary ultrasound in determining axillary lymph node status was 79.1%. Axillary lymph nodes were found to be positive on MRI and 18F-FDG-PET/CT in 155 cases (46.1%), while they were found to be negative in 181 cases (53.9%) (Aktaş A et al., 2021).

Ultrasound's sensitivity, specificity, PPV, and NPV for detecting axillary lymph node metastasis were 59.42%, 82.35%, 82.00%, and 60.00%, respectively. In contrast, MRI's sensitivity, specificity, PPV, and NPV were 36.67%, 77.78%, 73.33%, and 42.42%, respectively. For identifying axillary lymph node metastases, F-18 FDG-PET/CT showed sensitivity, specificity, PPV, and NPV of 47.50%, 76.67%, 73.08%, and 52.27%, respectively. The three imaging approaches combined provided a sensitivity of 50.00% and a specificity of%. The researchers observed that combining ultrasonography and F-18 FDG-PET/CT for diagnosing axillary lymph node metastases in breast cancer patients obtained 100% specificity and 100% PPV (Turan U et al., 2021).

The sensitivity of ultrasonography, MRI, and PET/CT was 50% (48/96), 72% (70/97), and 22% (16/73), respectively. The specificity of ultrasound, MRI, and PET/CT was 77% (30/39), 54% (21/39), and 85% (22/26), respectively. For detecting axillary nodal metastasis, the sensitivity, specificity, PPV, and NPV for ultrasound combined with MRI were 77%, 51%, 79%, and 48%; 54%, 73%, 84%, and 37% for ultrasound combined with PET/CT; 77%, 42%, 78%, and 41% for MRI combined with PET/CT; and 81%, 42%, 79%, and 46% for the combination of ultrasound and PET/CT had the highest Az value (0.634), followed by ultrasound (0.626) and ultrasound, MRI, and PET/CT (0.617). The ultrasound/PET/CT combo has the most outstanding positive predictive value (You S et al., 2015).

According to Fernandez et al. (2010), ultrasound has a sensitivity rate of 53.0% with a specificity rate of 97.05%. MRI has a sensitivity rate of 45.0% with a specificity rate of 100.0%, the highest specificity rate, and US+FNAB has a sensitivity rate of 36.0% with a specificity rate of 96.0%. Positive US-FNAB was 100% specific and resulted in the exclusion of 17% of patients from SNB. Even after removing cases with micro-metastases, axillary ultrasound was not sensitive enough to detect the remaining 14% of patients with macro-metastases–positive axillary lymph nodes.

According to Almeray T et al. (2019), axillary ultrasound has the highest sensitivity rate of 99.1% with a specificity rate of 15.4%, while MRI has the third-highest sensitivity rate of 97.4% with a specificity rate of 15.4%. Axillary MRI had high sensitivity (97.4%) and positive predictive value (91.1%) but a low comparable specificity to ultrasound (15.4%).

The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy of axillary ultrasonography for identifying axillary lymph node metastases were 44.6%, 88.7%, and 58.6%. 81.7% and 77.1%, respectively. AUS and cMRI were indistinguishable. PET/CT exhibited 44.5% sensitivity, 94.2% specificity, 73.2% PPV, 82.6% NPV, and 81.1% accuracy, respectively. The combination of cMRI and PET/CT was the most accurate, with sensitivity (39.1%), specificity (98.8%), PPV (92.33%), NPV (81.93%), and accuracy values (83.13%) (Hwang S et al., 2019).

DISCUSSION

The researchers of this study reported ten eligible studies that discussed the effectiveness of ultrasound and MRI in terms of their sensitivity and specificity in assessing the axillary lymph node status in breast cancer. The findings of this review vary depending on the modality and protocols used in each study. The ten (10) studies that used ultrasound, MRI, and other mentioned modalities produced remarkable results in assessing the status of the axillary lymph nodes. Despite the impressive results, each diagnostic modality discussed in this review has advantages and limitations, and no diagnostic modality is superior to another.

According to Abe H et al. (2013), ultrasound has a comprehensive evaluation with a high-frequency transducer to evaluate axillary lymph nodes. However, it has poor accessibility for lymph nodes seated deep in tissues and difficulty with areas that degrade the contact of the transducer and the skin surface, affecting the modality's sensitivity and specificity. On the other hand, MRI can evaluate the ipsilateral and contralateral axilla but has lesser spatial resolution and artefacts from cardiac activity. There was, however, no significantly huge distinction between MRI and ultrasound interpretation. When metastatic deposits were tiny, MRI and ultrasonography had a reduced chance of accurate diagnosis.

In Valente S et al. (2012)'s study, invasive ductal carcinoma was found in 216 patients (88.5%), with 14 percent having positive lymph nodes, while invasive lobular carcinoma was detected in 28 patients (11.5%), with 27 percent having positive lymph nodes. Thirty-five (70%) of the 50 patients had the questionable lymph node detected by sequential ultrasound and an ultrasound-guided core needle biopsy. During PE, the physician cannot distinguish between an enlarged malignant lymph node and one that is inflammatory or reactive, which might explain why this approach has a low specificity. Although axillary lymph nodes can be seen, MMG has a less sensitive approach for imaging the axilla due to varying interpretations. MRI is progressively being used to assess breast cancer, and it is presently the best research for demonstrating physiology in connection to the disease. It may assess internal mammary and level III lymph nodes and axillary lymph nodes at levels I and II. Using PE, MMG, US, and MRI as screening tests and verifying

with ultrasound-guided core biopsy, 25% of cancer patients had metastases to the axillary lymph nodes, and 42% of cancer patients were diagnosed preoperatively. The combination of PE, MMG, US, and MRI in breast cancer patients indicated a trade-off in sensitivity and specificity for predicting lymph node involvement.

75 (64 percent) of the 118 patients with pre-NAC positive metastatic lymph nodes on fine-needle aspiration had positive lymph nodes on final surgical pathology, whereas 43 (36 percent) had reformation to negative axillary lymph node status. Breast cancer patients receiving NAC, breast ultrasonography, MRI, and their combination show moderate sensitivity and specificity in predicting axillary lymph node status. The positive predictive value ranged from 73 to 78 percent, with MRI having the highest. The negative predictive value ranged from 46 to 50 percent and was highest with combined imaging. These imaging modalities, however, lack the sensitivity and specificity necessary to rule out the necessity for sentinel lymph node biopsy or to assess the requirement for axillary dissection. It is doubtful that ultrasound or MRI alone would correctly locate axillary nodes with micrometastases or solitary tumor cells (Ha S.M. et al., 2017).

Diagnostic performance metrics for axillary ultrasonography and breast MRI were created to discriminate between pN1 and pN2–3. The total number of suspicious axillary lymph nodes was utilised to define clinical nodal status. At final histopathology, 67.3 percent (33/49) of the patients had pN1 axillary lymph node disease, whereas 32.7 percent (16/49) had pN2–3 axillary lymph node illness. N1 axillary lymph node engagement was seen in 46 (93.9 percent) of the 49 clinically node-positive individuals, while N2–3 axillary lymph node disease was found in three (6.1 percent). On breast MRI, MRI reader 1 recognized 37 (75.5%) patients with N1 axillary lymph node disease and 12 (24.5%) patients with N2–3 axillary lymph node illness. On breast MRI, Reader 2 found 36 (73.5%) individuals with N1 axillary lymph node disease and 13 (26.5%) patients with N2–3 axillary lymph node involvement. According to the findings (Samiei S., 2019), In clinically node-positive breast cancer patients, the diagnostic performance of preoperative axillary ultrasound and conventional breast MRI is virtually similar and incorrect for discriminating between pN1 and pN2–3, and the emphasis may likely move to alternative imaging modalities.

Axillary lymph node metastases were discovered in 188 instances (556%) on histological evaluation of axillary ultrasound, with benign axillary lymph nodes reported in 148 cases (44%). On MRI and 18F-FDG-PET/C.T., axillary lymph nodes were found to be positive in 155 (46.1%) and negative in 181 (53.9%). Two patients were pN2 on axillary ultrasound, one on MRI, three were pN2, and two were pN3 on 18F-FDG-PET/C.T. when nodal burden and false-negative axillary ultrasounds, MRI, and 18F-FDG-PET/C.T. were assessed in upfront surgery patients. All patients tested positive in all three imaging modalities exhibited axillary lymph node metastasis. Using many imaging modalities improved overall diagnostic performance and accuracy. MRI and axillary ultrasound were more sensitive than 18F-FDG-PET/C.T. in identifying axillary lymph node metastases (MRI, axillary ultrasound, and 18F-FDG-PET/CT; 85.3%, 79.1%, and 72.5%, respectively). The study discovered a statistically significant difference in specificity and PPV whether using MRI alone or axillary ultrasound combined with MRI (Aktaş A et al., 2021).

Histopathological examinations indicated that 141 (82.5 percent) patients had invasive ductal carcinoma, and 14 (8.2 percent) had invasive lobular carcinoma. 28 (16.4 percent) of patients planned for NAC had stage IIA disease, 55 (32.2 percent) had stage IIB cancer, 82 (48 percent) had stage IIIB cancer, four (2.3 percent) had stage IIIB cancer, and two (1.2 percent) had stage IIIC cancer. In the post-NAC ultrasound screening of axillary lymph nodes, benign lymph nodes were found in 70 patients (58.3 percent) and malignant lymph nodes in 50 patients (41.7 percent). MRI scans indicated benign lymph nodes in 33 patients (68.8 percent) and malignant lymph nodes in 15 individuals (31.3 percent). During F-18 FDG-PET/CT examinations, benign lymph nodes were discovered in 88 patients (62.9 percent) and malignant lymph nodes in 52 people (37.1 percent). Ultrasound had the highest sensitivity and specificity scores, with 59.42 percent sensitivity and 82.35 percent specificity. Ultrasound showed the greatest PPV and NPV of all three tests, with 82.00 percent and 60.00 percent, respectively. The most notable conclusion of the study is that combining ultrasonography and F-18 FDG-PET/CT scans in the post-NAC axillary evaluation can be efficient and beneficial in identifying axillary lymph node metastases (Turan U et al., 2021).

Negative node conversion occurred in around 20–40% of patients following NAC, with 39 (28%) of these patients showing negative conversion of axillary lymph nodes on surgical specimens of sentinel lymph nodes or axillary lymph nodes after NAC. In comparison to ultrasound and PET-CT, MRI had the highest sensitivity. MRI could perform side-by-side comparisons of individual pairs of MR images before and after NAC treatment, focusing on changes in initially metastatic lymph nodes. Ultrasound alone or in combination with PET/CT, on the other hand, demonstrated the highest PPV, ranging from 78% to 84%. However, the NPV was relatively modest, ranging from 28% to 48%. The results also demonstrated that the combination of ultrasound, MRI, and PET/CT had the highest sensitivity (81%), the highest specificity (85%) and that the size of the tumor deposit within the axillary lymph node was substantially linked with ultrasound and PET/CT diagnostic performance (You S et al., 2015).

Axillary ultrasound was used in all instances, while MRI was used in 81. There were 376 negative axillary ultrasounds and 17 abnormal ultrasounds with negative FNABs. In the 81 cases where an MRI was performed, 74 had a negative result, while four had an abnormal MRI but a negative FNAB. Ultrasound-FNAB was 100% specific, resulting in the exclusion of 17% of patients from SNB. While axillary ultrasound is a precise technique, it is not very sensitive for detecting node metastases in people with macro-metastases–positive axillary lymph nodes. Adding axillary MRI after ultrasound did not increase the identification of positive nodes in ultrasound-negative situations (Fernandez A et al., 2010).

By MRI, 157 of 219 patients (72%), compared to 146 of 219 (67%) by ultrasound, had abnormal lymph node(s). The most prevalent aberrant finding in MRI and ultrasound was axillary lymph nodes larger than 10 mm. Under ultrasound guidance, 129 of 219 patients (58.9%) had a preoperative needle biopsy. Axillary ultrasound and MRI were both abnormal in 122 of 129 of these individuals (95%). More suspicious lymph nodes were discovered using MRI. Although the MRI performed well, it failed to notice clinically significant pathology in only two of 129 patients (1.5 percent). In 192 of 219 patients (87.6 percent), axillary ultrasonography and MRI agreed on nodal status, while they disagreed in 27. In this study, axillary ultrasonography and MRI

were concordant in 88% of the instances. Because ultrasound and MRI had equal accuracy, sensitivity, specificity, and positive predictive value (PPV), the researchers concluded that axillary ultrasound and breast MRI might be used to stage axillary lymph nodes (Almercy T et al., 2019).

SLNBs were performed on 96.8 percent (338/349) of the patients, whereas ADs were performed on 3.2 percent (11/349) of patients with axillary lymph node metastases. 26.4 percent (92/349) of people had axillary lymph node metastases. 71.7 percent (66/92) were at N1, 16.3 percent (15/92) were at N2, 8.7 percent (8/92) were at N1mi, and 3.3% (3/92) were at N3. Of the three trials, PET/CT had the best specificity, PPV, and accuracy (94.2 percent, 73.2 percent, and 81.1 percent, respectively). Furthermore, it was not a decisive test due to its poor sensitivity and PPV of less than 80%. When tumors are small, or the rate of axillary lymph node metastases is low, axillary ultrasound's sensitivity and PPV for predicting axillary lymph node metastases are lower. cMRI had a sensitivity and specificity of 36–100% and 54–100% for predicting axillary lymph node metastases, respectively. However, there has not been enough study to adequately estimate the factual accuracy of cMRI for identifying axillary lymph node metastases (Hwang S et al., 2019).

Conclusion

The CASP Diagnostic Study Checklist was used in 10 eligible studies in this scoping evaluation. The research used in this study was all retrospective. In the early stages of breast cancer, assessing the condition of the axillary lymph nodes is critical. Most research examined the diagnostic performance of ultrasound, MRI, and other indicated modalities in demonstrating axillary lymph node metastases, but no definite conclusion was achieved. However, depending on the protocols utilized in each trial, several studies included in this review concluded that the diagnostic performance of MRI was equivalent to ultrasound and the other modalities described.

According to Turan U et al., combining ultrasonography and F-18 FDG-PET/CT scans in the post-NAC axillary evaluation can be beneficial and efficient for identifying axillary lymph node metastases (2021). In the research of Ha S.M., Breast ultrasonography, MRI, and their combination offer intermediate

sensitivity and specificity in diagnosing axillary lymph node status in patients taking NAC, according to et al. (2017). The research concludes that ultrasonography or MRI alone is nearly impossible to discover axillary nodes with micrometastases or isolated tumor cells because both lack the sensitivity and specificity needed to remove the need for sentinel lymph node biopsy or establish the requirement for axillary dissection.

In the study of Valente S et al. (2012), MRI is increasingly used to evaluate breast cancer and is currently the best study for showing anatomy concerning pathology. It can assess internal mammary and level III lymph nodes and axillary lymph nodes at levels I and II. MRI can compare the ipsilateral and contralateral axilla, according to Abe H et al. (2013), but it has lower spatial resolution and artefacts caused by cardiac motion. It also claims that if metastatic deposits were small, the correct diagnosis rate would be lower. The diagnostic performance between MRI and ultrasound interpretation has no statistically significant difference.

MRI and axillary ultrasound were more sensitive than 18F-FDG-PET/CT in detecting axillary lymph node metastases in a study by Aktaş A et al. (2021). MRI and 18F-FDG-PET/CT were used to evaluate axillary lymph nodes in patients undergoing initial surgery. In 155 cases, nodes were found to be positive, while in 181 cases, nodes were found to be negative. On axillary ultrasound, one patient was pN2, one on MRI, three were pN2, and two were pN3 on 18F-FDG-PET/CT. Nevertheless, according to Samiei S. (2019), preoperative axillary ultrasound and standard breast MRI diagnostic performance in clinically node-positive breast cancer patients is comparable and inaccurate for differentiating between pN1 and pN2–3, and the emphasis should potentially shift to other imaging modalities.

Samiei S.'s investigation (2019) was supported by Almeray T et al. (2019), which stated that ultrasound and MRI exemplified roughly comparable accuracy, sensitivity, specificity, and positive predictive value (PPV). The researchers concluded that axillary ultrasound and breast MRI were nearly equivalent in staging axillary lymph nodes and were concordant in 88 percent of the cases.

However, according to You S et al. (2015), ultrasound alone or in combination with PET/CT demonstrated the highest PPV. The findings also showed that the combination of ultrasound, MRI, and PET/CT had the most heightened sensitivity and specificity and that the size of the tumor deposit within the axillary lymph node was significantly related to ultrasound and PET/CT diagnostic performance. Per Fernandez A et al. (2010), axillary ultrasound is a precise technique for negative FNABs. However, it is not very sensitive for detecting node metastases in people with macro-metastases–positive axillary lymph nodes; adding axillary MRI after ultrasound did not increase the identification of positive nodes in ultrasound-negative situations.

Furthermore, as supported by Hwang et al. (2019), the study states that not enough research has been conducted to assess the accuracy of cMRI for detecting axillary lymph node metastases.

This review also discovered that, while ultrasound and MRI are comparable, both imaging modalities could not distinguish between pN1 and pN2-3. As a result, this analysis shows that ultrasound and MRI should be complementary rather than competitive for a more accurate evaluation of axillary lymph nodes, as the accuracy rate of a combined modality is higher than using them separately.

Recommendations

Throughout the investigation, new gaps were discovered, and the quality of the assessment of axillary lymph nodes can be improved further by addressing the gaps encountered in this research study. Based on most of the studies used in this research, it is recommended to use both ultrasound and Magnetic Resonance Imaging (MRI) as complementary rather than competitive to acquire more accurate results in assessing the status of axillary lymph nodes in breast cancer.

However, there are also several recommendations for using other modalities, other than ultrasound and Magnetic Resonance Imaging (MRI), in assessing the status of axillary lymph nodes. First, the researchers of this study suggest that future researchers should consider researching the diagnostic performance of PET/CT in detecting tumor deposits within the

axillary lymph nodes. You S et al. (2015) state that the diagnostic accuracy of PET/CT was substantially linked with the size of the tumor deposit within the axillary lymph node.

The findings of this study also highly suggest additional research into the validity of ultrasound and F-18 FDG-PET/CT in the post-NAC axillary assessment of axillary lymph node metastases, as Turan et al. (2021) discovered that the combination of ultrasound and F-18 FDG-PET/CT in post-NAC axillary assessment is beneficial for detecting axillary lymph node metastases, which is considered the study's most notable findings.

This study also suggests that future researchers should look more into the most accurate modality to be used in assessing the status of an axillary lymph node in patients receiving neoadjuvant chemotherapy, as ultrasound and Magnetic Resonance Imaging (MRI) lack the sensitivity and specificity required to eliminate the need for SLNB because both of these modalities are unlikely to detect axillary nodes with micrometastases or axillary nodes with isolated cells accurately, as stated in the study of Ha S.M. et al. (2017).

Finally, the researchers determined in the study of Valente S et al. (2012) that mammography is a less sensitive approach to imaging the axilla and predicting lymph node involvement in breast cancer since some of the imaging projections gathered during the study are inconsistent. The authors of this study propose that future studies examine and seek additional answers to the question, "What circumstances caused mammography imaging projections to be inconsistent in imaging axillary lymph nodes?".

References

- Abe, H., Schacht, D., Kulkarni, K., Shimauchi, A., Yamaguchi, K., Sennett, C. A., & Jiang, Y. (2013). Accuracy of Axillary Lymph Node Staging in Breast Cancer Patients: An Observer-Performance Study Comparison of MRI and Ultrasound. *Academic Radiology*, 20(11), 1399–1404. <https://doi.org/10.1016/j.acra.2013.08.003>
- Akram, M., Iqbal, M., Daniyal, M., & Khan, A. U. (2017). Awareness and current knowledge of breast cancer. *Biological Research*, 50(1). <https://doi.org/10.1186/s40659-017-0140-9>
- Aktaş, A., Gürleyik, M. G., Aydın Aksu, S., Aker, F., & Güngör, S. (2022). Diagnostic Value of Axillary Ultrasound, MRI, and ¹⁸F-FDG-PET/ CT in Determining Axillary Lymph Node Status in Breast Cancer Patients. *European Journal of Breast Health*, 18(1), 37–47. <https://doi.org/10.4274/ejbh.galenos.2021.2021-3-10>
- Almery, T., Villacreses, D., Li, Z., Patel, B., McDonough, M., Gibson, T., Maimone, S., Gray, R., & McLaughlin, S. A. (2019). Value of Axillary Ultrasound after Negative Axillary MRI for Evaluating Nodal Status in High-Risk Breast Cancer. *Journal of the American College of Surgeons*, 228(5), 792–797. <https://doi.org/10.1016/j.jamcollsurg.2019.01.022>
- American Cancer Society. (2014). *Survival Rates for Breast Cancer*. Cancer.org; American Cancer Society. <https://www.cancer.org/cancer/breast-cancer/understanding-a-breast-cancer-diagnosis/breast-cancer-survival-rates.html>
- American Cancer Society. (2017). *What is Breast Cancer?* Cancer.org; American Cancer Society. <https://www.cancer.org/cancer/breast-cancer/about/what-is-breast-cancer.html>
- Bell, D. J. (2022, June 14). *Contrast medium | Radiology Reference Article | Radiopaedia.org*. Radiopaedia. <https://radiopaedia.org/articles/contrast-medium>
- Bonnema, J., Geel, A. N. van, Ooijen, B. van, Mali, S. P. M., Tjiam, S. L., Henzen-Logmans, S. C., Schmitz, P. I. M., & Wiggers, T.

- (1997). Ultrasound-Guided Aspiration Biopsy for Detection of Nonpalpable Axillary Node Metastases in Breast Cancer Patients: New Diagnostic Method. *World Journal of Surgery*, 21(3), 270–274. <https://doi.org/10.1007/s002689900227>
- Cai, D., Lin, T., Jiang, K., & Sun, Z. (2019). Diagnostic value of MRI combined with ultrasound for lymph node metastasis in breast cancer. *Medicine*, 98(30), e16528. <https://doi.org/10.1097/md.00000000000016528>
- Cancer Treatment Centers of America. (2019, May 16). *What is cancer?* Cancer Treatment Centers of America. <https://www.cancercenter.com/what-is-cancer>
- de Freitas, R., Costa, M. V., Schneider, S. V., Nicolau, M. A., & Marussi, E. (2019). Accuracy of ultrasound and clinical examination in the diagnosis of axillary lymph node metastases in breast cancer. *European Journal of Surgical Oncology: The Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology*, 17(3), 240–244. <https://pubmed.ncbi.nlm.nih.gov/2044777/>
- Esen, G. (2006). Ultrasound of superficial lymph nodes. *European Journal of Radiology*, 58(3), 345–359. <https://doi.org/10.1016/j.ejrad.2005.12.039>
- Fujimoto, R. H. P., Koifman, R. J., & Silva, I. F. da. (2019). Survival rates of breast cancer and predictive factors: a hospital-based study from western Amazon area in Brazil. *Ciencia & Saude Coletiva*, 24(1), 261–273. <https://doi.org/10.1590/1413-81232018241.35422016>
- García Fernández, A., Fraile, M., Giménez, N., Reñe, A., Torras, M., Canales, L., Torres, J., Barco, I., González, S., Veloso, E., González, C., Cirera, L., & Pessarrodona, A. (2011). Use of Axillary Ultrasound, Ultrasound-Fine Needle Aspiration Biopsy and Magnetic Resonance Imaging in the Preoperative Triage of Breast Cancer Patients Considered for Sentinel Node Biopsy. *Ultrasound in Medicine & Biology*, 37(1), 16–22. <https://doi.org/10.1016/j.ultrasmedbio.2010.10.011>
- Grant, M. J., & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. *Health*

Information & Libraries Journal, 26(2), 91–108.
<https://doi.org/10.1111/j.1471-1842.2009.00848.x>

Ha, S. M., Cha, J. H., Kim, H. H., Shin, H. J., Chae, E. Y., & Choi, W. J. (2017). Diagnostic performance of breast ultrasonography and MRI in the prediction of lymph node status after neoadjuvant chemotherapy for breast cancer. *Acta Radiologica*, 58(10), 1198–1205.
<https://doi.org/10.1177/0284185117690421>

Harby, S., & Assiut University. (2017). *The Role of Unenhanced Magnetic Resonance Imaging in Quantitative Assessment of Metastatic Involvement of Axillary Lymph Nodes in Patients With Breast Cancer: Observational Descriptive Study*. Clinicaltrials.gov.
<https://www.clinicaltrials.gov/ct2/show/NCT03163316>

Hwang, S. O., Lee, S.-W., Kim, H. J., Kim, W. W., Park, H. Y., & Jung, J. H. (2013). The Comparative Study of Ultrasonography, Contrast-Enhanced MRI, and ¹⁸F-FDG PET/CT for Detecting Axillary Lymph Node Metastasis in T1 Breast Cancer. *Journal of Breast Cancer*, 16(3), 315.
<https://doi.org/10.4048/jbc.2013.16.3.315>

Korteweg, M. A., Zwanenburg, J. J. M., Hoogduin, J. M., van den Bosch, M. A. A. J., van Diest, P. J., van Hillegersberg, R., Eijkemans, M. J. C., Mali, W. P. T. M., Luijten, P. R., & Veldhuis, W. B. (2011). Dissected Sentinel Lymph Nodes of Breast Cancer Patients: Characterization with High-Spatial-Resolution 7-T MR Imaging. *Radiology*, 261(1), 127–135.
<https://doi.org/10.1148/radiol.11103535>

Kvistad, K. A., Rydland, J., Smethurst, H.-B. ., Lundgren, S., Fjøsne, H. E., & Haraldseth, O. (2000). Axillary lymph node metastases in breast cancer: preoperative detection with dynamic contrast-enhanced MRI. *European Radiology*, 10(9), 1464–1471. <https://doi.org/10.1007/s003300000370>

Matsos, S. (2020, April 15). *About Johns Hopkins Medicine*. www.hopkinsmedicine.org.
<https://www.hopkinsmedicine.org/about/>

- Maxwell, F., de Margerie Mellon, C., Bricout, M., Cauderlier, E., Chapelier, M., Albiter, M., Bourrier, P., Espié, M., de Kerviler, E., & de Bazelaire, C. (2015). Diagnostic strategy for the assessment of axillary lymph node status in breast cancer. *Diagnostic and Interventional Imaging*, 96(10), 1089–1101. <https://doi.org/10.1016/j.diii.2015.07.007>
- Mumtaz, H., Hall-Craggs, M. A., Davidson, T., Walmsley, K., Thurell, W., Kissin, M. W., & Taylor, I. (1997). Staging of symptomatic primary breast cancer with MR imaging. *American Journal of Roentgenology*, 169(2), 417–424. <https://doi.org/10.2214/ajr.169.2.9242745>
- National Cancer Institute. (2011, February 2). *Definition of Axillary Lymph Node - NCI Dictionary of Cancer Terms*. Cancer.gov. <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/axillary-lymph-node>
- Parkin, D. M., Bray, F., Ferlay, J., & Pisani, P. (2005). Global Cancer Statistics, 2002. *CA: A Cancer Journal for Clinicians*, 55(2), 74–108. <https://doi.org/10.3322/canjclin.55.2.74>
- Radiology (ACR), R. S. of N. A. (RSNA) and A. C. of. (2020, June 15). *General Ultrasound*. Radiologyinfo.org. <https://www.radiologyinfo.org/en/info/genus>
- Redig, A. J., & McAllister, S. S. (2013). Breast cancer as a systemic disease: a view of metastasis. *Journal of Internal Medicine*, 274(2), 113–126. <https://doi.org/10.1111/joim.12084>
- Roy, P. S., & Saikia, B. J. (2016). Cancer and cure: A critical analysis. *Indian journal of cancer*, 53(3), 441–442. <https://doi.org/10.4103/0019-509X.200658>
- Rumrill, P. D., Fitzgerald, S. M., & Merchant, W. R. (2010). Using scoping literature reviews as a means of understanding and interpreting existing literature. *Work*, 35(3), 399–404. <https://doi.org/10.3233/wor-2010-0998>
- Samiei, S., van Nijnatten, T. J. A., van Beek, H. C., Polak, M. P. J., Maaskant-Braat, A. J. G., Heuts, E. M., van Kuijk, S. M. J., Schipper, R. J., Lobbes, M. B. I., & Smidt, M. L. (2019).

Diagnostic performance of axillary ultrasound and standard breast MRI for differentiation between limited and advanced axillary nodal disease in clinically node-positive breast cancer patients. *Scientific Reports*, 9(1). <https://doi.org/10.1038/s41598-019-54017-0>

Tao, Z., Shi, A., Lu, C., Song, T., Zhang, Z., & Zhao, J. (2015). Breast Cancer: Epidemiology and Etiology. *Cell Biochemistry and Biophysics*, 72(2), 333–338. <https://doi.org/10.1007/s12013-014-0459-6>

Turan, U., Aygun, M., Duman, B. B., Kelle, A. P., Cavus, Y., Tas, Z. A., Dirim, A. B., & Irkorucu, O. (2021). Efficacy of US, MRI, and F-18 FDG-PET/CT for Detecting Axillary Lymph Node Metastasis after Neoadjuvant Chemotherapy in Breast Cancer Patients. *Diagnostics*, 11(12), 2361. <https://doi.org/10.3390/diagnostics11122361>

Valente, S. A., Levine, G. M., Silverstein, M. J., Rayhanabad, J. A., Weng-Grumley, J. G., Ji, L., Holmes, D. R., Sposto, R., & Sener, S. F. (2012). Accuracy of Predicting Axillary Lymph Node Positivity by Physical Examination, Mammography, Ultrasonography, and Magnetic Resonance Imaging. *Annals of Surgical Oncology*, 19(6), 1825–1830. <https://doi.org/10.1245/s10434-011-2200-7>

Yang, W. T., Ahuja, A., Tang, A., Suen, M., King, W., & Metreweli, C. (1996). High resolution sonographic detection of axillary lymph node metastases in breast cancer. *Journal of Ultrasound in Medicine*, 15(3), 241–246. <https://doi.org/10.7863/jum.1996.15.3.241>

Yoshimura, G., Sakurai, T., Oura, S., Suzuma, T., Tamaki, T., Umemura, T., Kokawa, Y., & Yang, Q. (1999). Evaluation of axillary lymph node status in breast cancer with MRI. *Breast Cancer*, 6(3), 249–258. <https://doi.org/10.1007/bf02967179>

You, S., Kang, D. K., Jung, Y. S., An, Y-S., Jeon, G. S., & Kim, T. H. (2015). Evaluation of lymph node status after neoadjuvant chemotherapy in breast cancer patients: comparison of diagnostic performance of ultrasound, MRI and ¹⁸F-FDG PET/CT. *The British Journal of Radiology*, 88(1052), 20150143. <https://doi.org/10.1259/bjr.20150143>

Zhu, W., Zeng, N., & Wang, N. (2010). *Sensitivity, Specificity, Accuracy, Associated Confidence Interval and ROC Analysis with Practical SAS® Implementations*.
<https://www.lexjansen.com/nesug/nesug10/hl/hl07.pdf>

APPENDIX A

Comprehensive Search

PUBMED					
	TOTAL	INCLUDED	EXCLUDED		
MRI AND AXILLARY LYMPH NODE ASSESSMENT	9	8	1		
ULTRASOUND & AXILLARY LYMPH NODES STATUS	13	13	0	REASON FOR EXCLUSION	
BREAST CANCER & AXILLARY LYMPH NODES	1	0	1	DOUBLED	5
AXILLARY LYMPH NODE ASSESSMENT & STAGE 2 BREAST CANCER	15	12	3	OUT OF DATE	1
MRI EFFICACY & BREAST CANCER	3	2	1	NOT RELATED	5
ULTRASOUND EFFICACY & BREAST CANCER	2	1	1	AXILLARY LYMPH NODES' ASSESSMENT / UTZ NOT INCL	8
BREAST CANCER	2	0	2	GRAY LITERATURE	
ASSESSMENT OF LYMPH NODE & ULTRASOUND	1	0	1	NO ABSTRACT	1
BREAST CANCER AND MRI	5	2	3		
AXILLARY LYMPH NODES' ASSESSMENT AND ULTRASOUND	9	7	2		
AXILLARY LYMPH NODES' ASSESSMENT AND MRI	3	3	0		
TOTAL	63	48	15		

SCIENCE DIRECT					
	TOTAL	INCLUDED	EXCLUDED	REASON FOR EXCLUSION	
				DOUBLED	11
BREAST CANCER	1	0	1	OUT OF DATE	4
ASSESSMENT OF LYMPH NODES & BREAST CANCER	2	0	2	NOT RELATED	
EFFICACY OF MRI & LYMPH NODES	1	1	0	MRI/UTZ LYMPH NODES' ASSESSMENT NOT INCLUDED	1
EFFICACY OF UTZ & LYMPH NODES	1	0	1	GRAY LITERATURE	
ASSESSMENT OF LYMPH NODE & MRI	1	0	1	FULL-TEXT CAN'T BE RETRIEVED	7
AXILLARY LYMPH NODES & MRI & UTZ	2	2	0		
AXILLARY LYMPH NODES' ASSESSMENT AND ULTRASOUND	10	7	3		
BREAST CANCER AND MRI	2	2	0		
AXILLARY LYMPH NODE ASSESSMENT & MRI	2	2	0		
ACCURACY OF MRI & ULTRASOUND IN BREAST CANCER	1	1	0		
BREAST CANCER AND MRI AND ULTRASOUND	4	1	3		
EVALUATION OF ULTRASOUND AND MRI TO BREAST CANCER	2	1	1		
ASSESSMENT OF AXILLARY LYMPH NODES & BREAST CANCER	1	1	0		
TOTAL	30	18	12		

SPRINGER LINK				REASON FOR EXCLUSION	
	TOTAL	INCLUDED	EXCLUDED		
				DOUBLED	
BREAST CANCER	1	0	1	OUT OF DATE	4
ASSESSMENT OF LYMPH NODE & ULTRASOUND	1	0	1	NOT RELATED	
EFFICACY OF MRI & LYMPH NODES	2	1	1	MRI/UTZ/LYMPH NODES' ASSESSMENT NOT INCLUDED	
ASSESSMENT OF LYMPH NODE & MRI	2	1	1	GRAY LITERATURE	
TOTAL	6	2	4	NO ABSTRACT & FULL-TEXT	

AMERICAN CANCER SOCIETY				REASON FOR EXCLUSION	
	TOTAL	INCLUDED	EXCLUDED		
				DOUBLED	1
STAGE II BREAST CANCER & MRI SCAN	2	1	1	OUT OF DATE	2
BREAST CANCER & LYMPH NODES	1	0	1	NOT RELATED	
TOTAL	3	1	2	MRI/UTZ/LYMPH NODES' ASSESSMENT NOT INCLUDED	
				GRAY LITERATURE	
				NO ABSTRACT & FULL-TEXT	

GOOGLE SCHOLAR				REASON FOR EXCLUSION	
	TOTAL	INCLUDED	EXCLUDED		
				DOUBLED	1
AXILLARY LYMPH NODES METASTASES	4	0	4	OUT OF DATE	5
STAGE II BREAST CANCER & ULTRASOUND	2	1	1	NOT RELATED	1
STAGE II BREAST CANCER & MRI	1	0	1	MRI/UTZ/LYMPH NODES' ASSESSMENT NOT INCLUDED	2
ASSESSMENT OF AXILLARY LYMPH NODES & BREAST CANCER	1	0	1	GRAY LITERATURE	1
EFFICACY OF MRI & LYMPH NODES	1	0	1	NO ABSTRACT & FULL-TEXT	
EFFICACY OF UTZ & LYMPH NODES	2	1	1		
ASSESSMENT OF LYMPH NODES & MRI	1	1	0		
TOTAL	12	3	9		

JOC				REASON FOR EXCLUSION	
	TOTAL	INCLUDED	EXCLUDED		
				DOUBLED	
BREAST CANCER & MRI	1	1	0	OUT OF DATE	
TOTAL	1	1	0	NOT RELATED	
				MRI/UTZ/LYMPH NODES' ASSESSMENT NOT INCLUDED	
				GRAY LITERATURE	
				NO ABSTRACT & FULL-TEXT	

EJR				REASON FOR EXCLUSION	
	TOTAL	INCLUDED	EXCLUDED		
				DOUBLED	
AXILLARY LYMPH NODES & MRI & UTZ	5	5	0	OUT OF DATE	
TOTAL	5	5	0	NOT RELATED	
				MRI/UTZ/LYMPH NODES' ASSESSMENT NOT INCLUDED	
				GRAY LITERATURE	
				NO ABSTRACT & FULL-TEXT	

TOTAL DOUBLED	18
TOTAL OUT OF DATE	16
TOTAL NOT RELATED	6
TOTAL MRI/UTZ/LYMPH NODES' ASSESSMENT NOT INCLUDED	11
TOTAL GRAY LITERATURE	1
TOTAL NO ABSTRACT	1

TOTAL DOUBLED	18
TOTAL OUT OF DATE	16
TOTAL NOT RELATED	6
TOTAL MRI/UTZ/LYMPH NODES' ASSESSMENT NOT INCLUDED	11
TOTAL GRAY LITERATURE	1
TOTAL NO ABSTRACT	1
TOTAL FULL-TEXT CAN'T BE RETRIEVED	7

TOTAL RELEVANT ARTICLES (DOUBLED NOT INCLUDED; 138 IF INCLUDED)	120
TOTAL INCLUDED ARTICLES	85
TOTAL EXCLUDED ARTICLES (DOUBLED NOT INCLUDED)	35

FINAL	
TOTAL RELEVANT ARTICLES	85
TOTAL INCLUDED ARTICLES	10
TOTAL EXCLUDED ARTICLES	68
TOTAL MRI & UTZ	28
TOTAL UTZ	30
TOTAL MRI	20

FINAL	
TOTAL RELEVANT ARTICLES	85
^ FULL-TEXT CAN'T BE RETRIEVED	7
TOTAL INCLUDED ARTICLES	10
TOTAL EXCLUDED ARTICLES	68
TOTAL MRI & UTZ	28
TOTAL UTZ	30
TOTAL MRI	20

APPENDIX B

CASP Diagnostic Study Checklist Assessment Summary

	Hiroyuki Abe, et al. (2013)	Stephanie A. Valente, et al. (2012)	Su Min Ha, et al. (2016)	S. Samiel, et al. (2019)	Aysegül Aktas, et al. (2021)	Umit Turan, et al. (2021)	S You, Md, et al. (2015)	Antonio García Fernández, et al. (2013)	Tariq Almeroy, Md, et al. (2010)	Seung Ook Hwang, et al. (2019)
Was there a clear question for the study to address?	Y	Y	Y	Y	Y	Y	Y	Y	Y	?
Was there a comparison with an appropriate reference standard?	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Did all patients get the diagnostic test and reference standard?	Y	Y	?	Y	?	N	N	?	N	Y
Could the results of the test have been influenced by the results of the reference standard?	?	Y	?	Y	?	Y	Y	Y	?	?
Is the disease status of the tested population clearly described?	Y	Y	Y	Y	?	Y	Y	Y	?	Y
Were the methods for performing the test described in sufficient detail?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y

Y = YES; ? = CAN'T TELL; N = NO

<p>What are the results?</p>	<p>US: SE= 87.0%; SP= 97.0% MRI: SE= 90.0%; SP= 90.0%</p>	<p>PE: SE= 35.5%; SP= 98.4%; A=82.4% MMG: SE= 21.0%; SP= 99.5%; A=79.5% US: SE= 43.5%; SP= 96.2%; A=82.8% MRI: SE= 37.1%; SP= 96.7%; A=81.6%</p>	<p>US: SE = 60.0%; SP= 60.47% MRI: SE= 57.33%; SP = 72.09% US + MRI: SE= 65.33%; SP= 60.47%</p>	<p>US: SE= 97.0%; SP= 12.5%; A=9.4% MRI R1: SE= 84.8%; SP= 43.8%; A=71.4% MRI R2: SE= 84.8%; SP= 50.0%; A=73.5%</p>	<p>AUS: SE= 83.0%; SP= 62.0%; A=79.1% MRI: SE= 86.1%; SP= 75.0%; A=85.3% 18F-FDG-PET /CT: SE= 78.0%; SP= 53.0%; A=72.5%</p>	<p>US: SE= 59.42%; SP= 82.35%; A=69.17% MRI: SE= 36.67%; SP= 77.78%; A= 52.08% 18F-FDG-PET/ CT: SE= 47.50%; SP= 76.67%; A=60.0% F18-FDG-PET/ CT + MRI: SE= 40.0%; SP= 91.67%; A=59.38% US + MRI: SE= 41.18%; SP= 84.62%; A=60.0% US + F18-FDG-PET/ CT: SE= 57.89%; SP= 100.0%; A=74.19% US + F18-FDG-PET/ CT + MRI: SE= 50.0%; SP= 100.0%; A=68.18%</p>	<p>US: SE= 50.0%; SP= 77.0% MRI: SE= 72.0%; SP= 54.0% 18F-FDG PET/CT: SE= 22.0%; SP= 85.0% US + MRI: SE= 77.0%; SP= 51.0% F18-FDG-PET/ CT + MRI: SE= 77.0%; SP= 42.0% F18-FDG-PET/ CT + US: SE= 54.0%; SP= 73.0% US + F18-FDG-PET/ CT + MRI: SE= 81.0%; SP= 42.0%</p>	<p>AUS: SE= 44.6%; SP= 88.7%; A=77.1% CMRI: SE= 47.8%; SP= 88.7%; A=77.9% 18F-FDG PET/CT: SE= 44.5%; SP= 94.2%; A=81.1% AUS + CMRI: SE= 41.3%; SP= 93.4%; A=79.7% AUS + 18F-FDG PET/CT: SE= 35.9%; SP= 97.7%; A= 81.4% CMRI + 18F-FDG PET/CT: SE= 39.1%; SP= 98.8%; A=83.1%</p>	<p>US: SE= 53.0%; SP= 97.0% US + FNAB: SE= 45.0%; SP= 100.0% AxMRI: SE= 36.0%; SP= 96.0%</p>	<p>AUS: SE= 99.1%; SP= 15.4%; A=90.7% MRI: SE= 97.4%; SP= 15.4%; A=89.1%</p>
<p>How sure are we about the results? consequences and cost of</p>	<p>a. Out of 50 cases, 5 cases with metastatic axillary ln(s) were not</p>	<p>The findings of the study confirms that there is no imaging modality or a</p>	<p>a. Researchers did not analyse patients who had negative</p>	<p>This has several limitations; the analyses were based on a small</p>	<p>a. Imaging data was obtained from different imaging centres</p>	<p>a. Axillary biopsy was not required in patients who were clinically considered to</p>	<p>a. The total number of patients was relatively small b. Prospective larger</p>	<p>a. The interpreters of the cMRI and PET/ CT had knowledge of the</p>	<p>a. It lacks statistical mask b. Histologic golden standard was nonuniform and could be</p>	<p>a. The small number of patients</p>

Y = YES; ? = CAN'T TELL; N = NO

alternatives performed?	detected in the us studies b. The number of patients included in the study is small c. The sensitivity of mri and us combined appears smaller than mri and us alone	combination of it have an accuracy rate comparable and as high as the gold standard of surgical slnb	fine-needle aspiration results at the time of their initial diagnosis, which could have resulted in a selection bias b. The statistical analysis was performed on the number of axilla rather than the number of lymph nodes, node-to-node comparisons were not undertaken c. The postoperative recurrence of axillary lymph nodes of the short follow-up time was not evaluated	group of patients that might have caused clinically meaningful differences in diagnostic performance s to go undetected; the diagnostic performance parameters were based on a patient-by-patient level instead of a node-by-node level	b. Lack of standardisation was inevitable c. AUS is an operator-dependent modality, which has poor interobserver agreement.	have axillary metastases in the previous guidelines available at the time of the study b. Clipping of axillary lymph nodes with metastasis was not routinely recommended because sentinel lymph nodes or targeted biopsy was not routine after neoadjuvant treatment at that time.	multicentre studies are needed to validate our results. c. The study was performed retrospectively from a single centre, and it could cause selection bias	aus results for the most part b. The knowledge may have affected the results of cmri and PET/CT c. cmri and PET/CT have their own diagnostic criteria for alnm not related with ultrasonographic findings, so aus may not have definitive effects on the results of cmri and pet/ct	obtained from both alnd and snb c. Result might have been influenced by relevant clinical information and previous imaging	b. Selective population c. The blinded re-review of the MRIs
Can the results be applied to your patients/the population of interest?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Can the test be applied to your patient or	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = YES; ? = CAN'T TELL; N = NO

population of interest?										
Were all outcomes important to the individual or population considered?	Y	Y	Y	Y	?	Y	Y	Y	Y	Y
What would be the impact of using this test on your patients / population?	The result of this study made an impact in suggesting that mri and us are complementary to each other in identifying aberrant ins.	The result of this study made an impact in suggesting that the combination of pe, mmg, us, and mri demonstrated a trade off in sensitivity and specificity for prediction of involvement in breast cancer patients	This study concludes that breast ultrasonograph y, mri, and their combination show moderate sensitivity and specificity in predicting axillary lymph node status in breast cancer patients who receive NAC	The result of this study made an impact in suggesting that there is no added clinical value of preoperative standard breast mri for differentiation between p1 and p2-3 in patients with positive aus	The study found out that the diagnostic performance of mri was slightly better than aus and 18-fdg-pet/ct, but the study suggests that for accurate evaluation of ains, imaging modalities should be complementary rather than competitive	When the three most commonly used imaging techniques were compared, ultrasound had the highest sensitivity and specificity for the post-nac axillary assessment. the evaluation of the dual combinations of these imaging techniques showed that the combined use of us and f-18 fdg-pet/ct had a ppv of 100% and a specificity of 100%	The combination of three imaging modalities showed the highest sensitivity and pet/ct showed the highest specificity for the evaluation of ain metastasis after nac. ultrasound alone or combination of ultrasound and pet/ct showed the highest ppv. the size of tumour deposit within ain was significantly associated with diagnostic performance of ultrasound and pet/ct.	The ainm is a critical component in the prognosis of bc and has a significant influence on treatment options. In the detection of ainm in t1 breast cancer patients, there are no definitive modalities to replace the snib. Although pet/ct is more accurate than aus and cmri, it is insufficient for decision-making.	Ultrasound examination of the axilla, combined with fnab should be included in the preoperative work-up of patients considered for snb procedures to establish its indication while minimising the risk of false negatives; it has the potential to influence the clinicopathological aspects on the se of aus in the diagnosis of ainm in bc patients	This study suggests that mri is highly sensitive in detecting ain metastases; also, mri should be considered as an equivalent axillary staging modality to aus

Y = YES; ? = CAN'T TELL; N = NO

Knowledge, Attitudes, and Practices on Antibiotics Use and Resistance in Region IV-A CALABARZON

Authors: ¹Norlene T. Acedera, ¹Aldren R. Beliber Jr. ,
¹Viejay G. de Lara, ¹Milcah Fhaye T. Guevarra, ¹Jhonellah
Laco, ¹Wilhenn Joy E. Mendoza, ¹Ma. Patricia S.
Portugues, ¹Chaira Jane P. Saria; ¹Prof. Geraldine B.
Dayrit, ¹Dr. Supachai A. Basit

*¹School of Medical Technology, Emilio Aguinaldo College - Cavite
Dasmariñas City, Cavite*

corresponding author: viejaydelara@gmail.com
contact Number: 09175929288

KEYWORDS:

- Infection Control
- Antibiotic Overuse
- Antibiotic Use
- Public Health
- Interventions

Abstract. Antibiotic resistance poses a disastrous threat to all individuals worldwide despite antibiotics being a contributor of the advancement of public health by means of infection control. Antibiotic overuse or abuse is recognized as a major contributor to antibiotic resistance. The aim of this study was to determine the extent of

knowledge, attitudes and practices in antimicrobial use and resistance among the adult population of Region IV-A CALABARZON. A self-administered online questionnaire was used to conduct a cross-sectional survey. A total of 380 randomly selected community members of Region IV-A CALABARZON took part in this study. The data was analyzed using descriptive and chi-square statistical analysis. The overall response rate was 98.8%. More than half of the respondents (52.1%) had a poor knowledge on action and use, majority (72.33%) had higher knowledge regarding side effects, and almost three quarter (74.20%) had better knowledge in resistance. More than half

(54.7%) of the respondents have negative attitudes regarding preference in the use of antibiotics, antibiotics risk and resistance, and views about antibiotics prescribed by doctors. An average of a three quarter (75.03%) of the respondents were found to have better practice. It was found that knowledge has a significant relationship with attitudes ($r = 0.250$, $p = <0.001$) and practices ($r = 0.156$, $p = <0.002$). It was also found that attitudes have a significant relationship with practices ($r = 0.120$, $p = <0.019$). These data will aid in determining the effectiveness of current public education programs on antibiotics use and resistance. It will also provide more information to researchers for the development of future interventions to promote specific messages to rationalize antibiotic use and compensate for knowledge and attitude gaps in the battle against antibiotic resistance.

Knowledge, Attitudes, and Practices on Antibiotics Use and Resistance in the Region IV-A CALABARZON

INTRODUCTION

Infectious agents caused a high incidence of illness and mortality worldwide prior to the discovery of antibiotics. (World Health Organization, 2014). Antibiotics are widely regarded as one of the most significant discoveries of the 20th century, and they have made significant contributions to world health by allowing infectious diseases to be successfully treated and allowing millions of people to survive life-threatening infections. (Agarwal, et. al., 2015). Antibiotics, as defined by the World Health Organization, are drugs that are used to prevent and treat bacterial infections. (2016). Antibiotic resistance, on the other hand, is one of the greatest economic health problems that emerges when bacteria adapt and escape the antibiotics' killing action. Antibiotic-resistant bacteria have also been dubbed "nightmare bacteria" by world health officials, posing a dire threat to everyone on the planet. (Centers for Disease Control and Prevention, 2013).

Infections caused by resistant microorganisms frequently fail to respond to traditional treatment, resulting in prolonged sickness and an increased risk of mortality. Antibiotic resistance in bacteria that has developed over time is thought to be a natural occurrence, although excessive usage and abuse might hasten the development of resistance to various antimicrobial drugs. (Napolitano et. al, 2013). According to Awad and Aboud (2015), various variables have contributed to the incorrect use of these drugs, including patient awareness, belief, and attitudes toward antibiotic use and self-medication.

In the Philippines, it was revealed that self-medication is a prevalent cause of drug resistance in the country (Food and Drug Administration, 2013) as a result of consumers' over-the-counter antibiotics purchases without a physician's prescription,

subsequently administering them without any medical oversight. Another prominent cause of antimicrobial resistance is failure to complete the recommended course of therapy or taking incomplete doses of the antibiotic. This helps the bacteria to produce a stronger "self" that can withstand the drug effect or combat it. Self-medication is defined as the use of various pharmaceuticals to treat self-diagnosed diseases without medical supervision, or the ongoing use of prescribed drugs for chronic or recurrent sickness or symptoms without medical supervision. (WHO, 2000). Drug sharing, taking insufficient doses, discontinuing treatment once the sickness or symptoms have improved, and taking a short treatment duration are among the prevalent inappropriate practices of drug use in self-medication highlighted by Ocan, Obuku, Bwanga, et al. (2015). In most parts of the world, few studies have also estimated that more than 50 percent of antibiotics are bought over the counter without prescription (Alhomoud et al, 2017). According to Aljayyousi et al. (2019), an individual's mindset and practices influence their use of antibiotics. As a result, understanding the general public's awareness and behaviors will aid in reducing needless and excessive antibiotic use (Napolitano et al., 2013).

According to the Antimicrobial Resistance Surveillance Program Annual Report - 2019, the Philippines submitted and evaluated 100,334 isolates in 2019. According to Carlos (2019), multidrug- resistant infections are still prevalent in the country, posing therapeutic issues. These are multi-drug resistant among pathogens such as *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*. In addition to developing penicillin resistance among *Streptococcus pneumoniae*, there appears to be a distinct rise of vancomycin and linezolid resistance among enterococci. Despite this, the country's Methicillin Resistant *Staphylococcus aureus* (MRSA) rates have been falling in recent years, but they remain above 50%, limiting the use of the previously successful and inexpensive medication oxacillin to treat infections caused by these common bacteria.

The Inter-Agency Committee on Antimicrobial Resistance was established by the Philippine government to develop and implement the National Action Plan against Antimicrobial Resistance. Administrative Order No. 42 s. 2014 was used to establish this agency. One of the Inter- Agency

Committee on Antimicrobial Resistance's antimicrobial resistance plans is to continue capacity building, education, awareness, and advocacy. However, despite rising knowledge of AMR, this agency discovered that no survey was undertaken to establish how far the Department of Health's efforts have reached the general population and how this has influenced their activities. As a result, this study will examine the extent of antimicrobial usage and resistance knowledge, attitudes, and practices among the adult population of Region IV-A CALABARZON, as well as the effectiveness of Philippine government awareness initiatives.

METHODOLOGY

Study Design

A cross-sectional study was conducted from the month of April to May 2022 among residents of Region IV-A CALABARZON thru a self-administered online questionnaire.

Inclusion and Exclusion Criteria

This study comprised residents of Region IV-A CALABARZON aged 18 to 60 who had previously taken antibiotics. Non-residents of Region IV-A CALABARZON, as well as residents of Region IV-A CALABARZON who are under the age of 18 and over the age of 60 and have no history of taking antibiotics, were excluded from the study.

Data Collection

The researcher utilized a survey using the google form which is a web-based app used to create forms for data collection purposes. The researchers encoded a self-made questionnaire in the said web-based app that has undergone validity testing using Cronbach's alpha reliability testing. The knowledge variable obtained a value of 0.908, the attitude variable obtained a value of 0.8253, and the practice variable obtained a value of 0.8005. The three variables got a "Good" internal consistency. The researchers created a one-page recruitment banner including the title, purpose of the study, and inclusion criteria. Facebook page will be the main platform for

questionnaire distribution. Personal and professional networks of the researchers will also be used to maximize participation. Respondents will be assured of confidentiality and gave written consent to participate in the study.

Sample Size

Researchers used a Raosoft online sample size calculator to obtain a sample from the general population of Region IV-A CALABARZON considering a 95% Confidence level and 5% margin of error. This study required a minimum of 380 participants. The respondents would be sampled using convenience and snowball techniques. The respondents will be selected because of their convenient accessibility, proximity for the study, and from a referral of research participants due to limited resources.

Statistical Analysis

Data were entered and analyzed using Statistical Package for the Social Sciences. The respondents' knowledge and attitudes concerning antibiotics were assessed using a scoring system. The five-point likert scale responses will be combined into three categories for the questions of awareness and attitudes: 'strongly agree and agree', 'strongly disagree' and 'disagree' and 'uncertain'. The three groups are referred to as "Yes", "No" and "Don't know", accordingly. Descriptive analysis including frequency, and the percentage would be performed to describe the variables. Chi-square statistics was used to identify the demographic profile associated with knowledge, attitudes and practices. Logistic regression was performed to determine if the demographic profile were the factors for the levels of knowledge, attitudes and practices. The cut-off for dichotomizing the continuous variable for use as the dependent variable in chi-square analysis would be the p value based on responses to questions in each of the knowledge, attitudes, and practices sections. The median score based on responses to questions in each of the knowledge, attitudes, and practices sections was used as the cut-off point for dichotomizing the continuous variable for use as the dependent variable in multiple logistic regression analysis. Higher-scoring respondents were evaluated to have "greater understanding," "more acceptable attitudes," and "better habits" when it came to antibiotic use.

Furthermore, the inferential Spearman's rho would be used as inferential statistics to determine the relationship between the knowledge, attitude, and practice and the potential associations of knowledge, attitudes and practices with participants' exposure on awareness campaigns.

Ethical Consideration

This research study had been reviewed by the members of the Emilio Aguinaldo College – Cavite Ethics Review Committee through the Research and Development Office and was therefore granted approval after having been found free from any significant ethical issues and violations set forth by the chair and the esteemed members and of Emilio Aguinaldo College – Cavite Ethics Review Committee. This research study was given an Emilio Aguinaldo College - Cavite Ethics Review Committee Code number 2022-01-019 issued on April 29, 2022.

RESULTS

Table 1

General Characteristics of Respondents n=380

Characteristics	Frequency	Percentage (%)
Gender		
Male	153	40.26%
Female	227	59.74%
Age (Years)		
18-30	354	93.16%
31-40	10	2.63%
41-50	12	3.16%
51-60	4	1.05%
Residence		
Cavite	249	65.53%
Laguna	19	5%
Batangas	58	15.26%
Rizal	29	7.63%
Quezon Province	25	6.58%
Education Level		
Below High School Level	2	0.52%
High School Level	54	14.21%
Undergraduate	255	67.11%
College Graduate	65	17.11%
Graduate Studies	4	1.05%

A total of 385 people were requested to participate in the survey and 380 agreed to participate. Giving the study a response rate of 98.8%. The sample was composed of more females (59.74%) than males (40.26%), The respondents' average age was 22.5 and the most age group that took part in this study was age group 18-30 years old (93.16%) and the least were age group 51-60 (1.05%), most respondents hailed from the province of Cavite (65.53%) and the least came from the province of Laguna (5%), and most respondents were undergraduate (67.11%) and the least were below high school level (0.52%). Because of response clustering at cut-off positions, numbers are not evenly distributed across quartiles.

Table 2
Respondents' Input in Knowledge Variable Regarding Antibiotics

	Strongly Disagree	%	Disagree	%	Neutral/Uncertain	%	Agree	%	Strongly Agree	%	Median (IQR)
A. Action and Use											
Correct Statements											
Antibiotics are capable of killing bacteria	9	2.4	5	1.3	32	8.4	194	51.1	140	36.8	4 (1.0)
Antibiotics are required to treat many ailments.	11	2.9	33	8.7	57	15	155	40.8	124	32.6	4 (2.0)
Antibiotics can eliminate bacteria that normally found on the skin and in the digestive system.	9	2.4	30	7.9	93	24.5	171	45	77	20.3	4 (1.0)
Incorrect Statements											
Antibiotics are capable of killing viruses.	83	21.8	57	15	85	22	110	28.9	45	11.8	3 (2.0)
Antibiotics are effective against most coughs and cold.	38	10	57	15	94	24.7	139	36.6	52	13.7	4 (1.2)
Antibiotics aids people recover faster from coughs and colds	37	9.7	63	16.6	105	27.6	126	33.2	49	12.9	3 (2.0)
B. Side Effects											
If you encountered a skin reaction after taking an antibiotic, you should refrain from taking that medication again.	9	2.4	16	4.2	55	14.5	139	36.6	146	38.4	4 (1.0)
Antibiotics can disrupt the body's natural microbial flora. (A bacterial population that lives on/in the human body.)	8	2.1	24	6.3	110	28.9	72	18.9	55	14.5	4 (1.0)
If you encountered side effects while taking antibiotics, you should stop medication as soon as possible.	12	3.2	18	4.7	63	16.6	132	34.7	146	38.4	4 (1.0)
C. Resistance											
Correct Statement											
Antibiotics used inappropriately can cause microorganisms to become resistant to them.	11	2.9	30	7.9	57	15	139	36.6	143	37.6	4 (2.0)
Antibiotic use in animals can diminish the effectiveness of antibiotics in humans.	37	9.7	96	25.8	139	36.6	72	18.9	36	9.5	3 (2.0)
Antibiotic resistance is a worldwide issue.	5	3.9	15	3.9	98	25.8	132	34.7	130	34.2	4 (2.0)

All of the three knowledge domains were covered relatively well by respondents expressing good knowledge: "Action and use (Q1-Q3)", "side effects (Q7-Q9)", and "resistance (Q10-Q13)". While most of the answers in all three areas were right, two of the seven questions received an average percentage of response on "side-effects" and "resistance" fell into the "neutral/uncertain" category. (28.9-36.6% respectively).

Respondents demonstrated a lower level of understanding of "action and use." (Q4-Q6)". Antibiotics are

efficient against viruses was answered incorrectly by 40.7% of respondents, while 22% were neutral or unsure. Half (50.3%) of the respondents failed to answer the question “Antibiotics work on most coughs and cold” and about a quarter (24.7%) were neutral/uncertain showing less knowledge. Lastly, nearly half (46.1%) answered incorrectly to the question “Antibiotics speed up the recovery from most coughs and colds” and more than a quarter (27.6%) responded neutral/uncertain.

Table 3

Respondents’ Attitudes Towards Antibiotic Use

	Strongly Disagree	%	Disagree	%	Neutral/ Uncertain	%	Agree	%	Strongly Agree	%	Median (IQR)
A. Interest for Antibiotic Use											
Antibiotics should be taken while I have a cold to prevent a more serious disease.	91	23.9	104	27.4	81	21.3	82	21.6	22	5.8	2 (2,0)
Antibiotics help me recover more rapidly when I have a fever.	83	21.8	96	25.3	77	20.3	103	27.1	21	5.5	3 (2,0)
I'd rather take a potentially unnecessary antibiotic than wait to see whether I get better on my own.	148	38.9	111	29.2	74	19.6	34	8.9	13	3.4	2 (2,0)
B. Antibiotic Resistance and Safety											
Positive Attitude											
I contribute to the development of antibiotic resistance every time I take an antibiotic.	13	3.4	43	11.3	153	40.3	122	32.1	49	12.9	3 (1,0)
Negative Attitude											
Antibiotic resistance does not develop as a result of missing one or two doses.	57	15	74	19.5	128	33.7	81	21.3	40	10.5	3 (2,0)
Antibiotics are relatively safe medications; thus, if I anticipate receiving an antibiotic, I am less satisfied with a doctor's appointment if I do not receive one.	56	14.7	91	23.9	79	20.9	122	32.1	32	8.4	3 (2,0)
If a doctor fails to prescribe an antibiotic when I believe one is required, I will seek treatment from another physician.	61	16.1	154	40.5	107	28.2	48	12.6	10	2.6	2 (1,0)
	78	20.5	136	35.8	93	24.5	57	15	16	4.2	2 (1,0)

Answers to questions about antibiotic attitudes revealed both positive attitude among the respondents. In the domain of “preference of using antibiotics (Q14-Q16)”, more over half of the respondents were aware that antibiotics were not required to treat a cold in order to avoid a more serious disease (51.3%), if they developed a fever, nearly half of the respondents thought

antibiotics would help them recover faster (47.1%), and over half thought that if they didn't need an antibiotic, they didn't want to take it (68.1%) expressing a positive attitude of the respondents towards the domain.

Within the domain “antibiotic resistance and safety (Q17-Q19)”, more than half of the people who responded are not aware that they contribute to the development of antibiotic resistance whenever they took antibiotics (55%) only 45% of the respondents had a positive attitude in regard to this question. Only over a third agreed that skipping doses could contribute to antibiotic resistance (34.5%) while the other 65.5% stated otherwise showcasing a negative attitude. However, two-fifths of the respondents did not agree that antibiotics are safe drugs, hence they can be commonly used (38.6%) and more than a half of the respondents (61.4%) agreed that antibiotics are safe drugs expressing a negative attitude in that particular aspect.

In the domain “attitude to doctors prescribing of antibiotics (Q20-Q21)”, If they did not receive an antibiotic, more than half of the respondents (56.6%) were satisfied with their doctor's visit and more than a half (56.3%) indicated they would no longer visit another doctor for 2nd opinion if they were not prescribed an antibiotic when they believed one was required. This expresses a positive attitude towards this domain.

Table 4 Respondents' Practices in Antibiotic Use

	Never	%	Seldom	%	Sometimes	%	Often	%	Almost Always	%	Median (IQR)
Correct Practice											
Do you still finish the entire course of antibiotics if you feel better after two or three doses?	23	6.1	23	6.1	82	21.6	75	19.7	177	46.6	4 (2.0)
Do you seek medical advice before beginning an antibiotic treatment?	17	4.5	36	9.5	67	17.5	58	15.3	202	53.2	5.0 (2.0)

Table 4 (continued)

	Never	%	Seldom	%	Sometimes	%	Often	%	Almost Always	%	Median (IQR)
Do you check the antibiotic's expiration date before using it?	3	0.8	11	2.9	23	6.6	25	6.6	318	83.7	5.0 (2.0)
Incorrect Practice											
If you're sick, do you prefer to get antibiotics from a pharmacy rather than a doctor or a health worker?	65	17.1	54	14.2	114	30.1	75	19.7	72	18.9	3 (2.0)
When you have a cough or sore throat, do you seek to take an antibiotic?	60	15.8	66	17.4	101	26.5	77	20.3	76	20	3 (2.0)
Do you treat yourself with antibiotics as a preventative measure?	72	18.9	55	14.5	104	27.4	70	18.4	79	20.8	3.0 (2.0)

In response to inquiries regarding practices, most of the respondents examines the date of expiration of antibiotics before using them (90.3%), consulted doctors before starting an antibiotic (68.5%), and finished the entire course of treatment (66.3%), demonstrating proper antibiotic use practices. As these questions indicate, good practice is not always followed. More than a third (38.6%) showed that if they were sick, they would rather get antibiotics from a pharmacy than from a doctor or health worker. more than a third (39.2%) used antibiotics as a prophylaxis, and less than a half (40,3%) preferred to take an antibiotic when you have a cough and sore throat showing the results of the last 3 question a poor or incorrect practice.

Table 5 Association of Knowledge Level, Attitude Level, and Practices Level to the Respondents' Demographic Profile

Variables	Knowledge			Attitude			Practices		
	Less n (%)	Better n (%)	χ^2 (p)	Negative n (%)	Positive n (%)	χ^2 (p)	Poor n (%)	Better n (%)	χ^2 (p)
Gender									
Male	87 (56.86%)	66 (43.14%)	2.323 (0.127)	30 (104.037%)	55 (35.95%)	8.971 (0.003)	34 (101.447%)	33 (30.307%)	1.520 (0.218)
Female	111 (48.90%)	116 (51.10%)		110 (48.46%)	117 (51.54%)		125 (55.07%)	102 (44.93%)	
Age									
18-30	185 (52.26%)	169 (47.74)		198 (55.93%)	156 (44.07%)		209 (59.04%)	145 (40.96%)	
31-40	6 (60.00%)	4 (40.00%)	8.360 (0.019)	4 (40.00%)	6 (60.00%)	3.336 (0.067)	3 (30.00%)	7 (70.00%)	6.810 (0.078)
41-50	6 (50.00%)	6 (50.00%)		5 (41.67%)	7 (58.33%)		4 (33.33%)	8 (66.67%)	
51-60	1 (25.00%)	3 (75.00%)		1 (25.00%)	3 (75.00%)		3 (75.00%)	1 (25.00%)	
Residence									
Cavite	127 (51.00%)	122 (49.00%)		138 (55.42%)	111 (44.58%)		135 (54.22%)	144 (45.78%)	
Laguna	14 (73.68%)	5 (26.32%)	0.079 (0.079)	10 (52.63%)	9 (47.37%)	0.658 (0.658)	15 (78.95%)	4 (21.05%)	0.036 (0.036)
Batangas	33 (56.90%)	25 (43.10%)		35 (60.34%)	23 (39.66%)		34 (58.62%)	24 (41.38%)	
Rizal	16 (55.17%)	13 (44.83%)		13 (44.83%)	16 (55.17%)		15 (51.72%)	14 (48.28%)	
Quezon	8 (32.00%)	17 (68.00%)		12 (48.00%)	13 (52.00%)		20 (80.00%)	5 (20.00%)	
Educational Attainment									
Below High School	0 (0.00%)	2 (100%)		2 (100%)	0 (0.00%)		2 (100%)	0 (0.00%)	
High School Level	32 (59.26%)	22 (40.74%)		36 (66.67%)	18 (33.33%)		38 (70.37%)	16 (29.63%)	
Undergraduate	124 (48.63%)	131 (51.37%)	6.844 (0.144)	132 (51.76%)	123 (48.24%)	9.128 (0.058)	144 (56.47%)	111 (43.53%)	7.699 (0.103)
College Graduate	40 (61.54%)	25 (38.46%)		34 (52.31%)	31 (47.69%)		34 (52.31%)	31 (47.69%)	
Graduate Studies	2 (50.00%)	2 (50.00%)		4 (100%)	0 (0.00%)		1 (25.00%)	3 (75.00%)	

The table 5 demonstrates the association of the respondents' level of knowledge, attitude, and practices on their demographic profile. There is no association found between the knowledge and demographic profile of the respondents. Furthermore, opinions toward antibiotic use were found to be substantially related to gender. ($\chi^2=8.971$; $p=0.003$). Female respondents had a more positive attitude regarding antibiotic use compared to those male respondents. Furthermore, antibiotic use patterns were shown to be strongly linked to where people lived. ($\chi^2=10.285$; $p=0.036$). Respondents living in the area of Rizal had better practices than those living in Cavite, Laguna, Batangas, and Quezon province.

Table 6 Odds Ratios of Knowledge, Attitudes, and Practices in Relation to Antibiotic Use

Variable	Knowledge Level			Attitudes Level			Practices Level		
	Adjusted OR	95% CI (Lower and Upper Limit)	p = value	Adjusted OR	95% CI (Lower and Upper Limit)	p = value	Adjusted OR	95% CI (Lower and Upper Limit)	p = value
Gender	1.3044	0.8720 – 1.9513	0.1960	1.5821	1.0529 – 2.3774	0.0272	1.2002	0.7979 – 1.8054	0.3811
Age	1.0147	0.9787 – 1.0520	0.4285	1.0223	0.9854 – 1.0607	0.2399	0.9895	0.9535 – 1.0270	0.5793
Residence	1.0335	0.8856 – 1.2061	0.6756	0.9866	0.8440 – 1.1533	0.8656	0.8139	0.6917 – 0.9575	0.0130
Educational Attainment	0.8135	0.6224 – 1.0634	0.1309	0.7464	0.5676 – 0.9814	0.0362	1.0836	0.8237 – 1.4254	0.5662

According to Table 6, there is no significant relationship between the demographics of the respondents and their knowledge, attitude, and habits regarding the use of antimicrobials because the p- value is greater than one. It shows that the results were unaffected by the respondents' demographic profile. A multitude of factors could explain the lack of a significant relationship.

Table 7 Correlation Between Knowledge, Attitudes, and Practices

Variables	Correlation Coefficient	p = value
Knowledge – Attitude	0.250	<0.001
Knowledge – Practices	0.156	<0.002
Attitude – Practices	0.120	<0.019

The Spearman's correlation demonstrated a relatively poor, but statistically significant, positive correlation between knowledge and attitude ($r=0.250$, $p<0.001$), knowledge and practices ($r=0.156$, $p<0.002$), and attitude and practices ($r=0.120$, $p<0.019$) regarding antibiotic use and resistance.

DISCUSSION

The current findings would be the first step in providing a baseline quantitative data of antibiotic use patterns, knowledge, and attitudes among residents of Region IV-A CALABARZON, as this was the first known study to comprehensively showcase knowledge, attitudes, and practice

regarding antibiotic use in the region. This will aid in the evaluation of current community antibiotic education campaigns and provide additional insight into the design of future multifaceted interventions that encourage rational antibiotic usage and close knowledge and attitude gaps, focus on certain areas in the combating antimicrobial resistance.

A total of 52.1% of respondents to this study demonstrated a poor knowledge level regarding the actions and uses of antibiotics. The findings revealed that adults are unsure if antibiotics are helpful against germs and viruses. Most of the respondents (87.90%) correctly agreed that antibiotics are capable of killing bacteria. In contrast, one-third of the respondents (62.70%) failed to identify that antibiotics were not effective against viruses, which is considerably higher than was found in other Asian countries such as the study of J.M. Lim, 2021 in Singapore (45.60%), study of A.I. Awad, 2015 in Kuwait (40%), study of D. Hendrie, 2019 in Nepal (15.90%), and study of V. Tangcharoensathien, et al., 2021 in Thailand (49.8%). Moreover, the majority of the respondents (72.33%) were aware that antibiotics have side effects, which is much higher than a previous study by A. Ling Oh, et al., 2010 conducted in Malaysia (23.40%). Furthermore, most of the respondents are aware that misuse of antibiotics can cause microorganisms to become resistant to them (74.2%) and that antibiotic resistance is a global problem (68.9%), which is consistent with the rates reported in Malaysia (59.1%), and Thailand (69.3%). However, the respondents are typically unaware of the other factors contributing to antibiotic resistance. These findings show that there are clear misconceptions about the role of antibiotics along with the factors contributing to its resistance and also the origin of the disease itself. For example, antibiotics are beneficial against bacterial illnesses, however most respondents had incorrect information about their efficiency against viral infections. Public education towards antibiotic resistance is pivotal in its eradication. It necessitates solutions and interventions tailored to its specific scheme and necessitates an intersectoral means. A collective partnership of the government legislation with academic and private sectors is vital to maintain antibiotic accessibility and affordability by regulating antibiotic prescription and delivery, and understand local antibiotic resistance patterns in order to construct culturally appropriate solutions (J.P.G. Robredo, et al., 2022). Moreover, to overcome the limitations of expressing medical knowledge in a layperson's

vernacular, public education on antibiotic resistance must recognize and involve the roles of healthcare practitioners, public health experts, and community leaders, particularly from rural areas.

With regards to attitudes towards antibiotic use and resistance, more than half (54.7%) of the population demonstrated negative attitudes. Attitudes to the interests of using antibiotics were somewhat certain. Half of the respondents (51.3%) demonstrated that antibiotics were not necessary to treat a cold to prevent a more serious illness, which is a higher percentage than was found in studies conducted in Lebanon and Britain (S. Sakr, et al., 2022). Appropriate beliefs regarding antibiotic use may lead people becoming more aware of the disadvantages of using antibiotics inappropriately. However, almost a half of respondents (47.1%) incorrectly agreed that antibiotics would speed up their recovery, a comparable result to that study conducted in Indonesia. More than half (74%) of the respondents conducted in Indonesia believe that antibiotics can prevent illnesses from becoming worse. This study found that 55% of the population incorrectly disagreed that they contributed to the development of antibiotic resistance every time they took antibiotics. It shows that the idea of antibiotic resistance was well familiar but not clearly understood. The incorrect use of antimicrobial drugs is one of the leading sources of antibiotic resistance (S. Agarwal, et al., 2015). The uncertainty regarding antibiotic resistance is persistent. It is a well-known fact that uncontrolled antibiotic usage can result in significant and serious problems with the emergence and spread of resistant microbial strain, which is a worldwide problem (Hawkey, 1998). In the Philippines, where the prevalence of antibiotic resistance has become an imminent crisis, self-medication accompanied by the lack of knowledge towards antibiotic resistance is one of the main culprits (J.P.G. Robredo, et al., 2022). This study demonstrates that antibiotic indications, usage directions, and adverse effects are all subject to a variety of myths. On account of that, most people are unaware of the significance of incorrect use and non-adherence in antimicrobial resistance, as well as the implications for future health care expenses. Meanwhile, attitudes towards doctors' antibiotic prescription were positive. Most of the respondents (56.6%) agreed that if they were not given an antibiotic, it is much better and makes them satisfied, and trust in doctors was high. Notable in this study is the trust and confidence

of the patients to healthcare providers, particularly to doctors. Along with the problem presentation that is considered as an essential step in a patient-centered communication, trust is mainly associated with the agenda of both the patient and the doctor towards planning the management in eliciting the problems and other concerns of the patient. This will lead to an increased patient satisfaction, reduced late arising concerns, improved understanding, adherence to the course of treatment, and better health outcomes (A. Colliers, et al., 2021). Greater number of respondents (56.3%) demonstrated that they would no longer seek a second opinion from another doctor if the antibiotic was not prescribed by the doctor when they believed it was necessary. This is in contrast to a study in Kuwait showing that doctors who do not administer antibiotics are distrusted by one-third of the respondents. That doctor's degree of agreement frequently prescribes antibiotics in order to fulfill the patient's satisfaction, and frequently considers the need for antibiotic use carefully. It is well documented that excess prescribing of antibiotics by the doctor even when there are no adequate indications because of diagnostic hesitancy, having not enough knowledge about optimal therapies and patients' satisfaction are factors that can contribute to the development and increase of antibiotic resistance (A.I. Awad and E.A. Aboud, 2015).

Practices in using antibiotics were somewhat in contrast with each other. Most of the respondents always or often expressed checking the expiration date before use of antibiotics (90.3%), seek medical advice prior to the beginning of treatment (68.5%), and complied to complete the entire course of taking antibiotics in spite of feeling better after two or three doses (66.3%), which is consistent with a pilot study administered in a community in Jordan (M. Ocan, et al., 2015). The current findings demonstrated almost 60% of the respondents preferred self-medication of antibiotics. In the Philippines, self-medication is very common, posing a threat with a prevalence of 31–66% (D.A. Barber, et al., 2017). Practicing self-medication especially in low-income households avoids financial burden along with economic and opportunity costs of medical consultation and diagnosis, such as having efficient work hours hampered by excessive clinic wait times. Furthermore, non-medical professionals frequently administer antibiotics, and antibiotic sharing is still a popular practice among Filipino families and communities today. These behaviors reflect the country's lack

of control of antibiotic dispensaries. (J.A. Ayukekbong, et al., 2017).

This study presented poor practices where more than 60% presented that if they were sick, they would rather obtain antibiotics from a pharmacy than from a medical professional. The current findings demonstrated that self-medicating with antibiotics was chosen by almost 50% of study population, which is similar to the reported half of drug use. This finding is comparable with the study conducted in Saudi Arabia (N. Al-shibani, et al., 2017) which has a much higher percentage. The role of pharmacy personnel is noteworthy as it seemed to impart more respondents reported to have expressed concerns and acquired information about antibiotic use from pharmacy employees rather than doctors, implying a role in public education regarding appropriate antibiotic treatment. Thus, it is notable to say that campaigning for rational prescription should include not only efforts to communicate knowledge to the general public with the aspire to raise resistance awareness but to also sustain current trust in the prescribing professional.

The chi-square statistics unlocked the association between some of the independent variables to the dependent variables particularly, female respondents to having a positive attitude and respondents' residing in Rizal province found to have better practice. The logistic regression analysis showed that the demographic profile of the respondents were not an indicator of knowledge, attitudes and practices. One of the factors was that the respondents' conduct may be similar because they are members of the same community. People have a tendency to adopt the habits of others around them (P.M. Crucis, et al., 2019). On the spearman's correlation, all variables were interrelated with each other which the reflected on the responses of the respondents. Better knowledge would lead to better attitudes and better practices and vice versa.

Conclusion

The current findings enable critical comparisons with current and future investigations in Region IV-A CALABARZON and across the country. Given the rapidly expanding rate of antibiotic resistance in Region IV-A CALABARZON and documented health consequences associated with inappropriate

antibiotic use, the current findings highlight important concerns concerning antibiotics among Region IV-A CALABARZON residents. The study's main findings will aid policymakers in the region in planning and implementing future effective multimodal antibiotic usage initiatives. This research contributes to a better understanding of adult population knowledge, attitudes, and practices about antibiotics in Region IV-A CALABARZON, and its findings may be applicable across the country, particularly in a more rural regions and/or provinces. The findings of the researchers are crucial to the fight to decrease antibiotic misuse, and they can be utilized to help build effective and targeted interventions to reduce antibiotic misuse misunderstandings and promote awareness about the risks of inappropriate use.

Antibiotic misuse will not be prevented only through community education. Policymakers, prescribers, and the general public must all work together to develop a multifaceted approach that both instructional and regulatory initiatives are included such steps should be part of a larger strategy to change the culture of antibiotic use by increasing public understanding of the hazards associated with antibiotic usage and dispelling popular misconceptions about the benefits of using antibiotics for mild infections.

This is the first documented community survey in Region 4-A CALABARZON to investigate public knowledge, attitudes, and practices about antibiotic use. As a result, the findings give baseline evidence about the region's population's knowledge, attitudes, and practices about antibiotic usage, as well as insight into how to create interventions to minimize antibiotic abuse.

The high response rate (98.8%) was one of the study's strengths, demonstrating representative results and reducing the possibility of bias. However, because the study was limited to a single region of the Philippines, Region VI-A CALABARZON, the findings are only applicable to that region. Furthermore, surveys like the one used in this study rely heavily based on the data supplied by the respondents, so the outcomes are dependent in part on the honesty and memory capacity of the responses. Furthermore, because the survey did not ask about family structure, for example, households with teens and those with older people may have different knowledge, attitudes, and practices.

Recommendations

The researchers recommend to the health policy makers of the Region IV-A CALABARZON to further strengthen their programs concerning antibiotics use and resistance. This study unlocked the knowledge, attitude, and practices of the region's residents and should be given importance for the years to come. The researchers also recommend to the future researchers to conduct the study in other Regions and/or Provinces in the Philippines and have the number of respondents be equally distributed per demographic profile.

Furthermore, the researchers recommend to the healthcare sector to be vigilant, proactive, and dedicated in promoting safe antibiotic use to reduce the impact of antimicrobial resistance on the broader public. The development and implementation of public education programs to improve antibiotic use among inhabitants in this region should be the focus of future research.

References

- Abdel-Qader, D. H., Albassam, A., Ismael, N. S., El-Shara, A., Shehri, A., Almutairi, F. S., . . . Ibrahim, O. M. (2020). Awareness of Antibiotic Use and Resistance in Jordanian Community. *National Library of Medicine*.
- Agarwal, S., Yewala, V. N., & Dharmalan. (2015). Antibiotics Use and Misuse in Children: A Knowledge, Attitude and Practice Survey of Parents in India. *Journal of Clinical and Diagnostic Research*. doi:10.7860/JCDR/2015/14933.6819
- Alhomoud, F., Aljamea, Z., Almahasnah, R., Alkahalifah, K., Basalelah, L., & Alhomoud, F. K. (2017). Self-medication and self-prescription with antibiotics in the Middle East-do they really happen? A systematic review of the prevalence, possible reasons, and outcomes. *National Library of Medicine*.
- Aljanyousi, G. F., Abdel-Rahman, M. E., El-Heneidy, A., Kurdi, R., & Faisal, E. (2019). Public practices on antibiotic use: A cross-sectional study among Qatar University students and their family members. *National Library of Medicine*.
- Al-shibani, N., Hamed, A., Labban, N., Al-kattan, R., Al-Otaibi, H., & Alfadda, S. (2017). Knowledge, attitude and practice of antibiotic use and misuse among adults in Riyadh, Saudi Arabia. *National Library of Medicine*.
- Awad, A. I., & Aboud, E. A. (2015). Knowledge, Attitude and Practice towards Antibiotic Use among the Public in Kuwait. *National library of Medicine*. doi:10.1371/journal.pone.0117910
- Ayukekbong, J. A., Ntemgwa, M., & Atabe, A. N. (2017). The threat of antimicrobial resistance in developing countries: causes and control strategies. *Antimicrobial Resistance & Infection Control*, 6(1). <https://doi.org/10.1186/s13756-017-0208-x>
- Barber, D. A., Casquejo, E., Ybañez, P. L., Pinote, M. T., Casquejo, L., Pinote, L. S., Estorgio, M., & Young, A. M. (2017). Prevalence and correlates of antibiotic sharing in the

Philippines: antibiotic misconceptions and community-level access to non-medical sources of antibiotics. *Tropical Medicine & International Health*, 22(5), 567–575. <https://doi.org/10.1111/tmi.12854>

Bhardwaj, K., Shenoy, S. M., Baliga, S., Unnikrishnan, & Baliga, S. (2021). Knowledge, attitude, and practices related to antibiotic use and resistance among the general public of coastal south Karnataka, India – A cross-sectional survey. *Clinical Epidemiology and Global Health*.

Chandra, S., Mohammadnezhad, M., & Ward, P. (2018) Trust and Communication in a Doctor-Patient Relationship: A Literature Review. *Journal of Health Care Communications* <https://www.primescholars.com/articles/trust-and-communication-in-a-doctorpatient-relationship- a-literature-review-96330.html>

Chaw, Hoper, & Mikolajczyk. (2018). The knowledge, attitude and practice of health practitioners towards antibiotic prescribing and resistance in developing countries-A systematic review. *Journal of clinical pharmacy and therapeutics*.

Colliers, A., Bombeke, K., Philips, H., Remmen, R., Coenen, S., & Anthierens, S. (2021). Antibiotic Prescribing and Doctor-Patient Communication During Consultations for Respiratory Tract Infections: A Video Observation Study in Out-of-Hours Primary Care. *Frontiers in Medicine*, 8. <https://doi.org/10.3389/fmed.2021.735276>

Effah, C. Y., Amoah, A. N., Liu, H., Agboyibor, C., Maio, L., Wang, J., & Wu, Y. (2020). A population-base survey on knowledge, attitude and awareness of the general public on antibiotic use and resistance. *Antimicrobial Resistance and Infection Control*.

Gebeyehu, E., Bantie, L., & Azage, M. (2019). Inappropriate Use of Antibiotics and Its Associated Factors among Urban and Rural Communities of Bahir Dar City Administration, Northwest Ethiopia. *National Library of Medicine*.

Gualano, M. R., Gili, R., Scaioli, G., Bert, F., & Siliquini, R. (2015). General population's knowledge and attitudes about

antibiotics: a systematic review and meta-analysis. *Pharmacoepidemiol Drug.*

Ha, T. V., Nguyen, A. M., & Thi, N. H. (2019). Public Awareness about Antibiotic Use and Resistance among Residents in Highland Areas of Vietnam. *National Library of Medicine.*

Horva, O., Tomas, A., Paut Kusurica, M., Bukumiric, D., Tomic, Z., & Sabo, A. (2017). Is the level of knowledge a predictor of rational antibiotic use in Serbia? *NAtional Library of Medicine.*

Jafar, A., & Yohanes, A. (2018). Assessment of Knowledge, Attitude, and Practice toward Antibiotic Use among Harar City and Its Surrounding Community, Eastern Ethiopia. *Interdisciplinary Perspective on Infectious Disease.*

Jairoun, A., Hassan, N., Ali, A. J., & Shahwan, M. (2019). Knowledge, attitude and practice of antibiotic use among university students: a cross sectional study in UAE. *BMC Public Healh.*

Kamata, K., Tokuda, Y., Gu, Y., Ohmangari, & Yanagihari, K. (2018). Public knowledge and perception about antimicrobials and antimicrobial resistance in Japan: A national questionnaire survey in 2017. *National Library of Medicine.*

Khan, F. U., Khan, F. U., Hayat, K., Chang, J., Saeed, Amna, & Khan, Z. (2020). Knowledge, attitude and practices among consumers toward antibiotics use and antibiotic resistance in Swat, Khyber- Pakhtunkhwa, Pakistan. *Expert Review of Anti-infective Therapy.*

Kurdi, S., Faran, A., Eareeni, A., Alhalal, N., Joseph, R., Wali, H., & Alshayban, D. (2020). Assessment of knowledge and attitude toward the new antibiotic dispensing law and its effect on antibiotic use in Saudi Arabia. *Saudi Pharmaceutical Journal.*

Lim, J. M., Duong, M. C., Cook, A. R., Hsu, L. Y., & Tam, C. C. (2021). Public knowledge, attitudes and practices related to antibiotic use and resistance in Singapore: a cross-sectional population survey. *BMJ Open*, 11(9), e048157. <https://doi.org/10.1136/BMJOPEN-2020-048157>

- Ling Oh, A., Hassali, M.A., Al-Haddad, M.S., Syed Sulaiman, S.A., Shafie, A.A., Awaisu, A, (2010) Public knowledge and attitudes towards antibiotic usage: a cross-sectional study among the general public in the state of Penang, Malaysia. *J Infect Dev Ctries*.
- Mazinska, B., Struzycka, I., & Hryniewicz, W. (2017). Surveys of public knowledge and attitudes with regard to antibiotics in Poland: Did the European Antibiotic Awareness Day campaigns change attitudes? *National Library of Medicine*.
- Napolitano, F., Izzo, M. T., Di Giuseppe, G., & Angelillo, I. F. (2013). Public knowledge, attitudes, and experience regarding the use of antibiotics in Italy. *National Library of Medicine*. doi:10.1371/journal.pone.0084177
- Nepal, A., Hendrie, D., Robinson, S., & Selvey, L. A. (2019). Knowledge, attitudes and practices relating to antibiotic use among community members of the Rupandehi District in Nepal. *BMC Public Health*.
- Ocan, M., Obuku, E. A., Bwnaga, F., Akena, D., Richard, S., Ogwal-Okeng, J., & Obua, C. (2015). Household antimicrobial self-medication: a systematic review and meta-analysis of the burden, risk factors and outcomes in developing countries. *BMC Public Health*.
- Robredo, J. P. G., Eala, M. A. B., Paguio, J. A., Salamat, M. S. S., & Celi, L. A. G. (2022). The challenges of combatting antimicrobial resistance in the Philippines. *The Lancet Microbe*, 3(4), e246. [https://doi.org/10.1016/s2666-5247\(22\)00029-5](https://doi.org/10.1016/s2666-5247(22)00029-5)
- Sakr, S., Ghaddar, A., Hamam, B., & Shee, I. (2020). Antibiotic use and resistance: an unprecedented assessment of university students' knowledge, attitude and practices (KAP) in Lebanon. *BMC Public Health*.
- Shehadeh, M., Sauifan, C., Darwish, R., Wazaify, M., Zaru, L., & Aljafari, S. (2011). Knowledge, attitudes and behavior regarding antibiotics use and misuse among adults in the community of Jordan. A pilot study. *Saudi Pharmaceutical Journal*.
- Taha, Abu-Zaydeh, Ardah, Al-jabi, Sweileh, & Awang. (2016).

Public Knowledge and Attitudes Regarding the Use of Antibiotics and Resistance: Findings from a Cross-Sectional Study Among Palestinian Adults. *Zoonoses Public Health*.

Tangcharoensathien, V., Chanvatik, S., Kosiyaporn, H., Kirivan, S., Kaewkhankhaeng, W., Thunyahan, A., & Lekagul, A. (2021). Population knowledge and awareness of antibiotic use and antimicrobial resistance: results from national household survey 2019 and changes from 2017. *BMC Public Health*, 21(1). <https://doi.org/10.1186/s12889-021-12237-y>

Vallin, M., Polyzoi, M., Marrone, G., Rosales-Klitz, S., Wisell, K., & Lundborg, C. (2016). Knowledge and Attitudes towards Antibiotic Use and Resistance - A Latent Class Analysis of a Swedish Population-Based Sample. *Plos one Collection*.

Voidazan, S., Moldovan, G., Voidazan, L., Zazgyva, A., & Moldovan, H. (2019). Knowledge, Attitudes and Practices Regarding the Use of Antibiotics. Study On the General Population of Mureş County, Romania. *Infection and drug Resistance*.

Wang, Y., Guo, F., Zhang, Y., Lui, Z., & Huang, Y. (2020). Knowledge, attitudes and practices in relation to antimicrobial resistance amongst Chinese public health undergraduates. *Journal of Global Antimicrobial Resistance*.

You, Yau, Choi, Chau, Huang, & Lee. (2008). Public knowledge, attitudes and behavior on antibiotic use: a telephone survey in Hong Kong. *National Library of medicine*.

Knowledge, Attitude, and Practice Towards the Prevention of Covid-19 of the 3rd and 4th Year Biomedical Science Students in Emilio Aguinaldo College Cavite A.Y 2021 - 2022

¹Elaine Fino, ¹Fernand Flores, and ²Glenda V. Sangalang

¹*School of Respiratory Therapy, Emilio Aguinaldo College, City of Dasmariñas, Cavite*

²*School of Physical Therapy, Emilio Aguinaldo College, City of Dasmariñas, Cavite*

corresponding author: efufino.cvt@eac.edu.ph
contact number: 09066811853

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- Attitude
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- Biomedical sciences students
- Prevention

Abstract. This study focuses on the knowledge, attitude, and practice towards the prevention of COVID-19. To be able to have a deeper understanding of their experience during the COVID-19 pandemic, the researchers explored the respondents' current knowledge of COVID-19 specifically on the nature of the disease, signs and symptoms, mode of transmission, and its prevention, as well as the respondents' attitude towards COVID-19 and its nature, prevention

and management, and the government's response. The practices done by the respondents to prevent contracting the virus were also tackled in terms of their personal hygiene and restricting behavior as well as how often these self-protective measures are done. This study chose the 3rd year and 4th year Biomedical Sciences students in Emilio Aguinaldo College - Cavite in A.Y

2021 - 2022 since they were the priority batch for the limited face-to-face classes. Using a descriptive quantitative research design, the researchers were able to gather significant data which defined the current status of the students. The study found the respondents to have a high level of knowledge, attitude, and practice towards the prevention of COVID-19 which may be a result of not only the aggressive promotion of the government against COVID-19 but also may be due to their duty as future medical professionals. The researchers of this study recommend that future researchers utilize the data gathered from this study to further broaden the knowledge regarding COVID-19.

Knowledge, Attitude, and Practice Towards the Prevention of Covid-19 of the 3rd and 4th Year Biomedical Science Students in Emilio Aguinaldo College Cavite A.Y 2021 - 2022

INTRODUCTION

COVID-19 was first identified in December of 2019 as a group of acute respiratory diseases in Wuhan, Hubei Province, China, from where it rapidly spread to more than 198 countries. WHO declared it a pandemic on March 12, 2020 (Erfani et al., 2020). According to the WHO, the symptoms of COVID-19 may vary and may include fever, fatigue, muscle pain, shortness of breath, difficulty of breathing, as well as dry cough.

There have been over a million fatalities globally as of early October in the year 2020. Despite national efforts to contain the spread, new cases are being discovered day by day (Acheampong et al., 2021). As of June 1, 2022, there are over 3.69 million COVID-19 cases in the Philippines, with 60,455 deaths (DOH, 2022). In the City of Dasmariñas, Cavite, there are a total of 171,307 with 44 active cases (Provincial Government of Cavite, 2021). The Philippine healthcare system is less developed than that of developed nations such as the United States, China, and Russia, so there is an evident necessity to maximize efforts in battling the COVID-19 epidemic to make the most use of the country's limited resources (Duavit et al., 2021).

In Emilio Aguinaldo College Cavite, limited face-to-face classes have been held for selected 3rd-year and 4th-year students in both biomedical and non-biomedical courses. Strict adherence to COVID-19 protocols has been implemented for students, faculty, and other employees. With this study, the researchers aim to fill in the knowledge gap on the level of knowledge and attitude, as well as the practices done by the students of the 3rd year and 4th year Biomedical Sciences

students who were the pioneer batch for the new limited in-campus classes.

Effective disease control strategies require knowledge and comprehension of its transmission patterns, fundamental hygiene principles in relation to its prevention, and emergency protocols in such events. These knowledge and compliance measures are needed to prepare ahead for the limited in-campus classes in colleges and universities across the country (Acheampong et al., 2021).

METHODOLOGY

Study Design

Quantitative research methods were used in this study. Additionally, a descriptive form of design was used in order to describe phenomena and their characteristics. What happened rather than how or why it occurred is the main focus of this investigation. The study's purpose is to accurately understand knowledge, attitude, and practice about COVID-19 prevention.

Respondents of the Study

The respondents of this study were the third-year and fourth-year Biomedical Science students of Emilio Aguinaldo College Cavite in the City of Dasmariñas. The Biomedical Science courses included the Bachelor of Science in Medical Technology, Bachelor of Science in Radiologic Technology, Bachelor of Science in Nursing, Bachelor of Science in Midwifery, Bachelor of Science in Pharmacy, Bachelor of Science in Physical Therapy, Bachelor of Science in Respiratory Therapy, Doctor of Optometry and Doctor of Dental Medicine.

The Subject

The criteria for selecting the respondents are the following: they must be enrolled in the Emilio Aguinaldo College Cavite for the first semester of the Academic Year 2021-2022; they must be a third, fourth year, and 6th year if they are from Dentistry, enrolled in the Biomedical Science course listed above, and they must be willing to participate and answer the survey

questions. The researchers have selected these respondents because they are the priority group for the limited in-campus classes in the institution. The study excluded the first and second-year Biomedical Science Students and all year level of Non-Biomedical Science Courses enrolled in the Emilio Aguinaldo College Cavite because they were not part of the first batch of limited in-campus classes.

Table 1

Characteristics of the Respondents

Age	Responses	Percentage
18 -25 years old	233	97%
26 - 35 years old	6	3%
36 years old and above	1	0%
Sex	Responses	Percentage
Female	193	80%
Male	47	20%
Year	Responses	Percentage
3rd Year	145	60%
4th Year	94	39%
6th Year	1	0%
Course	Responses	Percentage
BS Medical Technology	81	34%
BS Nursing	67	28%
BS Radiologic Technology	50	21%
Doctor of Dental Medicine	15	6%
BS Physical Therapy	11	5%
BS Pharmacy	10	4%
Doctor of Optometry	3	1%
BS Respiratory Therapy	3	1%
Doctor of Optometry	3	1%
BS Respiratory Therapy	3	1%

Table 1 presented the characteristics of the respondents. 233 or an average of 97.08% of the respondents are from 18 to 25 years old, while the 6 or 2.50% of the respondents are from ages 26 to 35. The remaining respondent, or 0.42%, is from aged 36 and above. 193, or an average of 80.42% of the respondents are Female, while 47 or 19.58 % of the respondents are Male. 145

or an average of 60.42% of the respondents are 3rd Years, while 94 or 39.17% of the respondents are 4th Years. The remaining one respondent, or 0.42%, is from the 6th Year. Based on this data, the majority of the respondents for this study are in 3rd year. Finally, 81 or an average of 33.75% of the respondents are from the BS Medical Technology; 67 or 27.92% of the respondents are from BS Nursing; 50 or 20.83% of the respondents are from Radiologic Technology; 15 or 6.25% of the respondents are from Doctor of Dental Medicine, the 11 or 4.58% of the respondents are from Physical Therapy, the 10 or 4.17% of the respondents are from BS Pharmacy. The remaining 3 or 1.25% of the respondents are from Doctor of Optometry and BS Respiratory Therapy. Based on this data, most of the respondents for this study are from the School of Medical Technology.

Procedure

The researchers' initial step is to find an appropriate data collection method that would allow them to collect relevant data from the respondents. Once an appropriate data collection tool was identified, the researchers communicated with the original author to get permission to use and modify the tool for this research.

The main instrument in data-gathering for the study is a questionnaire that was modified from the tool used by Erfani et al. (2020) in their research entitled, "Knowledge, attitude and practices toward the novel coronavirus (COVID-19) outbreak: a population-based survey in Iran". The researchers have communicated with the original author for permission to use and modify the questionnaire. Once approved, the questionnaire was modified using the Department of Health, Commission on Higher Education, and Emilio Aguinaldo College Cavite's current guideline for COVID-19 prevention to adapt to the Philippine context. Before proceeding to the data collection proper, the data collection tool has undergone an ethics review from the Research Department. After the Research Department's approval to proceed with the data collection, validators have reviewed the material and given their comments and suggestions regarding the questionnaire's content and structure.

The questionnaire was distributed online via Google Meet after the researcher and target respondents had set up a

schedule. After their consent is obtained, the researchers proceeded to the next part of the questionnaire. In order to minimize misunderstandings and confusion on the side of the respondents, the terms that were used in the questionnaire were clarified in their respective contexts. The Google Form automatically collected the responses in the questionnaires once respondents are done answering.

Ethical Consideration

The methods of this research were reviewed and approved by the Institutional Ethics Review Board (IERB) of Emilio Aguinaldo College-Cavite. An informed consent that included the following information: research title, proponents, objectives, participant's contribution to research, risks and measures to address risks, benefits of participation, voluntary participation, confidentiality and data privacy, and contact details of the research team were discussed and the respondents were given opportunity to clarify any information.

RESULTS

Table 2

Source of COVID-19 Information

Source of COVID-19 Info	Responses	Percentage
Scientific journals and articles	136	56.67%
Family and friends	140	58.33%
Health-care providers such as physicians and nurses	165	68.75%
News Media (TV/Video, Magazines, Newspapers, And Radio)	206	85.83%
Social Media and the Internet	226	94.17%

Figure 1

Source of COVID-19 Information

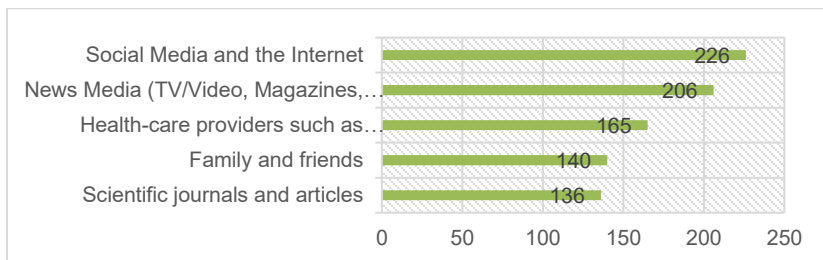


Table 2 and Figure 1 above show the total number of respondents on the source of COVID-19 information. 226 or an average of 94.17% of the respondents are from social media and the internet. 206 or 85.83% of the respondents answered news media (TV/video, magazines, newspapers, and radio). 165 or 68.75% of the respondents answered health care providers such as physicians and nurses, while 140 or 58.33% of the respondents are from family and friends. The remaining 136 respondents, or 56.67%, came from Scientific journals and articles. Based on this data, most of the respondents for this study gathered data regarding COVID-19 from social media and the internet, news and media, and health care providers.

Table 3

Responses on assessment on knowledge: True or False Question

STATEMENT	TRUE		FALSE		I DON'T KNOW		TOTAL
	Responses	%	Responses	%	Responses	%	
1	240	100%	0	0%	0	0%	240
2	235	98%	2	1%	3	1%	240
3	217	90%	15	6%	8	3%	240
4	213	89%	13	5%	14	6%	240
5	237	99%	0	0%	3	1%	240
6	240	100%	0	0%	0	0%	240
7	234	98%	2	1%	4	2%	240
8	232	97%	7	3%	1	0%	240

9	222	93%	16	7%	2	1%	240
10	86	36%	115	48%	39	16%	240
11	231	96%	5	2%	4	2%	240
12	212	88%	21	9%	7	3%	240
13	222	93%	16	7%	2	1%	240
14	239	99%	1	0%	0	0%	240
15	231	96%	6	3%	3	1%	240

Table 4

Responses on assessment on knowledge: Multiple Choice Question

Cause of COVID-19	Responses	Percentage
Virus	232	96.67%
Bacteria	4	1.67%
Immunodeficiency	3	1.25%
Fungi	1	0.42%

Table 4 (continued)

Incubation Period of COVID-19	Responses	Percentage
3 to 14 days	211	87.92%
2 to 5 days	21	8.75%
Less than two days	4	1.67%
I don't know	4	1.67%
Symptom of COVID-19	Responses	Percentage
Cough	240	100%
Loss of taste or smell	238	99%
Fever	237	99%
Sore throat	231	96%
Headache	196	82%
Aches and pains	180	75%
Tiredness	179	75%
Diarrhea	161	67%
A rash on the skin, or discoloration of finger or toes	67	28%
Red or irritated eyes	61	25%
I don't know	0	0%

Figure 2

The percentage of positive responses for the assessment of knowledge

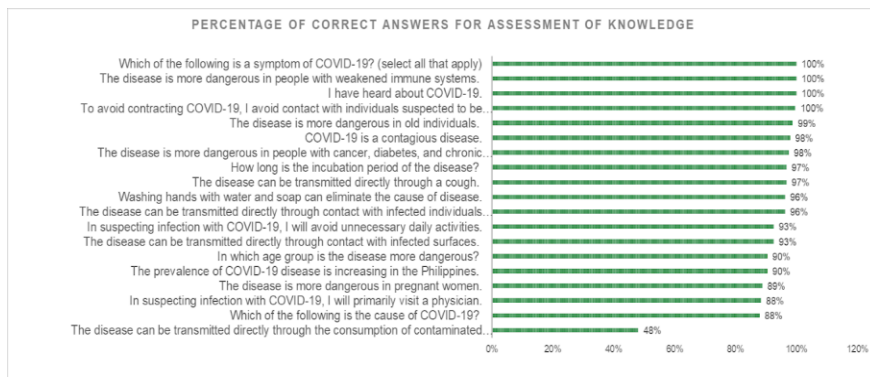


Table 3 & 4 and Figure 2 showed the result of the Assessment of Knowledge on 15-item true or false question as well as the four-item multiple choice question. The respondents were asked to answer based on their knowledge of the COVID-19.

- In the first statement, 'I have heard about COVID-19.', 100% of the respondents answered true.
- The second statement, 'COVID-19 is a contagious disease.', 98% of the respondents answered true, 2 or 1% answered false on the second statement, and the remaining 3 or 1% of the respondents answered I don't know.
- In the third statement, 'The prevalence of COVID-19 disease is increasing in the Philippines.', 217 or 90% of the respondents answered True, 15 or 6% answered false, and the other 8 or 3% answered I don't know.
- In the fourth statement, 'The disease is more dangerous in pregnant women.', 213 or 89% of the respondents answered true, 13 or 5% answered false, and 14 or 6% answered I don't know.
- In the fifth statement, 'The disease is more dangerous in old individuals.', 237 or 99% of the respondents answered true, and 3 or 1% answered I don't.

- In the sixth statement, 'The disease is more dangerous in people with weakened immune systems.', 40 or 100% of the respondents answered true.
- The seventh statement, 'The disease is more dangerous in people with cancer, diabetes, and chronic respiratory disease.' 234 or 98% of the respondents answered true, 2 or 1% answered false, and 4 or 2% answered I don't know.
- The eighth statement, 'The disease can be transmitted directly through a cough.' 232 or 97% answered true, 7 or 3% answered false, and only one respondent answered I don't know.
- In the ninth statement, 'The disease can be transmitted directly through contact with infected surfaces,' 222 or 93% of the respondents answered true, 16 or 7% answered false, and 2 or 1% answered I don't know.
- In the tenth statement, 'the disease can be transmitted directly through the consumption of contaminated dairy and meat.', 86 or 36% of the respondents answered true, 115 or 48% answered false, and 39 or 16% answered I don't know.
- In the eleventh statement, 'The disease can be transmitted directly through contact with infected individuals (handshaking, hugging, kissing)', 231 or 96% of the respondents answered true, 5 or 2% answered false, and 4 or 2% answered I don't know.
- In the twelfth statement, 'In suspecting infection with COVID-19, I will primarily visit a physician.' 212 or 88% of the respondents answered true, 21 or 19% answered false, and 7 or 3% answered I don't know.
- In the thirteenth statement, 'In suspecting infection with COVID-19, I will avoid unnecessary daily activities', 222 or 93% of the respondents answered true, 16 or 7% answered false, and 2 or 1% answered I don't know.
- In the fourteenth statement 'To avoid contracting COVID-19, I avoid contact with individuals suspected of being infected with COVID-19.' 239 or 99% of the respondents answered true, and only one respondent answered false.
- In the fifteenth and last statement on the assessment of the knowledge, 'Washing hands with water and soap can eliminate the cause of disease.', 231 or 96% of the respondents answered true, 6 or 3% answered false, and 3 or 1% answered I don't know.

- 232 or an average of 96.67% of the respondents answered Virus as the cause of COVID-19
- 211 or an average of 87.92% of the respondents answered 3 to 14 days incubation period.
- 90.42% of the respondents answered above 50 years old as the age group where COVID-19 is more dangerous.
- On the symptoms of COVID-19, 100% answered cough; 99% loss of taste or smell; 237 or 99% fever; 31 or 96% answered sore throat; 82% answered headache; 75% Aches and pains. 75% answered tiredness. 67% answered diarrhea. 28% answered rash on the skin, or discoloration of finger or toes; while 25% of the answered red or irritated eyes.

Table 5

Responses on assessment on attitude

QUESTION	AGREE		NEUTRAL		DISAGREE		TOTAL
	<i>Responses</i>	%	<i>Responses</i>	%	<i>Responses</i>	%	
1	227	95%	13	5%	0	0%	240
2	168	70%	62	26%	10	4%	240
3	108	45%	45	19%	86	36%	240
4	227	95%	11	5%	2	1%	240
5	232	97%	8	3%	0	0%	240
6	188	78%	33	14%	19	8%	240
7	228	95%	11	5%	1	0%	240
8	137	57%	65	27%	37	15%	240
9	214	89%	26	11%	0	0%	240
10	188	78%	46	19%	6	3%	240
11	199	83%	36	15%	5	2%	240
12	192	80%	45	19%	3	1%	240
13	193	80%	42	18%	5	2%	240

Figure 3

The percentage of positive responses for the assessment of attitude.

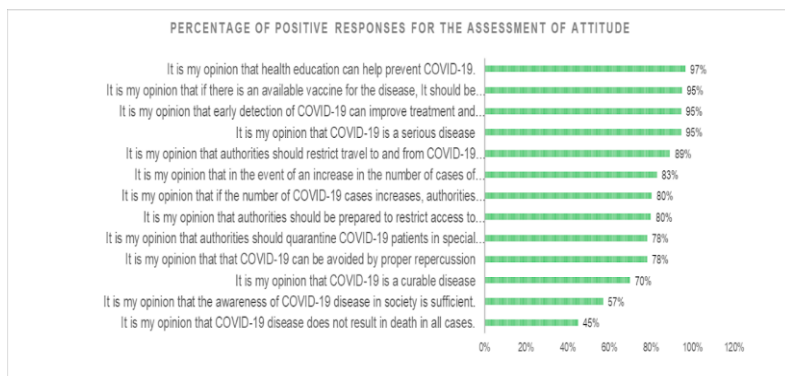


Table 5 and Figure 3 show the 13-item Assessment of Attitude result wherein a set of statements regarding their attitude on the COVID-19 will be measured. The respondents were asked to answer agree, neutral, or disagree based on their current perception. The following is the breakdown of the results:

- On the first statement regarding the opinion of the respondents about how COVID-19 was a serious disease, 227 or 95% agreed, while the remaining 13 or 5% were neutral.
- On the second statement regarding the opinion of the respondents about how COVID-19 is a curable disease, 168 or 70% agreed, 62 or 26% were neutral, and 10 or 4 % disagreed.
- On the third statement regarding the opinion of the respondents about how COVID-19 disease does not result in death in all cases, 108 or 45% agreed, and 45 or 19% were neutral, while 86 or 36% disagreed.
- On the fourth statement regarding the opinion of the respondents about how early detection of COVID-19 can improve treatment and outcome, 227 or 95% agreed, 11 or 5% were neutral, and 2 or 1% disagreed
- On the fifth statement regarding the opinion of the respondents about how health education can help prevent

COVID-19, 232 or 97% agreed. In comparison, the remaining 8 or 3% were neutral.

- On the sixth statement regarding the respondents' opinion about how COVID-19 can be avoided by proper repercussion, 188 or 78% agreed, 33 or 14% were neutral, and 19 or 8% disagreed.
- On the seventh statement regarding the respondents' opinion about using the available vaccines, 228 or 95% agreed, 11 or 5 % were neutral, and only one respondent disagreed.
- On the eighth statement regarding the respondents' opinion about how awareness of COVID-19 disease in society is sufficient, 137 or 57% agreed, 65 or 27% were neutral, and 37 or 15% disagreed.
- On the ninth statement regarding the opinion of the respondents about how authorities should restrict travel to and from COVID-19 disease areas to prevent contamination, 214 or 89% agreed and the remaining 26 or 11% were neutral.
- On the tenth statement regarding the respondents' opinion about how authorities should quarantine COVID-19 patients in special hospitals, 188 or 78% agreed, 46 or 19% were neutral, and 6 or 3% disagreed.
- On the eleventh statement regarding the opinion of the respondents about how in the event of an increase in the number of COVID-19, authorities should be ready to close educational centers, 199 or 83% agreed, 36 or 15% were neutral, and 5 or 2% disagreed.
- On the twelfth statement regarding the opinion of the respondents on how authorities should be prepared to restrict access to religious sites, shrines, and mosques if the number of COVID-19 cases increases, 192 or 80% agreed, 45 or 19% were neutral, 3 or 1% disagreed.
- On the thirteenth and last statement regarding the opinion of the respondents about how authorities should be ready to lockdown and quarantine the city if the COVID-19 cases increase, 193 or 80% agreed, 42 or 18% were neutral, and 5 or 2% disagreed.

Table 6

Responses on assessment on practices

	ALWAYS		OFTEN		SOMETIMES		RARELY		NEVER		TO TAL
	Respo nses	%	Respo nses	%	Respo nses	%	Respo nses	%	Respo nses	%	
1	220	92%	17	7%	2	1%	1	0%	0	0%	240
2	225	94%	12	5%	3	1%	0	0%	0	0%	240
3	149	62%	68	28%	18	8%	5	2%	0	0%	240
4	203	85%	18	8%	15	6%	3	1%	1	0%	240
5	176	73%	44	18%	18	8%	2	1%	0	0%	240
6	233	97%	5	2%	2	1%	0	0%	0	0%	240
7	92	38%	59	25%	53	22%	29	12%	7	3%	240
8	131	55%	78	33%	26	11%	5	2%	0	0%	240
9	162	68%	55	23%	20	8%	2	1%	1	0%	240
10	226	94%	12	5%	2	1%	0	0%	0	0%	240
11	125	52%	67	28%	38	16%	7	3%	3	1%	240
12	165	69%	52	22%	18	8%	4	2%	1	0%	240
13	210	88%	24	10%	6	3%	0	0%	0	0%	240
14	191	80%	36	15%	10	4%	2	1%	1	0%	240
15	217	90%	19	8%	4	2%	0	0%	0	0%	240
16	222	93%	13	5%	4	2%	1	0%	0	0%	240
17	163	68%	31	13%	19	8%	15	6%	12	5%	240
18	161	67%	34	14%	17	7%	15	6%	13	5%	240
19	210	88%	24	10%	6	3%	0	0%	0	0%	240
20	124	52%	56	23%	40	17%	15	6%	5	2%	240
21	134	56%	60	25%	29	12%	11	5%	6	3%	240

Figure 4

The percentage of positive responses for the assessment of practice

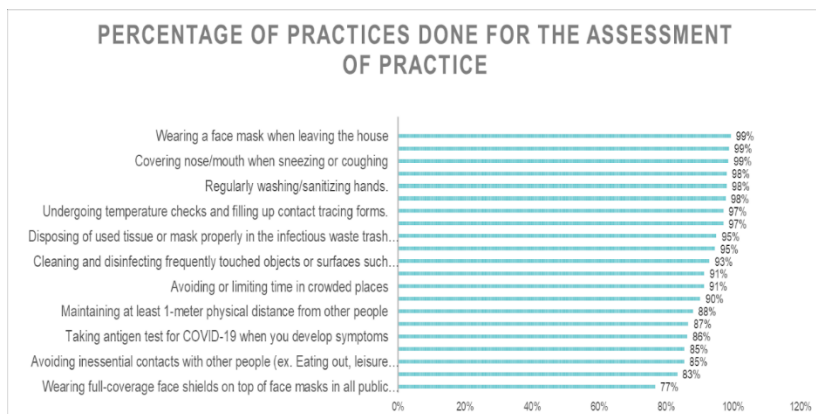


Table 6 and Figure 4 showed the result of the 21-item assessment of practice, wherein a set of statements would determine the practices the respondents currently perform to prevent contracting COVID-19 and the frequency on how often they practice them. The respondents were asked to answer always, often, sometimes, rarely, and never. The following is the breakdown of the results:

- Statement one “Regular washing/sanitizing hands”: 220 or 92% answered always, 17 or 7% answered often, 2 or 1% answered sometimes, and only 1 respondent answered rarely.
- Statement two “Covering nose/mouth when sneezing or coughing”: 225 or 94% answered always, 12 or 5% answered often, and 3 or 1% answered sometimes.
- Statement three “Avoid touching the nose, eyes, or mouth”: 149 or 62% answered always, 68 or 28% answered often, 18 or 8% answered sometimes, and 5 or 2% answered rarely.
- Statement four “Disposing of used tissue or mask properly in the infectious waste trash bin (ex. Yellow trash can)”: 203 or 85% answered always, 18 or 8% answered often, and 15 or 6% answered sometimes, 3 or 1% answered rarely, and only 1 respondent answered never.

- Statement five “Cleaning and disinfecting frequently touched objects or surfaces such as cellphones, doorknobs, etc.”: 176 or 73% answered always, 44 or 18% answered often, 18 or 8% answered sometimes, and 2 or 1% answered rarely.
- Statement six “Wearing a face mask when leaving the house”: 233 or 97% answered always, 5 or 2% answered sometimes and 2 or 1% answered often.
- Statement seven “Wearing full-coverage face shields on top of face masks in all public spaces”: 2 or 38% answered always, 59 or 25% answered sometimes, 53 or 22% answered often, 29 or 12% answered rarely, and 7 or 3% answered never.
- Statement eight “Maintaining at least 1-meter physical distance from other people”: 131 or 55% answered always, 78 or 33% answered sometimes, 26 or 11% answered often, and 5 or 2% answered rarely.
- Statement nine “Avoiding or limiting time in crowded places”: 162 or 68% answered always, 55 or 23% answered sometimes, 20 or 8% answered often, 2 or 1% answered rarely, and only 1 respondent is never.
- Statement ten “Avoiding close contact with symptomatic people”: 226 or 94% answered always, 12 or 5% answered sometimes, and 2 or 1% answered often.
- Statement eleven “Avoiding inessential contacts with other people (ex. Eating out, leisure travels)”: 125 or 52% answered always, 67 or 28% answered sometimes, 38 or 16% answered often, 7 or 3% answered rarely, and 3 or 1% answered never.
- Statement twelve, “Avoiding confined or enclosed spaces with poor ventilation” 165 or 69% answered always, 52 or 22% answered sometimes, 18 or 8% answered often, 4 or 2% answered rarely, and only 1 respondent is never.
- Statement thirteen “When possible, opening of windows and doors to improve ventilation at home”: 210 or 88% answered always, 24 or 10% answered sometimes, and 6 or 3% answered often.
- Statement fourteen “Following foot traffic (Entry/Exit / One-way lane)”: 191 or 80% answered always, 36 or 15% sometimes answered, 10 or 4% answered often, and 2 or 1% answered rarely.

- Statement fifteen “Following local quarantine protocol”: 217 or 90% answered always, 19 or 8% answered sometimes, and 4 or 2% answered often.
- Statement sixteen “Complying with 7-days self-quarantine (for fully vaccinated) when you develop symptoms”: 222 or 93% answered always, 13 or 5% answered sometimes, 4 or 2% answered often, and only 1 respondent answered rarely.
- Statement seventeen “Taking polymerase chain reaction (PCR) swab test for COVID-19 when you develop symptoms”: 163 or 68% answered always, 31 or 3% answered sometimes, 19 or 8% answered often, 15 or 6% answered rarely, and 12 or 5% answered never.
- Statement eighteen “Taking antigen test for COVID-19 when you develop symptoms”: 161 or 67% answered always, 34 or 14% answered sometimes, 17 or 7% answered often, 15 or 6% answered rarely, and 13 or 5% answered never.
- Statement nineteen “Undergoing temperature checks and filling up contact tracing forms”: 210 or 88% answered always, 24 or 10% answered sometimes, and 6 or 3% answered often.
- Statement twenty “Using public transportation (jeep/tricycle/bus/train) when traveling”: 124 or 52% answered always, 56 or 23% answered sometimes, 40 or 17% answered often, 15 or 6% answered rarely, and 5 or 2% answered never.
- Statement twenty-one “Using private transportation when traveling”: 134 or 56% answered always, 60 or 25% answered sometimes, 29 or 12% answered often, 11 or 5% answered rarely, and 6 or 3% answered never.

DISCUSSION

The findings regarding the primary source of COVID-19 information of the 3rd and 4th-year Biomedical Science students in Emilio Aguinaldo College Cavite were the **social media and the internet, news and media, and health care providers**. It is vital to give timely, accurate, and reliable information addressing critical infection control issues regarding COVID-19. Social media and the internet played an essential role in distributing this information. This has been used most frequently as these are the

easiest and most successful ways to transmit information because they have a large number of registered users, and can be used easily with inexpensive internet access.

However, there are both benefits and drawbacks to this medium. Some advantages are the speedy dissemination of educational information regarding the COVID-19, webinars on platforms like YouTube and Skype may be used to facilitate multi-center investigations and research collaborations as well as to provide continuous medical education. Negative aspects include outdated or incorrect data, data that has not been peer-reviewed, data that does not apply in context, and data that is just false (González-Padilla and Tortolero-Blanco, 2020). news and media such as TV/video, magazines, newspapers, and radio, otherwise known as the traditional media, are a close second as the primary source of the respondents. This is a similar result to the study by Acheampong et al. (2021) entitled "Putative factors influencing knowledge and behavioral practices of health science undergraduate students towards COVID-19 infection ahead of re-opening universities in Ghana" wherein they cite social media and television/radio/newspaper as the medium where the students mostly get their information on COVID-19.

The data collection has also revealed a **high level of knowledge of COVID-19** for all the respondents with an overall score of 36 or 95%. The respondents were able to correctly identify the correct answer on a 19-item questionnaire regarding COVID-19 and its nature, its signs and symptoms, mode of transmission, and prevention. It is higher than the result from a similar study done by Sondahk et al. (2022), where medical students from Indonesia have only 50% good knowledge of COVID-19. On the other hand, the study's result is in line with the result of the study done by Bichara et al. (2021) and Dalanon et al. (2021) in the Philippines, Le An et al. (2021) in Vietnam, Noreen et al., (2020) in Pakistan, and Khalil et al. (2020) in Iraq, wherein students from undergraduate medical courses have sufficient knowledge on COVID-19.

The respondents in the study have good knowledge of how COVID-19 is more dangerous for people ages 50 and above, pregnant women, and people with weakened immune systems such as those who have cancer, diabetes, and

chronic respiratory diseases. Most have correctly answered the mode in which the virus can be transmitted, which is through a cough, contact with infected surfaces, and contact with infected individuals (handshaking, hugging, kissing). However, 48% of the respondents have incorrectly identified consumption of contaminated dairy and meat as a mode for transmission of COVID-19. This is attributed to the misinformation that has been circulating in the earlier surge of the virus. This false information was being disseminated on a variety of social media sites and was a cause of COVID-19-related worry. At present, however, there is still no evidence that this myth is true (Sahoo et al., 2020). On the other hand, the respondents were able to correctly identify the common signs and symptoms (cough, fever, loss of sense of taste/smell, etc.), the incubation period (3-14 days), and causative microorganisms (virus). Preventive measures were answered correctly, such as avoiding contact with individuals suspected to be infected with COVID-19, practicing proper hand washing, and in the event of being at risk of being the carrier of the virus. The respondents also correctly chose to visit their physician and avoid unnecessary daily activities. The correct answers in this questionnaire are in line with the information from the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC). The satisfactory outcomes were linked to the respondents' current educational attainment (Dalanon et al, 2021). Thus, it may be concluded that students of medical courses possess adequate knowledge of COVID-19's nature, signs and symptoms, mode of transmission, and prevention to help healthcare systems in the fight against the pandemic in terms of sharing correct information to the community.

For the assessment of attitude, the respondents have found to have a **positive attitude (91%)** toward COVID-19. Based on the questionnaire result, the respondents believed that, although COVID-19 is a severe disease, it is curable and does not result in death in all cases. According to them, early detection and proper health education are the keys to preventing the spread of the virus, and the awareness for this disease is sufficient. According to Dalanon et al. (2021), being a part of the healthcare system as an undergraduate of allied health courses can be a factor that gives them hope that the pandemic will be contained soon and that they will be able to

return to face-to-face classes next academic year. Most of the respondents (95%) also agree with the vaccine administration as soon as it is available. This result is higher than prior surveys done by Manning et al. (2021), which revealed that a more significant percentage of students and healthcare personnel declined vaccination. On the other hand, the positive attitude toward vaccination is similar to the studies done by Pagador et al. (2022) wherein 79.5% are found to be willing to accept vaccination for COVID-19. According to Philippine Statistics Authority, 61.89% of Filipinos are now fully vaccinated as of April 2022 – 90% is the target percent of the vaccinated population to achieve herd immunity in the Philippines.

On the possibility of another surge of COVID-19 cases, the respondents have agreed to take proper measures to contain the disease such as having quarantine protocols, restriction of travel to areas of high cases, and temporary closure of educational centers and religious sites. In the case of this pandemic, such precautions are required to prevent illness transmission from person to person and decrease the number of active cases (Erfani et al, 2020). Isolation and quarantine, social distancing, and community confinement have been used on an unprecedentedly large scale in the Philippines for the past two years. They have only lessened the restriction due to the decrease of active cases. Despite this, government support is still essential to convert these well-adjusted attitudes into appropriate practice.

Finally, based on the overall score on the assessment of practices of 92%, the respondents have a **high level of practice to prevent COVID-19**. The majority of the respondent of the study made efforts to avoid COVID-19 exposure in terms of their hygiene, such as regular handwashing, covering their mouth when sneezing or coughing, disinfecting frequently touched objects, and proper disposal of tissues and masks, and wearing a face mask when outside. Handwashing is one of the most promoted preventive behavior, and 98% of the respondents diligently practice it. Since the hand is frequently in contact with various objects, the hand is the most susceptible to carrying the virus. As has been documented, SARS-CoV-2 may live for days on many surfaces. By washing hands with soap, the virus on the

hands will be separated because the lipid coating of the virus's body will be dissolved (Sondahk et al., 2022).

Wearing a face shield outside is slowly being discontinued by the respondents. Face shields had been optional ever since the active cases decreased. Other restrictive behaviors include social distancing, avoiding crowded and unventilated places, avoiding people with symptoms, following local quarantine and self-isolation protocols, undergoing temperature checks and filling up contact tracing forms, and undergoing antigen RT-PCR when symptoms were developed are strictly adhered by the respondents. Both public and private transportation are used by the respondents when traveling. The high level of practice of the respondents might be due to extensive information dissemination by the government as well as private entities, given the virus's high infectivity and ease of transmission via droplets (Erfani et al., 2020). It is also possible to take into account the fact that their sense of responsibility and concern as aspiring medical professionals may encourage students to demonstrate more optimistic attitudes and proactive behaviors in the midst of this pandemic (Noreen et al, 2020). These findings are supported by the studies done by Khalil et al. (2020), Erfani et al. (2020), Huynh et al. (2020), and Alzoubi et al. (2020).

Conclusion

In conclusion, the 3rd and 4th-year Biomedical Science students in Emilio Aguinaldo College Cavite have a high level of knowledge, attitude, and practice towards preventing COVID-19. Behavior practices might vary over time. Because of this, continuous research is needed to analyze the frequency of the degree of KAP towards COVID-19 to design ways to combat disease transmission over time. It should be insisted that students continue to improve their knowledge and attitudes.

Both knowledge and attitude play a significant role in increasing adherence to self-precautionary measures and transferring knowledge to other people in the community to help end this pandemic. By improving the COVID-19 education program, people should learn more about the risks of this disease and how to avoid it. The more they learn, the

more they will think and act in a good way. Studies in the past have shown a strong link between these two domains. Therefore, knowledge is essential to improve the practice of COVID-19 prevention.

Recommendation

The study Knowledge, Attitude, and Practice towards the Prevention of COVID-19 of the 3rd & 4th Year Biomedical Science Students in Emilio Aguinaldo College Cavite recommend the following based on the analysis from the results of the gathered data from the respondents. To the students and Instructors in Emilio Aguinaldo College Cavite, they must further improve their knowledge regarding COVID-19, especially on the transmission and prevention, to help decrease the cases in the community and share with the others the information gathered and promote involvement in COVID-19 prevention measure. To the community, they must cooperate by continuously providing information about the status of the disease at the community level by reporting local cases in their family or neighborhood in order to take appropriate action, as well as adhere to the current guidelines given by the authorities to lessen the transmission of the disease; and for the future researcher, the researchers recommended addressing the study's limitations, such as the limited time for conducting the study and online data gathering. Expanding the sample size as well as using a variety of respondents from different sectors and groups can also be done to increase the scope of the study. The researchers also recommend utilizing this study's findings and comparing the data gathered to other related studies in order to add more information to the overall understanding of the COVID-19 pandemic.

References

- Acheampong, E., Adu, E. A., Anto, E. O., Obirikorang, Y., Adua, E., Lopko, S. Y., Acheampong, E. N., Anto, A. O., Baah, V., & Obirikorang, C. (2021). Putative factors influencing knowledge and behavioural practices of health science undergraduate students towards covid-19 infection ahead of re-opening universities in Ghana. *Journal of Public Health and Emergency*, 5, 11–11. <https://doi.org/10.21037/jphe-20-89>
- Ancheta, R., & Ancheta, H. (2020). The New Normal in Education: A Challenge to the Private Basic Education Institutions in the Philippines? *International Journal of Educational Management and Development Studies*, 1(1), 1–19. <https://doi.org/10.53378/345960>
- Azlan, A. A., Hamzah, M. R., Sern, T. J., Ayub, S. H., & Mohamad, E. (2020). Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia. *PLOS ONE*, 15(5), e0233668. <https://doi.org/10.1371/journal.pone.0233668>
- Baniyas, N., Sheek-Hussein, M., al Kaabi, N., al Shamsi, M., al Neyadi, M., al Khoori, R., Ajab, S., Abid, M., Grivna, M., & Abu-Zidan, F. M. (2021). COVID-19 knowledge, attitudes, and practices of United Arab Emirates medical and health sciences students: A cross sectional study. *PLOS ONE*, 16(5), e0246226. <https://doi.org/10.1371/journal.pone.0246226>
- Barrot, J. S., Llenares, I. I., & del Rosario, L. S. (2021). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Education and Information Technologies*, 26(6), 7321–7338. <https://doi.org/10.1007/s10639-021-10589-x>
- Baticulon, R. E., Sy, J. J., Alberto, N. R. I., Baron, M. B. C., Mabulay, R. E. C., Rizada, L. G. T., Tiu, C. J. S.,

Clarion, C. A., & Reyes, J. C. B. (2021). Barriers to Online Learning in the Time of COVID-19: A National Survey of Medical Students in the Philippines. *Medical Science Educator*, 31(2), 615–626. <https://doi.org/10.1007/s40670-021-01231-z>

Bridgit Bichara, Job Yzeckiel De Leon, Jahdiel Aljie Lomibao, Geaney Pacursa, Vincent Paolo Santos, Andrea Mae Teaño, Hannah Lyn Tiu, & Julius Eleazar Jose. (2021). Assessing the Knowledge, Attitude, and Practices of College Students in Manila, Philippines Regarding COVID-19 Preventive Measures. *International Journal of Progressive Research in Science and Engineering*, 2(8), 65–76. Retrieved from <https://www.journals.grdpublications.com/index.php/ijprse/article/view/361>

Dalanon, J., Redoble, R., Belotindos, J. A., Reyes, C. D., Fabillar, J., Armero, M. S., Locsin, R., Suzuki, Y., Okura, K., & Matsuka, Y. (2021). Adequate knowledge of COVID-19 impacts good practices amongst health profession students in the Philippines. *bioRxiv*. <https://doi.org/10.1101/2021.02.18.431919>

Duavit, T. J. M., Destura, S. L. R., Felix, J. R. B., Gonzalez, A. L., Liwanag, A. M. M., Platon, S. S., & de Vera, G. I. S. (2021). Knowledge, Attitudes, and Practices towards COVID-19 among Non-healthcare Individuals in the Municipality of Pateros, Metro Manila. *International Journal of Progressive Research in Science and Engineering*, 2(7), 103-123.

EAC-Cavite granted to conduct limited face-to-face classes. (n.d.). Retrieved June 25, 2022, from <https://eac.edu.ph/2021/06/eac-cavite-granted-to-conduct-limited-face-to-face-classes/>

Ferdous, M. Z., Islam, M. S., Sikder, M. T., Mosaddek, A. S. M., Zegarra-Valdivia, J. A., & Gozal, D. (2020). Knowledge, attitude, and practice regarding

COVID-19 outbreak in Bangladesh: An online-based cross-sectional study. *PLOS ONE*, 15(10), e0239254.
<https://doi.org/10.1371/journal.pone.0239254>

González-Padilla, D. A., & Tortolero-Blanco, L. (2020). Social media influence in the COVID-19 Pandemic. *International Braz j Urol*, 46(suppl 1), 120–124.
<https://doi.org/10.1590/s1677-5538.ibju.2020.s121>

Huynh, G., Nguyen, T. V., Nguyen, D. D., Lam, Q. M., Pham, T. N., & Nguyen, H. T. N. (2021). Knowledge About COVID-19, Beliefs and Vaccination Acceptance Against COVID-19 Among High-Risk People in Ho Chi Minh City, Vietnam. *Infection and Drug Resistance, Volume 14*, 1773–1780.
<https://doi.org/10.2147/idr.s308446>

IATF resolution regarding quarantine. Bureau of Quarantine. (2021, September 9). Retrieved June 25, 2022, from <https://quarantine.doh.gov.ph/iatf-resolution-regarding-quarantine/>

Khalil, N. S., Al-Yuzbaki, D. B., & Tawfeeq, R. S. (2020). COVID-19 knowledge, attitude and practice among medical undergraduate students in Baghdad City. *EurAsian Journal of BioSciences*, 14(2), 4179-4186.

Lau, L. L., Hung, N., Go, D. J., Ferma, J., Choi, M., Dodd, W., & Wei, X. (2020). Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: A cross-sectional study. *Journal of Global Health*, 10(1).
<https://doi.org/10.7189/jogh.10.011007>

le An, P., Huynh, G., Nguyen, H. T. N., Pham, B. D. U., Nguyen, T. V., Tran, T. T. T., & Tran, T. D. (2021). Knowledge, Attitude, and Practice Towards COVID-19 Among Healthcare Students in Vietnam. *Infection and Drug Resistance, Volume*

14, 3405–3413.
<https://doi.org/10.2147/idr.s328677>

National COVID-19 Vaccination Dashboard | Department of Health website. (n.d.). Department of Health.
<https://doh.gov.ph/covid19-vaccination-dashboard>

Noreen, K., Rubab, Z. E., Umar, M., Rehman, R., Baig, M., & Baig, F. (2020). Knowledge, attitudes, and practices against the growing threat of COVID-19 among medical students of Pakistan. *PLOS ONE*, *15*(12), e0243696.
<https://doi.org/10.1371/journal.pone.0243696>

Pagador, P., Pacleb, A., Ormita, M. J., Valencia, F. E., Velasco, D. H., & Josue-Dominguez, R. (2022). Acceptance of COVID-19 Vaccine among Unvaccinated Filipinos. *International Journal of Medical Students*.
<https://doi.org/10.5195/ijms.2022.1192>

Paul, A., Sikdar, D., Hossain, M. M., Amin, M. R., Deeba, F., Mahanta, J., Javed, M. A., Islam, M. M., Noon, S. J., & Nath, T. K. (2020). Knowledge, attitudes, and practices toward the novel coronavirus among Bangladeshis: Implications for mitigation measures. *PLOS ONE*, *15*(9), e0238492.
<https://doi.org/10.1371/journal.pone.0238492>

Philippine Institute for Development Studies. (2020, September 11). *Poverty, the Middle Class, and Income Distribution amid COVID-19*. Think Asia.
<https://think-asia.org/handle/11540/12319>

Srivastava, B., & Reddy, P. (2020). ASSESSMENT OF KAP (KNOWLEDGE, ATTITUDE AND PRACTICE) OF UNIVERSITY STUDENTS TOWARDS PREVENTION OF COVID-19. *International Journal of Biological Innovations*, *02*(02), 117–125.
<https://doi.org/10.46505/ijbi.2020.2206>

Taherdoost, H. (2016). Sampling Methods in Research Methodology; How to Choose a Sampling

Technique for Research. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3205035>

APPENDIX A

INFORMED CONSENT FORM & RESEARCH INSTRUMENT

KNOWLEDGE, ATTITUDE, AND PRACTICE TOWARDS THE PREVENTION OF COVID-19 OF THE 3RD & 4TH YEAR BIOMEDICAL SCIENCE STUDENTS IN EMILIO AGUINALDO COLLEGE-CAVITE

PART I: INFORMED CONSENT FORM FOR RESPONDENTS

This informed consent form is for the participants in the Emilio Aguinaldo College-Cavite and we are inviting you to participate in research, titled *“Knowledge, Attitude, and Practice towards the prevention of COVID-19 of the 3rd and 4th year Biomedical Science students in Emilio Aguinaldo College-Cavite”*.

Fino, Elaine Fleur U.
Flores, Fernand Aaron R.

Part 1.1: Information Sheet

Introduction

We, the researchers, are doing a study about the Knowledge, Attitude, and Practice towards the prevention of COVID-19 of the 3rd and 4th-year Biomedical Science students in Emilio Aguinaldo College-Cavite. We are going to give you information and invite you to be part of this research. Before proceeding with the interview, you can communicate with the researchers regarding the research.

This consent form may contain words that are unfamiliar to you. If you have any questions, feel free to ask us for clarification.

Purpose of the Research

The goal of the study is to list the respondent's current knowledge of COVID-19. We want to determine the respondent's attitude towards COVID-19 and the practices done by the respondent's relation to the prevention of contracting the virus. This study aims to have a proper understanding of knowledge, attitude, and practice toward preventing COVID-19.

Type of Research Tool

Agreeing to be a respondent would mean undergoing to answer a survey questionnaire and it won't take more than 20 minutes to complete.

Participation Selection

Participation in this data collection is voluntary. Respondents may refuse to take part in this research or exit the data collection at any time without penalty. We are looking for third and fourth-year students with Bachelor of Science in Medical Technology, Bachelor of Science in Radiologic Technology, Bachelor of Science in Nursing, Bachelor of Science in Midwifery, Bachelor of Science in Pharmacy, Bachelor of Science in Physical Therapy, Bachelor of Science in Respiratory Therapy, Doctor of Optometry and Doctor of Dental Medicine that are enrolled for School Year 2021 - 2022 in the Emilio Aguinaldo College - Cavite. We want to know your opinion as a Biomedical Science student

about Knowledge, Attitude, and Practices towards the prevention of COVID-19.

Duration

Each question can be answered in ten to fifteen seconds and the survey will be lasting for **ten to twenty minutes** via Google Form that will be disseminated in the Google Meet.

Risks

The study has several risks. First, the participant will spend time answering the questionnaire. Second, the participant may experience discomfort in answering the questionnaire. The researchers are going to clarify the questions to the participants so they will be able to comprehend the questions. The respondents are free to stop participating in the data collection if they choose to do so and it will not affect their relationship with the researchers.

Benefits

The participation of the respondents may help the researchers to learn more about the knowledge, attitude, and practices towards the prevention of COVID-19. In line with this, five respondents can win a raffle of 20 pesos G-cash load; it will serve as a token of appreciation for participating in the data collection.

Confidentiality

Personal information collected from participants will be kept confidential and used only for academic purposes. The survey answers will be collected to the responses section of the Google Form and only the researchers and their Research Adviser can have access to it. Participants will be able to choose whether they want to be called by their real names or code names when it comes to their names. After the data has been interpreted, the participants' information will be deleted.

Who to Contact

If you have any questions, you can ask now for clarifications or you may contact the following:

Fino, Elaine Fleur U. - efufino.cvt@eac.edu.ph / (09066811853)

Flores, Fernand Aaron R. - farflores.cvt@eac.edu.ph / (09185157590)

Part 1.2: Certificate of Consent

I have been invited to participate in research titled, "**Knowledge, Attitude, and Practice towards the prevention of COVID-19 of the 3rd and 4th-year Biomedical Science students in Emilio Aguinaldo College-Cavite**".

I have been invited to participate in research titled, "Knowledge, Attitude, and Practice towards the prevention of COVID-19 of the 3rd and 4th-year Biomedical Science students in Emilio Aguinaldo College-Cavite". I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study. I confirm as a respondent, I was given an opportunity to ask questions about the study, and all the questions I asked have been answered satisfactorily and honestly. I confirm that I have not been coerced

into giving consent, and the consent has been given freely and voluntarily. I also consent to use my email to participate in the raffle draw at the end of the study.

As a sign of consent to participate, I will provide my EAC email address on the last part of the consent form.

Print Name and Signature of the Respondent

Date _____

DD/MM/YYYY

**PART II: DEMOGRAPHIC
PROFILE**

Instructions: Answer the following:

A. Name (Optional):

B. Age:

- 18 – 25 years old
- 26 – 35 years old
- 36 years old and above

C. Sex:

- Male
- Female

D. Year Level:

- 3rd-year
- 4th-year
- 6th year

E. Year & Course:

- BS Medical Technology
- BS Radiologic Technology
- BS Nursing
- BS Midwifery
- Doctor of Dental Medicine
- BS Pharmacy
- BS Physical Therapy
- BS Respiratory Therapy
- Doctor of Optometry

F. Source of COVID-19 Information

- Social Media and the Internet
- News Media (TV/Video, Magazines, Newspapers, And Radio)
- Family and friends
- Scientific journals and articles
- Health-care providers such as physicians and nurses
- Others:

KNOWLEDGE			
	True	False	No Opinion
1. I have heard about COVID-19.			
2. COVID-19 is a contagious disease.			
3. The prevalence of COVID-19 disease is increasing in the Philippines.			
4. Which of the following is the cause of COVID-19? <input type="checkbox"/> Bacteria <input type="checkbox"/> Virus <input type="checkbox"/> Fungi <input type="checkbox"/> Parasite <input type="checkbox"/> Immunodeficiency <input type="checkbox"/> No opinion			
5. How long is the incubation period of the disease? <input type="checkbox"/> Less than two days <input type="checkbox"/> 2 to 5 days <input type="checkbox"/> 3 to 14 days <input type="checkbox"/> No opinion			
6. In which age group is the disease more dangerous? <input type="checkbox"/> Under 15 years <input type="checkbox"/> 15 to 30 years <input type="checkbox"/> 30 to 50 years <input type="checkbox"/> Above 50 years <input type="checkbox"/> No opinion			
7. Which of the following is a symptom of COVID-19? (<i>select all that apply</i>) <input type="checkbox"/> fever <input type="checkbox"/> cough <input type="checkbox"/> tiredness <input type="checkbox"/> loss of taste or smell <input type="checkbox"/> sore throat <input type="checkbox"/> headache <input type="checkbox"/> aches and pains <input type="checkbox"/> diarrhea <input type="checkbox"/> a rash on the skin, or discoloration of fingers or toes <input type="checkbox"/> red or irritated eyes			

8. The disease is more dangerous in pregnant women.			
9. The disease is more dangerous in old individuals.			
10. The disease is more dangerous in people with weakened immune systems.			
11. The disease is more dangerous in people with cancer, diabetes, and chronic respiratory diseases.			
12. The disease can be transmitted directly through a cough.			
13. The disease can be transmitted directly through contact with infected surfaces.			
14. The disease can be transmitted directly through the consumption of contaminated dairy and meat.			
15. The disease can be transmitted directly through contact with infected individuals (handshaking, hugging, kissing)			
16. In suspecting infection with COVID-19, I will primarily visit a physician.			
17. In suspecting infection with COVID-19, I will avoid unnecessary daily activities.			
18. To avoid contracting COVID-19, I avoid contact with individuals suspected to be infected with COVID-19.			
19. Washing hands with water and soap can eliminate the cause of disease.			

PART IV: ASSESSMENT OF ATTITUDE

Instructions: What is your attitude on COVID-19? Based on the following statement below, answer the following according to your current attitude of COVID-19.

ATTITUDE			
	Agree	Neutral	Disagree
Nature of COVID-19			
1. It is my opinion that COVID-19 is a serious disease.			
2. It is my opinion that COVID-19 is a curable disease.			
3. It is my opinion that COVID-19 disease does not result in death in all cases.			
COVID-19 Prevention/Management			
4. It is my opinion that early detection of COVID-19 can improve treatment and outcome.			
5. It is my opinion that health education can help prevent COVID-19.			
6. It is my opinion that COVID-19 can be avoided by proper percussion.			
7. It is my opinion that if there is an available vaccine for the disease, it should be used.			
8. It is my opinion that the awareness of COVID-19 disease in society is sufficient.			

COVID-19 and Government Protocols			
9. It is my opinion that authorities should restrict travel to and from COVID-19 disease areas to prevent contamination.			
10. It is my opinion that authorities should quarantine COVID-19 patients in special hospitals.			
11. It is my opinion that in the event of an increase in the number of cases of COVID-19, authorities should be ready to close educational centers (kindergartens, schools, and universities).			
12. It is my opinion that authorities should be prepared to restrict access to religious sites, shrines, and mosques if the number of COVID-19 cases increases.			
13. It is my opinion that if the number of COVID-19 cases increases, authorities should be ready to lock down and quarantine the city.			

PART V: ASSESSMENT OF PRACTICES

Instructions: Which of the following practices do you perform to prevent contracting COVID-19 and how often do you perform them? Read the following statement and choose how often you perform these tasks.

PRACTICES					
	Alwas	Often	Sometimes	Rarely	Never
Personal Hygiene					
1. Regularly washing/sanitizing hands					
2. Covering nose/mouth when sneezing or coughing					
3. Avoid touching the nose, eyes, or mouth					
4. Disposing of used tissue or mask properly in the infectious waste trash bin (ex. Yellow trash can)					
5. Cleaning and disinfecting frequently touched objects or surfaces such as cellphones, doorknobs, etc.					
6. Wearing a face mask when leaving the house					
7. Wearing full-coverage face shields on top of face masks in all public spaces					

Restrictive Behavior					
8. Maintaining at least 1-meter physical distance from other people					
9. Avoiding or limiting time in crowded places					
10. Avoiding close contact with symptomatic people					
11. Avoiding inessential contacts with other people (ex. Eating out, leisure travels)					
12. Avoiding confined or enclosed spaces with poor ventilation					
13. When possible, opening of windows and doors to improve ventilation at home					
14. Following foot traffic (Entry/Exit / One-way lane)					
15. Following local quarantine protocol					
16. Complying with 7-days self-quarantine (for fully vaccinated) when you develop symptoms					
17. Taking polymerase chain reaction (PCR) swab test for COVID-19 when you develop symptoms					

18. Taking antigen test for COVID-19 when you develop symptoms					
19. Undergoing temperature checks and filling up contact tracing forms					
20. Using public transportation (jeep/tricycle/bus/train) when traveling					
21. Using private transportation when traveling					

Physical Therapists' Practices on Protecting Data Privacy and Security of Patients Under Telerehabilitation in National Capital Region, Philippines

¹Regor John Andrei L. Borromeo, ¹Juwan Chrisna D. Gorospe, ¹Nicole Ellaine G. Labarda, ¹John Edward T. Galvez, and ¹Glenda V. Sangalang

¹*School of Physical Therapy, Emilio Aguinaldo College, City of Dasmariñas, Cavite*

corresponding author: neglabarda.cvt@eac.edu.ph
contact number: 09272929633

KEYWORDS:

- Data Privacy Act
- Data Privacy and Security
- Health Information
- Physical Therapy
- Physiotherapy
- Telerehabilitation

Abstract. The study aimed to identify the practices of physical therapy (PT) on the data privacy and security concerns of patients under telerehabilitation in the National Capital Region (NCR), Philippines using qualitative, exploratory research design. Six (6) PTs practicing telerehabilitation in NCR, Philippines were gathered using purposive sampling based on the inclusion criteria of licensed expert or novice PT practicing telerehabilitation in NCR,

Philippines. In-depth interviews were conducted virtually and the data gathered from transcriptions and observations during the interviews were synthesized through coding, inter-coder agreement, categorizing, thematic analysis, audit trailing, and member checking.

The practices of PT in ensuring the health information of patients under telerehabilitation conform with the Data Privacy Act of 2012 starting with the data collection process: storing, transferring,

retrieving, promoting versatility in implementing accessibility in telerehabilitation while applying different technological safety measures. The PTs are bound by their ethical duty based on the Standards of PT practice and Code of Ethics. Also, the establishment of mutual trust and rapport results to therapeutic alliance as a protection for both the PT and the patient.

Based on the themes that arose in the results, these accentuate how the data privacy and security practices affect the outcomes of PT practice in the telerehabilitation. It showed that the Data Privacy Act of 2012, serves as a protection for both the healthcare professionals and the patients that can further promote the therapeutic alliance through collaborative engagement. Conclusively, PTs inherently protects the health information of the patients regardless of continuous advancement of technology.

Physical Therapists' Practices on Protecting Data Privacy and Security of Patients Under Telerehabilitation in National Capital Region, Philippines

INTRODUCTION

Physical therapy or physiotherapy (PT) is a healthcare service provided by a physical therapist or physiotherapist (PT) under rehabilitation program that aims to develop, maintain and mobilize movements and functional capacity to improve quality of life (World Physiotherapy, 2021). Rehabilitation programs including PT, continued to be in-demand despite health inequities. Thus, through utilization of advancements of technology and with the aim to minimize the gap in achieving health equity, rehabilitation adapted an emerging field, the telerehabilitation (Schmeler, Schein, McCue and Betz, 2020).

Telerehabilitation is a healthcare delivery system of rehabilitation services incorporated with assessment, prevention, treatment, education and counselling procedures through use of information and communication technologies according to Cramer (2016). It has been acquired and implemented as a new healthcare delivery system across the globe with the purpose of being able to provide accessibility and improve healthcare systems especially to remote areas (Seron, Oliveros, Fuentes-Aspe and Gutiérrez-Arias, 2020). Telerehabilitation provides a way to utilize PT services digitally. According to Lemaire, et.al (2001) the benefits that have been identified are: 1) reduced travel need between rural and specialized health centers in urban areas; 2) improved local community clinical support; 3) enhanced health specialization access; 4) healthcare delivery in local areas; 5) remote clinicians' indirect educational gain; 6) lesser feeling of remoteness among rural clinics; 7) enhanced stability of healthcare service regionally with high staff turnover; and 8) multimedia connectivity. The demand for different healthcare services is continuous despite the evidence of inequity in health,

such as inaccessibility to healthcare services, undercompensated healthcare workers, insufficient healthcare facilities and equipment and other factors (Seron, Oliveros, Fuentes-Aspe and Gutiérrez-Arias, 2020).

With all identified benefits of telerehabilitation as a healthcare delivery system method, providing healthcare access equitably is still difficult to address since telerehabilitation also contributes to health inequity due to different barriers. Telerehabilitation has technical requirements in order to pursue. The primary needs of conducting telerehabilitation is the need for high-speed and stable internet connection, video conferencing programs installed in gadgets, connected peripheral medical equipment such as cameras, stethoscopes and the like, privacy and security of the patients, and knowledge in operating technology (Burke, & Hall, 2015). Other barriers include loss of physical interaction between the healthcare provider and the patient which resulted as limitation especially among geriatrics, alleged negligence and malpractice among healthcare providers and financial needs especially for technological costs as stated by Burke & Hall (2015).

These barriers are evident most especially among developing countries like the Philippines. Consisting of 3 main islands namely: Luzon, Visayas and Mindanao with the total of 7,107 islands, Philippines is an archipelago located in Southeast Asia in the Pacific region (Borlaza, 2021). Despite being currently one of Asia's rapid growths in economy as stated by the World Bank (2018), the distribution of health resources remained inequitable (The Philippines Health System Review, 2018). Thus, different factors that contribute to health inequity in the country have been identified such as geographical landscape, organization of the Philippine administration, and continuous imbalance between the country's population and health resources (Jamora and Miyazaki, 2017).

In addition, with these existing health disparities, a global pandemic has occurred brought by the novel coronavirus 2019 known as COVID-19 which is proven to be more contagious and fatal than the severe acute respiratory syndrome, known as SARS coronavirus with the first case of COVID-19 in the Philippines reported on March 1, 2021 from a patient admitted in San Lazaro Hospital (Edrada, et.al, 2020). With the current state of the country's healthcare system, According to Leochico, et.al (2020),

telerehabilitation in the Philippines have been established but not fully implemented due to various barriers such as slow internet connection, legal concerns, and skepticism.

One of the main concerns in the emergence of telerehabilitation in the country is legal matters particularly data privacy and security. The concerns included are: the absence of framework policy regarding legal issues about access to health information by non- healthcare professionals, unrelated usage of health information, policies about the acquiring, storing and utilization of health information either gathered electronically and most of all, privacy concerns both on the healthcare professionals and patients or clients (Antonio, Patdu, and Marcelo, 2016).

The study aims to explore the PT's practice on protecting the data privacy and security of patients under telerehabilitation in the National Capital Region (NCR), Philippines.

METHODOLOGY

Study Design

The researchers used exploratory research design for it aims to explore and determine whether there is a problem that is not clearly identified on the practices of PT in protecting data privacy and security of the patients who are participating in telerehabilitation in the NCR, Philippines.

Participants of the Study

The researchers gathered the needed data from PT who are practicing telerehabilitation in the NCR, Philippines about their current practices on how they ensure the data privacy of the patients who undergo telerehabilitation. The researchers selected six (6) PT from NCR, Philippines who are presently active in telerehabilitation.

According to the Department of Environment and Natural Resources- Environmental Management Bureau (2021), NCR is the region with the highest population as stated by the 2015 national census. In addition, as stated by the World Confederation for Physical Therapy (2021), the number of practicing physiotherapists in the Philippines is currently 13, 773 or 1.29 per 10,000 population.

The Subjects

Only licensed PTs (novice and or expert PT), practices telerehabilitation in the NCR, Philippines. The participants in the study were from each field of practice: pediatrics, orthopedics, neurology, cardiac, sports and wellness.

Table 1
Characteristics of study participants

Participant (Pseudonym)	Years of Practice	Common Conditions Handled	Practice Setting
Artemis	7 years	Neurologic, Orthopedics, Pediatrics, Academe	Public hospital and academe
Brenda	4 years	Neurologic, Orthopedics, Pediatrics, Sports, Wellness	Independent practice and private clinic
Cathryn	3 years	Cardiac, Neurologic, Orthopedics, Pediatrics, Wellness, Geriatrics	Private hospital
Danielle	12 years	Neurologic, Orthopedics, Sports, Wellness, Education	Independent practitioner and private clinic
Ericka	8 to 9 years	Pediatrics	Private clinic
Ferb	3 years	Orthopedics, Workers' compensation	Independent practitioner

Table 1. contains the characteristics of the 6 participants gathered based on their role identification

Procedure

The formulation of interview guide questions was based from the background knowledge of the researchers based from the related literature studied and how they want to extract in-depth answers from the interview. Upon approval of IERB, The research instrument were validated by one (1) expert in clinical practice in telerehabilitation, one (1) expert cardiac PT and law, and one (1) expert in medicine, law and data privacy practitioner. After the revisions, the pilot study was implemented to one (1) PT intern and one (1) PT practicing telerehabilitation outside NCR, Philippines to check the set of questions for improvement such as

the flow of asking the questions, time involved to complete the interview. The actual interview process was conducted to the selected participants based on the inclusion criteria. The data gathering was done after distribution of informed consent and information sheet followed by the in-depth interview and observation through video call platform specifically the Google meet. Consequently, the transcription and proofreading of data was performed, then the researchers proceeded with coding and inter coder agreement followed by categorization and formulation of themes and member checking along with audit trailing all throughout, which was done to further increase the credibility of findings through triangulation of data.

Ethical Consideration

This study was approved by the Emilio Aguinaldo College-Cavite Institutional Ethics Review Boards (IERB). Informed consent consisting research title, proponents, name of institution, brief background about the study, type of research intervention, participation selection, voluntary participation, procedures a) format of research study and b) types of questions, benefits of the study, possible risks and discomfort, measures to address risks and discomfort, confidentiality, contact details, and certificate of consent were distributed to the participants.

RESULTS AND DISCUSSION

Theme 1: Conformance of telerehabilitation process to the Data Privacy Act

The adoption of telerehabilitation in the Philippines was considered an exigency to address the COVID-19 pandemic which served initially as an alternative to the typical health delivery setting for rehabilitation (Leochico, 2020). According to Lubkina, V. & Marzano, G. (2015)., Telerehabilitation was considered as a specialized field of telemedicine categorized into three (3) steps namely: 1) clinical assessment, 2) diagnosis, and 3) clinical therapy which aimed of improving the rehabilitation of socio-functional capabilities and inclusion of people into the society. Thus, the process of telerehabilitation was paralleled with the PT process of examination, evaluation, diagnosis, prognosis, intervention, and outcomes as stated by O’Sullivan (2014).

Relevantly, telerehabilitation utilized health information and information communication technology (ICT) to provide a patient-centered care. In accordance with that, this implicated integration of policies and guidelines for protection of the health information of patients under telerehabilitation. In particular, the R.A. 10173, commonly known as the Data Privacy Act of 2012 promulgated rules and regulations for data protection. Hence, based from the data gathered from the participants, the process of PTs in protecting the data privacy and security of the patients under telerehabilitation conformed to the Data Privacy Act of 2012.

Subtheme 1: Data collection process in telerehabilitation

According to the Sec. 18c, Rule IV. Data Privacy Principles of the Implementing Rules and Regulations of the Data Privacy Act of 2012, the Data Privacy Principle of Proportionality stated that:

“Sec. 18c. Proportionality. “The processing of information shall be adequate, relevant, suitable, necessary, and not excessive, in relation to a declared and specified purpose. Personal data shall be processed only if the purpose of the processing could not reasonably be fulfilled by other means.”

Based on the clause from the Data Privacy Act of 2012, the PTs conformed with the Principle of Proportionality as mentioned by the participants that only the essential health information was acquired from the patients under telerehabilitation.

“We start with making sure that we don’t get information that’s not necessary.” - Danielle

Consequently, the process of telerehabilitation started with the referral from a physician which was inclined with the Sec. 2, No. 1, Patient Acquisition of the Standards of Practice of the PPTA (2000) which stated that: “*The physical therapist receives patients upon the referral of a duly licensed and registered health professional.*” The participant mentioned of familiarization of the health information of the patient as well as intervention given by the physician as a preparation for the plan of care (POC) which was also inclined with the Sec. 2, No. 5, Intervention of the

Standards of Practice of the PPTA (2000) which stated that: “The physical therapist provides or supervises the implementation of the plan of care in collaboration with other members of the rehabilitation team.”

“Pag-gather namin ng information actually start. Kasi bago namin or bago makita nila doctor may referral yan from OPD or yung ambulatory care namin since we are under supervision of doctor, chini-check namin the files of the patient sa electronic via local network namin, makikita mo diyan, files ng patient, doctor’s orders, x-ray result, ano mga request niya, past medical history nya, ayun inaalaral syempre bago i-meet si patient, aaralin mo na bakit siya na-refer, na-check mo na yung exercises yung program na binigay ni doc, ayun.”- Artemis

*["We gather data usually from the start. Even before we see (the patient) there is a referral from OPD or the ambulatory care since we are under the supervision of a doctor, we check the files of the patient, doctor’s order, x-ray result, patient’s request, and their past medical history. Then, of course before we meet the patient, you study why the patient was referred, and you check the exercises program the doctor provided, that is it”
-Artemis]*

Consequently, as part of the assessment procedure of PTs, the participants mentioned that the data collection process starts through providing the patient a preliminary assessment through a screening or intake form. In which, according to the World Health Organization (2020) serves as an identification of individuals prioritized for early intervention who are at higher risk of a health condition. Alongside with the screening or intake forms, providing an informed consent was done by the PTs in correspondence with the clause Sec. 19, a.1. based from the Implementing Rules and Regulations of the Data Privacy Act of 2012, stating that: *“consent is required prior to the collection and processing of personal data, subject to exemptions provided by the Act and other applicable laws and regulations—”*

“First I send them the intake form and informed consent. The intake form is something they can fill up as a form of

preliminary assessment. It's a Google form that they fill up *tapos si* [then the] informed consent" -Brenda

In addition, another participant expounded the purpose of the provision of screening form was to determine if the condition of the potential patient was appropriate for telerehabilitation which coincided on the Sec. 2 no. 2 of the Standards of PT Practice of the PPTA (2000) that the inclusion of information provided to the patient were the possible risks associated with the intervention.

"The screening form, *nandoon yung* [contains] questions about the injury, about the case *tapos* [then] like a mini subjective part because I want to know if they are actually candidates for telerehab, because not all patients would be able to handle telerehabilitation" – *Danielle*

Moreover, a participant added providing information about the type of healthcare service delivery stated on the informed consent which was based from the Sec. 2 no. 2 of the Standards of PT Practice of the PPTA (2000) that the information provided to the patient includes the plan of intervention as well as the alternative modes of intervention—the telerehabilitation.

"I will give them an option, if they want to continue the telerehab or if they want the face to face. *Naka-state din doon* [it is also stated in the] (informed consent) *na telerehab siya, kung ano 'yung service na pr-provide, kung PT o OT* [that they are in telerehab and what services are provided, if PT or OT]"– *Ericka*

Also, the acquisition of informed consent involves the family or caregiver in gathering health information of the patient such as videos or pictures as stated by the participant in accordance with the Sec. 2, No. 2, Informed Consent of the Standards of Practice of the PPTA (2000) which stated that: "The physical therapist shall obtain informed consent from a competent client or his caregiver."

"...and then *may nakalagay na din don* [there is provided space], the parents can click the box or check the box if they are allowing us to take videos, to take pictures of the client or the session." -*Ericka*

Moreover, in correspondence to Rule IV. Data Privacy Principles, Sec. 18b known as the Data Privacy Principle of Legitimate purpose which states that: “Legitimate purpose. The processing of information shall be compatible with a declared and specified purpose which must not be contrary to law, morals, or public policy”, a participant shared a statement from their informed consent about the inclusion of rationale of data collection of the patients under telerehabilitation.

“It would help me assess better or it would help me plan your care better if you would be able to send me the following videos. This is to mimic our functional assessment kasi.” – Danielle

So, aside from the informed consent, another document was provided by the participants called the attestation to privacy. Based on the Sec. 47 no. 9 of the Rule XI. Registration and Compliance Requirements Implementing Rules and Regulations of the Data Privacy Act of 2012, it stated that: “attestation to all certifications attained that are related to information and communications processing” Thus, the participants mentioned that attestation to privacy was provided to ensure data protection.

“Meron kasi kaming dalawang form [We have two forms]. So, iba ‘yung [the] attestation to privacy [is different] and iba rin ‘yung [it is also dissimilar from] informed consent” - Danielle

The participant further stated that, the attestation to privacy consists of the rules for the PT and the patient such as none of them can record the session without mutual permission following the Rule VIII. Rights of Data Subjects, Sec. 34a known as the Right to be informed based from the Data Privacy Act of 2012 with a statement: “The data subject has a right to be informed whether personal data pertaining to him or her shall be, are being, or have been processed, including the existence of automated decision-making and profiling.”

“Data privacy... nandon ‘yung rules namin [contains our rules], so hindi kami pwedeng basta bastang mag record ng screen kung hindi alam ng isa’t isa... [so we cannot just record the screen without the approval of one another

(PT and the patient.)) Nobody from the household could actually record our session without informing me and I will not record our session also if I don't inform them." - Danielle

However, in acquisition of legal documents like informed consent of the patient in order to proceed with the telerehabilitation, a participant shared that in her workplace specifically that the usage of electronic signature or a scanned informed consent was not allowed. Thus, requiring the patient to provide a paper-based signature to proceed with the telerehabilitation sessions.

"Ang [the] problem lang usually is yun nga, kailangan nilang magpunta ng [they (patients) need to go] face to face to sign the informed consent. *Hindi kasi namin ni-recognize yung* [we do not recognize the] informed consent *na naka-scan at tyaka yung telerehab policy na naka-scan tas pipirma sila ng digital... kasi nagkaroon kami ng issue sa ganun* before [We do not recognize the scanned informed consent and under the telerehab policy, scanned then they will sign digitally.. because we had an issue before]" - Cathryn

Since telerehabilitation follows the PT process, a participant shared that recognition of cues and patterns of presentation of the patients under telerehabilitation were utilized by the PTs which referred to the clinical reasoning of expert PTs known as forward reasoning process according to O'Sullivan (2014).

"I just familiarize myself sa information *na pino-provide nila sa* [they provide in the] intake form but really I rather go into the session *na titingnan* [and look with an] open mind *kasi ayoko na hindi maging accurate or maganda yung pag assess ko maging* [because I do not want my assessment to be inaccurate or not good], if *meron akong parang naka set na na* idea [if I have ideas set] in my mind so *mas gusto ko yun* [I prefer it]. *Nag-respond ako* [I respond] based on how the patient presents within the session and kung ano yung mga ikukwento nila or

babanggitin nila [what information they will tell or mention]" -Brenda

Subtheme 2: Versatility of PT practice in implementing accessibility

After the processing of gathered health information of the patients under telerehabilitation, the participants stated the mode of communication through texts, calls, or any messaging applications to minimize various barriers like distance, time and costs in line with the preference of the patient to implement accessibility as stated by Leochico (2020).

"...*ite-text namin sila or tatawagan* [we will text or call (to the patients)] to confirm *kung pwede sila sa araw na iyon* [if they are available that day], *tatanungin mo kung ano yung* [you will ask them what are their] Facebook, Messenger *at kung pwede silang makausap sa* Messenger or *ano mas prefer nila*, Viber or Messenger... text and call *dapat ma-contact mo sila at may proof ka* [you will ask if you can contact them through Messenger, or ask what they prefer if Viber or Messenger...text and call. You should provide a proof that you contacted them". -Artemis

Another example of autonomous practice of PTs was assessing the technological knowledge of the patients under telerehabilitation to still ensure accessibility. Thus, supported by the study conducted by Antonio, C., Patdu, I., & Marcelo, A. (2016) that the intention of telehealth services was to provide accessibility.

"...some patients *hindi sila ma-techy* [are not techy] so that really depends between you as a PT and the patient's agreement." -Ferb

According to Lubkina, V. & Marzano, G. (2015)., one of the goals in conducting telerehabilitation was to optimize time and costs which results in accessibility of the patients. Thus, the participants shared that part of the communication process with the patients under telerehabilitation includes provision of instructions like preparation of necessary materials prior to the session to reduce interruptions in doing exercise programs.

“Before the session I ask them to prepare whatever materials I think I might need. So *halimbawa* [for example] if I need a stool or a chair, or *kailangan ng gamit* [we need equipment] for vital signs, or *kailangan ng mga* [there is need for] added weights not necessary dumbbells *no, kung meron sila* [if they have] bottle of water or canned goods at home. I have to prepare it before the session *kasi para di na sila mahirapan mag adjust* [so that it won't be difficult for them in adjusting] on and off the camera.”
– Brenda

According to Brennan, et al. (2010) modification to materials, techniques, equipment, and setting for PT sessions were required in conducting telerehabilitation. Relevantly, with the aforementioned statement above, since telerehabilitation was conducted at homes, equipment modifications were considered as stated by the participants like usage of water bottles instead of dumbbells for facilitation of strengthening exercises. Thus, resourcefulness of the PT was challenged since telerehabilitation was conducted at homes. Still, as stated by Brennan, et al. (2010)., healthcare professionals shall provide healthcare services in accordance with the standards of practice. Hence, in the Philippines, according to the Standards of Practice of the PPTA (2000)., the PTs are committed to quality and competent healthcare service provision.

“Home set up *to hindi mo naman ineexpect na may mga dumbbells sila, di mo ieexpect na may therabands sila* [This is a home set up. We do not expect that the patients have dumbbells or TheraBand]. I think *dito matetest yung* [this (telerhab) will test our] knowledge *natin ng* [in] CBR. community based rehab, ‘*yung pagiging resourceful mo* [your resourcefulness]” - Ferb

In addition, according to Hale-Gallardo, et al. (2020)., telecommunications equipment on both the PT and the patient was required. With that, the participants shared that PTs prepare equipment prior to telerehabilitation that will be utilized for demonstration purposes.

“*May mga machines, may mga gamit, may dumbbells, may mga accessories na pwedeng gamitin para ipakita sa pasyente.*” [There are machines, materials, dumbbells,

accessories that can be used to show to the patients]–
Artemis

In addition, according to Hale-Gallardo, et al. (2020), camera angle as well as physical space of the PT to commence telerehabilitation in demonstration of exercises were vital. Thus, the participants provided an example scenario to ensure effectiveness of exercises during the sessions through checking appropriate angles of both the PT and the patient—an example of a given case was the Carpal Tunnel Syndrome (CTS).

“Kunwari nahihirapan sila mag-follow ng [For example, they are having a difficulty following the] exercises. Well case to cases basis siya. Kung ito lang upper body ‘yung nakikita nila [they only need to see the upper body], okay. Kunwari ‘yung [For example,] CTS, Carpal Tunnel ‘yung case niya yan so pwede na itong mga gantong angle (upper half body) [the case of the patient is carpal tunnel, it is okay to provide this (upper body) type of angle]” - Ferb

Consequently, according to Sec. 2 no. 2 known as Informed Consent of the Standards of Practice of the PPTA (2000) it stated that: *“The physical therapist shall obtain informed consent from a competent client or his caregiver.”* In which, the participants emphasized the importance of gathering informed consent of the patients under telerehabilitation prior to treatment and as necessary. Thus, accorded with Rule IV. Data Privacy, Sec. 19 a1 of the Implementing Rules and Regulations of the Data Privacy Act of 2012 which stated that: *“consent is required prior to the collection and processing of personal data, subject to exemptions provided by the Act and other applicable laws and regulations—”*

“It depends on the patient’s case pero [but] usually at the beginning of my treatment talaga ‘yung [essentially the (I get the)] consent. Sometimes kapag nagpo-progress ka na, kukunin mo na ‘yung [if you are progressing, you will get their] additional consent nila... pero [but] most of the time sa [in] beginning talaga. [really]” - Ferb

Aside from that garnering consent from the patient, based from the study conducted by Brennan, et al. (2010), an adequate space of the healthcare provider was needed to ensure quality of the video call and reduce background noises. Thus, as stated by the participants, important aspects were deemed such as physical

security measures like social distancing and audio considerations.

“...*kasi etong* [because this] rehab room *namin may kasama kaming* [we are with the] doctors, ‘*yung area namin may* [our area has a] curtain to provide privacy *sa* [to the] patient *na tine-telerehab*. [under telerehab]. Good environment ...for telerehab... social distancing *parin* [still] and *i-tone down* ‘*yung* voice since *may nag -coconsult sa kabila* [The voices are toned down since consultations are also on going on the other (side of room)]” -Artemis

Conforming to Article IV, Sec. 3 of the Code of Ethics of the PPTA (2000)., “The PT shall be guided by concern for the physical, psychological, and socioeconomic welfare of individuals entrusted to his or her care.” Furthermore, the participants mentioned that after the telerehabilitation sessions, a provision of home exercises program was provided for increased effectiveness of the therapy.

“...after the first therapy telerehabilitation *dapat send-an mo siya ng* exercises *na ginawa namin, kasi* before *nag record kami ng* exercises so *pwede mo i-send sa kanya kasi may* simple exercises *doon*” [you should send the exercises that were performed. Actually before, we recorded exercises so we can send (the recorded video) the simple exercises there] - Artemis

Thus, a participant added that, even after settling the informed consent and the attestation to privacy, an agreement of protecting the data privacy of both the PT and the patient as well as to the family was emphasized. In which, accorded with Rule IV. Data Privacy Principles, Sec. 18a known as the Principle of Transparency that stated that: “Sec. 18a. Transparency. The data subject must be aware of the nature, purpose, and extent of the processing of his or her personal data, including the risks and safeguards involved, the identity of the personal information controller, his or her rights as a data subject, and how these can be exercised. Any information and communication relating to the processing of personal data should be easy to access and understand, using clear and plain language.”

“I need to send them the Data Privacy rules and regulation things specially because *mag-rerecord kami sa* [we will record in] Initial Evaluation and there are chances that the family might actually want to have it recorded, so I need it to ensure na data privacy wise from their end and on my end are clearly settle” – Danielle

Subtheme 3: Technological safety measures in telerehabilitation

Technology enhanced in the organization and accessibility services in telemedicine by guaranteeing the security particularly in dealing with the sensitive information and technologies that may be passed on shown online through mobile health systems and store-and-forward applications according to Hall and McGraw (2014). In accordance with the Data Privacy Act of 2012, PTs consider technological safety measures such as the devices used to ensure the health information of the patients under telerehabilitation as mentioned by the participants. Given the considerations in technological safety, participants mentioned practices in preventive measures such as:

“I have my tablet and then I have my phone and then I have my laptop as well *lahat sila* password-secured *naman* [all of them are password-secured]” -Brenda

Also, another participant shared that security codes like passwords and pins used in institutions were approved by the IT department. In compliance with the regulation in HIPAA (n.d.), the strict national privacy and security standards are foundation in safeguarding the organization from data breaches.

“Usually, we use password and pin. *Yung* [the] password *namin* [we use] is approved by the IT department, *kasi hindi siya pwedeng ano hindi* unique like *may* symbols, *may* caps, *may ano kailangan ma approve siya ng* IT department *bago namin siya magamit*. [because it cannot be unique like it has symbols, capslock, there has to be an approval from the IT department before we can use it]” –Cathryn

Moreover, another participant shared personal practice in regular changing of security codes like passwords were done to ensure protection of the health information of the patients.

“I always practice *yung* passwords *ko chine-change ko siya* [that my passwords are changed] regularly. When I say regular, *may schedule ako dyan ng* [I have a schedule for] change of passwords... *meron akong* [I have] Google calendar, *nakalagay* “o 6 months *na* password *mo* [that indicates your password is already at its sixth month], please change your password” So, *syempre* [of course] as a PT practicing telerehab, you have to make sure that your password is also protected. *Hindi lang dapat na may password ka okay na yon, dapat meron kang* [It is not just simply having a password, then it is okay. You should have] regular frequent change of password” -Ferb

Theme 2: Ethical duty of PTs based on the Standards of Practice

According to the study conducted by Askitopoulou, H. & Vgontzas, A. (2018), the European Court of Human Rights stated that, “it should be the duty of all doctors to exercise their profession according to the Hippocratic Oath and of all medical departments to cooperate to protect life.” In which, all of the participants of the study correspond to the Code of Ethics of the PPTA (2000) as the basis of practice of the profession. Based on the Article IV, Section 5 which stated the responsibilities to clients include the duty of confidentiality. Hence, the participants asserted in their practice the duty of confidentiality as part of the Code of Ethics with a statement:

“Well, for me *kasi lahat* [all are] confidential *siya*. *Kasi dapat ang* [because the] information, it’s between me and my client family... *pero* [but] at my end, *lahat yan ay* [all are] confidential” -Ericka

Therefore, the participants heed to the declaration of Article IV, Section 5 of the Code of Ethics of the PPTA (2000) which states that “The PT shall adhere to the rule of confidentiality on all matters pertaining to the patient, except in the interest of justice, public health, or public safety.”

In addition, with the duty of confidentiality, a participant mentioned the responsibility of the PTs towards discretion of health information of the patient which were supported by the pledge of PTs towards responsibility to promote and maintain the highest ethical standards individually and collectively according to the preamble of the Code of Ethics of the PPTA (2000).

“Kung ano mangyari sa patient mo [Whatever happens to your patient], it’s always your discretion, it’s always your responsibility” - Cathryn

Thus, the participants of the study attested that PTs were committed towards the duties of protecting the health information of the patients based on the Code of Ethics of the PPTA (2000) traditionally and with the adoption of modern healthcare delivery systems—telerehabilitation.

Subtheme 1: Ethics as a foundation of the professional practice of PT

The Code of Ethics of the Philippine Physical Therapy Association (2000) was administered as the ethical framework in implementing professional practice of PT in conducting telerehabilitation. Similarly, in the context of traditional provision of healthcare services to the patients, Hippocrates uttered an oath during the 4th century B.C. to pledge on respecting the confidentiality of the patients with these words:

“And about whatever I may see or hear in treatment, or even without treatment, in the life of human beings— things that should not ever be blurted out outside— I will remain silent, holding such things to be unutterable” (Askitopoulou & Vgontzas, 2018).

With ethics being a foundation of professional practice of PT, the participants of the study practiced legal and ethical considerations according to the Code of Ethics of the PPTA as stated on the Standards of Practice of the Philippine Physical Therapy Association (2000). Thus, a participant commented that:

*“Professionals technically, you should be ethical, so it is against our principles, to do something *na hindi ikabubuti ni* [that will not be good for the] patient such as giving their*

information to other people without their consent. *Binuild na tayo maging* [we are built to be] ethical people.” - Artemis

Furthermore, a participant expressed the core values of professional ethics namely: confidentiality, autonomy, and beneficence which are considered the essence of ethics of healthcare professionals intended for the welfare of the patients (Askitopoulou, H. & Vgontzas, A., 2018).

“It’s very important because it’s for confidentiality, autonomy, beneficence, *yung mga core values natin sa* [our core values in] PT *na kailangan natin sundin* [that we have to follow] ... *hindi naman pala kailangan sundin pero* [...not necessary to follow but] *it’s ethical for the patient.*”- Ericka

Subtheme 2: Therapeutic alliance of PT and patient in data protection

According to Babatunde, MacDermid, & MacIntyre (2017), Therapeutic alliance, also known as working alliance, refers to the concept of relationship between the healthcare worker and the patient which was considered as a key component to a patient-centered care. Since telerehabilitation involves data collection of the patients, the participants mentioned that establishing a therapeutic relationship is essential. Consequently, therapeutic relationship involves building rapport, trust, genuine interest, empathy, acceptance, self - awareness and positive regard that aims to achieve both the goal of the therapist and the patient as stated by McLeod, S. A. (2014) is part of a collaborative work relationship to maintain data protection, PTs implement confidentiality of health information together with the patients. Hence, constitutes to the accountability and liability of the therapists as the participants mentioned:

“*Kapag alam ni patient mo na nag-papractice ka ng mga ganito, medyo nakaka-build siya ng* [if your patient knows that you are practicing this, it will build] trust, *yung rapport talaga na... mas comfortable sila mag share ng information sayo, ayun. Kaya medyo dapat accountable eto babalik ako sa sinabi ko* [the rapport and they (patients) will be more comfortable to share the

information with you. Back to what I was saying] accountability and liability...” -Ferb

Accordingly, the Data Privacy Act of 2012 stated that it protects the basic rights of an individual called the right to privacy. The DPA allowed free movement of information towards a patient-centered care through a therapeutic alliance of the PT and the patients under telerehabilitation. Thus, another participant mentioned that privacy is both the right of the PT and the patient.

“Very important *na kailangan* [that] both parties *naiintindihan niyo na kailangan* [understand the importance (of privacy)], you treat all information confidential *diba? kasi* [right? Because] that information... *importante yun* [is important] [it is your] privacy *mo yun*, right to privacy” -Cathryn

An example of the outcome of therapeutic alliance as mentioned by the participant was that it builds mutual trust between the patient and the PT that leads to increase in confidence of the patient during telerehabilitation.

“Actually, it will ...*parang kasi* [it's like] part *siya ng* [of the] professional practice... So, *parang mas magiging* [like it will]... *magboost ng* [boost the] confidence *yung* [of the] parents.” -Ericka

Nevertheless, the participants shared some challenges encountered in telerehabilitation despite establishing therapeutic alliance with the patient. A participant shared:

“I had experienced *na* [that] somebody else will record the session. I'm not aware that it was being recorded and then suddenly it could be posted online. Of course, it was posted without any intention of harming *naman pero kasi* [also, but because] you know, it was posted on social media. The people there will not understand *naman* [that] the context of the exercise so it's always a problem for me. “*Alam mo masakit din yung tuhod ko eh, so yan din yung exercise ko*” [“you know my knee hurts so I'll do that exercise as well”] but we know as Physical Therapists, *pwedeng sa'yo, okay yan, pwedeng yung gumaya sayo dahil hindi naman yan same na case, makasama and baka sakin mag-repercuss* [“it could be okay for you (patient) but it's not the same case, it

might cause harm (to other people) and repercussion for me] - Danielle

In addition to the challenges aforementioned, a participant mentioned how building mutual trust with the patient served as protection by averting each other from challenges such as being posted online as a mockery.

“So, *si* patient *nag-send ng* video *sa’yo* [the patient sent you a video], and then *nag-reply ka* [you replied] with a demo video or whatever... again, build *yung* [the] mutual trust, protects both of you from the possibility of your information being distributed... What if it goes meme or whatever ‘*di ba?* [right?] Which is unprofessional”–Brenda

Moreover, establishing therapeutic alliance with the patients under telerehabilitation aimed to lessen humiliation towards healthcare professionals as said by the participants:

“You know... *mababawasan din yung... sana, yung* [to lessen, hopefully the] doctor shaming, nurse shaming, *mga ganun.* [things like that] “- Artemis

Theme 3: Application of Data Privacy Act in Data Management

The impacts of the adoption of telerehabilitation contributed to the enhancement of the healthcare delivery system through providing accessibility for all people which also identified various concerns about data management (Leochico, 2020). Since telerehabilitation utilized health information for patient care, the commitment to data privacy and security remained a concern among healthcare providers and the patients according to Antonio, C., Patdu, I., & Marcelo, A. (2016).

In which, the legal frameworks in implementing data privacy and security during telerehabilitation were administered particularly the R.A. 10173, commonly known as the Data Privacy Act of 2012. According to the Data Privacy Act of 2012, the implementation of the rules and regulations was provided to monitor, and ensure compliance in conformance to the international set of standard practices for data protection. So, the participants stated the application of the Data Privacy Act of 2012 in data management of the gathered data of the patients under

telerehabilitation on the following processes of storing, transferring and retrieving.

Subtheme 1: Storing of health information

Traditionally, paper-based health information of the patients was secured physically in cabinets or secure rooms in which only authorized persons were given access as stated by Antonio, C., Patdu, I., & Marcelo, A. (2016). However, brought by the emergence of telerehabilitation, health institutions adapt information and communications systems to process the health information of the patients.

An example includes computer system or devices which can record, transmit, or store electronic document according to the Sec. 3 of the National Privacy Commission (2016)

The participants shared the usage of personal devices like laptops and cloud storage like Google Drive.

“*Meron ako sa* [I have in my] laptop, *meron din akong* [I also have] cloud, Google drive, *mga ganyan* [stuff like that]. Most of the time, laptop... sometimes I do use Google drive just to back up, in case *na nag-loko yung* laptop. [in case the laptop has a problem]” -Ferb

Also, another participant mentioned that the method of storing health information of the patients under telerehabilitation depends wherein in health institutions such as hospitals, it utilized electronic medical records (EMR) and storing it on their own database according to Antonio, C., Patdu, I., & Marcelo, A. (2016). On the other hand, for private practitioners like mentioned above, PTs mentioned utilization of Google Drive.

Another participant added that it was common for institutions such as hospitals to have their own database and utilize Google drive for private patients.

“*Sa* (institution) *may sarili silang* [In the institution, they have their own] database, *pero don sa mga* private patients *ko* [but in my private patients] ... *naka-Google drive na sila* [they are in Google Drive]”-Danielle

However, a participant also mentioned one of the loopholes in the electronic health record wherein other healthcare

professionals in the department have access to the database with the health information of the patient in instances where the main PT was not available for the therapy session.

“*Sila Co-PT pwede nilang makita kasi* [my co-PT can see because], it’s just a database full of patient information. For example, *kunwari absent ako* [if I am absent], *kinukuha nila (co-PT) yung* [they (co-PT) will get the] contact number *ni* [of the] patient so *pwede nila* search *si* [so the can search the] patient... *makikita nila doon yung* [they will see there the] contact number and give it to me. So *isa to sa* [it is one] *mga* [of the] loophole *ng* [in] electronic health record”-Artemis

Subtheme 2: Transferring of health information

In order to provide patient-centered care, various factors were considered such as interpersonal skills of the physical therapist according to Babatunde, MacDermid, & MacIntyre (2017). Interprofessional Collaborative Practice (IPC) refers to the collaboration process of various healthcare workers to provide quality healthcare services towards the patients, families or caregivers and to the communities as stated by the World Health Organization (2010). So, collaboration with other healthcare professionals was inevitable which involved providing access to the health information of the patients under telerehabilitation through transferring of data (Antonio, C., Patdu, I., & Marcelo, A., 2016). Thus, the participants said:

“If there is a need for me to work with other professionals even before passing notes, we meet the patient as a team, online *din*. We do conference also *para* [so that we can set] ahead of time *maseset namin kung paano magiging sistema* [our system]. *Meron talaga akong ka trabaho don* [I have co-worker there] so, the folder is really accessible for us ...”

- Danielle

Hence, providing access to the health information of the patient to authorized professionals was supported by the Code of Ethics of the PPTA (2000) on Article IV, Sec. 5.4: “Information may be disclosed to appropriate authorities when it is necessary to protect the welfare of the individual or the community.” Thus,

another participant specified that transferring of health information of the patient through the interprofessional collaborative practice involves meeting with the attending physician of the patient.

“...*lahat ng notes mo* [all of your notes], *lahat ng progress sayo* and *assessment mo* [all of your progress and assessment], *i-cocompile mo siya* [you will compile it] into one file *na nasa* [in the] portal and *naka-printed para pag nag meeting kayo* [printed, so that if you will have a meeting] together with attending physician. We do conferences so that we can set the process of our system. I have workmates there so the folder is really accessible for us” - Cathryn

Moreover, a participant narrated an example of challenges encountered wherein there was a possibility for the healthcare worker to commit an error during transferring of health information of the patient via email which warrants accountability of PTs written under Rule XII. known as Rules on Accountability from National Privacy Commission (2016).

“...*pwedeng mangyari yung magkaroon ka ng error sa pagsend ng mga* [it is possible to encounter an error in sending the] information or transferring of information” - Ferb

Subtheme 3: Retrieving of health information

According to the National Privacy Commission (2016), to be able to gather health information of the patients, provision of informed consent was vital. Upon acquisition of consent, the time frame of keeping the data, known as data retention must be declared. The inclusions of data retention were the timeline, criteria for data purging and deletion. An example scenario of this was provided by the participants of the policy among health institutions wherein PTs retrieve the health information of the patient based on a timeframe by creating a new health record of the patient.

“..after 5 years for example *na-shred na yung paper niya or hindi mo na nakita, gagawan mo na lang ng bago.* [if the paper is already shredded or not seen, the therapist will make a new one]” -Artemis

Additionally, the retention of health information of the patients was based from the specified timeframe on the informed consent provided by the PT. Thus, a participant shared a personal practice of organizing the data of the patients into folders of those who are currently attending telerehab and inactive in PT sessions.

“...once *na na-discharge na yung* patient [the patient is discharged], then, that’s it. *Hindi ko na siya masyadong binabalikan, inii-store ko lang siya* [I rarely check it again and I store it] separately, *meron kasi akong folder sa laptop na kunwari* [I have a folder in my laptop. For example,] active vs. inactive patients.”- Ferb

Correspondingly, the participants shared that retrieval of the health information only occurs if the patient attended PT sessions again. Thus, it coincided with the principle of legitimate purpose which refers to the specified and declared purpose of processing health information so that the patient may continue the telerehab sessions which was stated under Section 18 of Rule IV. Data Privacy Principles of the National Privacy Commission (2016).

“Usually if I need to go back to the file this is because, *baka* [perhaps] the patient (might) return again” - Danielle

Theme 4: Data Privacy Act as protection for the healthcare professionals and patients

According to the Standards of Practice of the Philippine Physical Therapy Association (2000), the Physical Therapy profession is committed to quality and competent service provision. The Standards of PT Practice have ethical and legal considerations which adhere to the Code of Ethics of the PPTA and the current laws. First, for the ethical considerations, under the General Responsibilities on Article IV, Sec. 5 of the Code of Ethics of the PPTA, which states that,

“The PT shall adhere to the rule of confidentiality on all matters pertaining to the patient, except in the interest of justice, public health or public safety.”

Similarly, with the legal considerations, the R.A. 10173, commonly known as the Data Privacy Act of 2012 emphasized the implementation of global standards of practice consisting of rules

and regulations for the protection of data while allowing free flow of information. Also, it encouraged patients under telerehabilitation to provide accurate and complete health information for better provision of healthcare services (National Privacy Commission, 2016). As healthcare workers handling the given health information of the patients, in addition from the Code of Ethics of the PPTA (2000), as stated on Article IV, Sec. 5.1,

“Information relating to the PT-patient relationship is confidential and may not be communicated to a third party not involved in the patient care, without prior consent from the patient”

Another principle aforementioned about the PT-patient relationship was the occurrence of therapeutic alliance between the PT and the patient wherein it involves mutual trust and working together vital for a patient-centered care (Babatunde, F., MacDermid, J., & MacIntyre, N., 2017). Thus, increased the protection of data not only for the patients, but also for the PTs. The participants verified it by the given statement of:

“Protects both of you from the possibility of your information being distributed... It's really for the protection and the security of the client and the company” -Brenda

Based on the aforementioned statement of the participant, the Data Privacy Act of 2012 served as protection in preventing unauthorized distribution of information of the PT and the patient. In line with this, unauthorized distribution of information may be preventable through establishing mutual trust and transparency as stated by the Data Privacy Principle of Transparency. According to the Sec. 18a, Rule IV. Data Privacy Principles of the Implementing Rules and Regulations of the Data Privacy Act of 2012, the principle of transparency stated that:

“Sec. 18a. Transparency. The data subject must be aware of the nature, purpose, and extent of the processing of his or her personal data, including the risks and safeguards involved, the identity of the personal information controller, his or her rights as a data subject, and how these can be exercised. Any information and communication relating to the processing of personal data should be easy to access and understand, using clear and plain language.”

Thus, the Data Privacy Act of 2012 increased the protection of the healthcare professionals wherein according to a participant, it was regarded as the “safety blanket” of the Physical Therapy profession, other healthcare professionals and the PTs.

“Parang [It is like a] safety blanket mo sya [for you,] for the profession, for the professional, for the therapist “-Ericka

Moreover, the establishment of accountabilities of the PT and the patient in protecting data privacy and security during telerehabilitation accounted to the objectivity of improving healthcare delivery systems (Custodio, R., et al. 2020). Thus, coincided with the statement of the participants that:

“The importance of this is because if you protect your patient’s information, you could actually improve the protection across the industry. Ibig sabihin, if ikaw [meaning, if you] as a healthcare professional, you will respect the privacy of your patient, mag-aano siya eh [it will (lead to a)], trickledown effect.”-Danielle

In line with the statement aforementioned by the participants, the practices of PT in protecting health information entails improvement of protection across the health industry which was fortified by the study conducted by Antonio, C., Patdu, I., & Marcelo, A. (2016) stating that:

["Ultimately, it must be stressed that the quest for privacy is but one critical component in improving the overall quality of care available to Filipinos."]

Hence, the regulation of the PT practices in protecting the data privacy and security of the patients under telerehabilitation were directed by the current laws particularly the R.A. 10173, commonly known as the Data Privacy Act of 2012, and ethical principles based from the Code of Ethics as well as the establishment of therapeutic alliance of the PT and the patients. Conclusively, PTs inherently protects the health information of the patients regardless of continuous advancement of technologies which resulted in overall amelioration of healthcare services. Thus, the study corroborated the emphasis of

safeguarding the primary right of a person to privacy regardless of role-identities.

Conclusion

Physical therapists are honed to be professional, ethical and duty oriented individuals traditionally. With the emergence of telerehabilitation, PTs continued to display these characteristics to ensure the data privacy and security of patient health information.

The current state of the data privacy act implementation in the healthcare setting includes the conformance of the telerehabilitation process, and PTs practice of autonomy to provide accessibility.

As mentioned, the practice in integrating the data privacy and security of personal information are bound by the ethical principles and duty of the PTs based on the Standards of PT Practice.

The process of data management involves a range of tasks that the PTs, as healthcare professionals, are duty-bound to deliver in storing, transferring and retrieving health information. To ensure the data privacy and security in this process, safety measures in technology, access restrictions in the data, and environmental considerations are implemented. All the practices mentioned are connected to abidance to the ethical duty in conjunction with the Data Privacy Act of 2012.

In the bottomline of the themes that arose, these emphasized how the data privacy and security practices affect the outcomes of PT practice in the telerehabilitation. It showed that the Data Privacy Act of 2012, serves as a protection for both the healthcare professionals and the patients that can further promote therapeutic alliance through collaborative engagement . Conclusively, PTs inherently protects the health information of the patients regardless of continuous advancement of technologies which resulted in overall amelioration of healthcare services. Thus, the study corroborated the emphasis of safeguarding the primary right of a person to privacy regardless of role-identities.

Recommendations

Based on the results and conclusion, the researchers formed a recommendation to the 1) Physical therapy organizations 2) physical therapists practicing telerehabilitation 3) Other Healthcare professionals practicing telerehabilitation 4) patients, and 5) future researchers.

For PT organizations, 1) implications for the development of a standard guidelines that indicates the importance of data protection of patients under telerehabilitation 2) and adapt utilization of telerehabilitation even after the pandemic.

PT institutions, to provide a comprehensive education about the Data Privacy Act of 2012.

For PTs and other healthcare professionals, 1) we are encouraging them to partake in continuing professional development in protecting the data privacy and security of health information of the patients 2) To conduct training of senior PTs on how to be well-versed on the DPA.

Future researchers 1) to conduct a study about PT practices on protecting the data privacy and security of patients under telerehabilitation outside NCR, Philippines. 2) to focus on the practice of the patient and caregiver in protecting the data privacy and security of the healthcare workers.

References

- American Cancer Society. (2019). Informed consent: What is informed consent? <https://www.cancer.org/treatment/treatments-and-side-effects/planning-managing/informed-consent/what-is-informed-consent.html>
- American Physical Therapy Association. (n.d.). *Law Insider*. <https://www.lawinsider.com/dictionary/american-physical-therapy-association-apta>
- Antonio, C. A., Patdu, I. D., & Marcelo, A. B. (2016). Health information privacy in the Philippines: trends and challenges in policy and practice. *Acta Medica Philippina*, 50(4). <https://doi.org/10.47895/amp.v50i4.760>
- Askitopoulou, H., & Vgontzas, A. N. (2018). The relevance of the hippocratic oath to the ethical and moral values of contemporary medicine. part II: Interpretation of the hippocratic oath—today's perspective. *European Spine Journal*, 27(7), 1491–1500. <https://doi.org/10.1007/s00586-018-5615-z>
- Babatunde, F., MacDermid, J., & MacIntyre, N. (2017). Characteristics of therapeutic alliance in musculoskeletal physiotherapy and occupational therapy practice: A scoping review of the literature. *BMC Health Services Research*, 17(1). <https://doi.org/10.1186/s12913-017-2311-3>
- Bassan, S. (2020). Data privacy considerations for telehealth consumers amid covid-19. *Journal of Law and the Biosciences*, 7(1). <https://doi.org/10.1093/jlb/ljaa075>
- Brennan, D., Tindall, L., Theodoros, D., Brown, J., Campbell, M., Christiana, D., Smith, D., Cason, J., & Lee, A. (2010). A blueprint for telerehabilitation guidelines. *International Journal of Telerehabilitation*: 31–34. <https://doi.org/10.5195/ijt.2010.6063>
- Burke, B. L., Hall, R. W., Dehnel, P. J., Alexander, J. J., Bell, D. M., Bunik, M., Burke, B. L., & Kile, J. R. (2015).

- Telemedicine: Pediatric applications. *Pediatrics*, 136(1).
<https://doi.org/10.1542/peds.2015-1517>
- Compliance Group. (2022). *HIPAA password requirements*.
https://compliance-group.com/hipaa-passwordrequirements/?fbclid=IwAR0KnfEaB00a_J1QarUmRRA4B2tjloArPq0SZ1hvyCDvKj8z_OCcRNLQn0c
- Cramer, S. C. (2016). Interventions to improve recovery after stroke. *Stroke*.
<https://doi.org/10.1016/b978-0-323-29544-4.00059-1>
- Department of Health (2020). *DOH boosts telemedicine services for NCR; service to expand to other regions soon*.
<https://doh.gov.ph/doh-press-release/doh-boost-telemedicine-services-for-ncr-service-to-expand-to-other-regions-soon>
- Edrada, E. M., Lopez, E. B., Villarama, J. B., Salva Villarama, E. P., Dagoc, B. F., Smith, C., Sayo, A. R., Verona, J. A., Trifalgar-Arches, J., Lazaro, J., Balinas, E. G., Telan, E. F., Roy, L., Galon, M., Florida, C. H., Ukawa, T., Villanueva, A. M., Saito, N., Nepomuceno, J. R., Solante, R. M. (2020). First covid-19 infections in the Philippines: A case report. *Tropical Medicine and Health*, 48(1).
<https://doi.org/10.1186/s41182-020-00203-0>
- Fernald, D. H., Tsai, A. G., Vance, B., James, K. A., Barnard, J., Staton, E. W., Pace, W. D., & West, D. R. (2013). *Health assessments in primary care*.
https://www.ahrq.gov/sites/default/files/publications/files/health-assessments_0.pdf
- Freud, S. (1912). The dynamics of transference. *The Standard Edition of the Complete Psychological Works of Sigmund Freud, XII* (1911-1913):97-108.
- Gupta, M., & Sharman, R. (2009). *Handbook of research on social and organizational liabilities in information security*.
<https://doi.org/10.4018/978-1-60566-132-2>
- Hale, T. M., & Kvedar, J. C. (2014). *Privacy and security concerns in Telehealth*. *AMA Journal of Ethics*, 16(12), 981–985.

<https://doi.org/10.1001/virtualmentor.2014.16.12.jdsc1-1412>

- Hale-Gallardo, J. L., Kreider, C. M., Jia, H., Castaneda, G., Freytes, I. M., Cowper Ripley, D. C., Ahonle, Z. J., Findley, K., & Romero, S. (2020). Telerehabilitation for rural veterans: A qualitative assessment of barriers and facilitators to implementation. *Journal of Multidisciplinary Healthcare*, 13, 559–570. <https://doi.org/10.2147/jmdh.s247267>
- Hall, J. L., & McGraw, D. (2014). For telehealth to succeed, privacy and security risks must be identified and addressed. *Health Affairs*, 33(2), 216–221. <https://doi.org/10.1377/hlthaff.2013.0997>
- Ishibashi, K., Lewis, S., & Baker, T. (2016). Clinical ethics and professionalism. *Problem-Based Behavioral Science and Psychiatry*: 159–186. https://doi.org/10.1007/978-3-319-23669-8_9
- Leochico, C. F., Espiritu, A. I., Ignacio, S. D., & Mojica, J. A. (2020). Challenges to the emergence of telerehabilitation in a developing country: A systematic review. *Frontiers in Neurology*, 11. <https://doi.org/10.3389/fneur.2020.01007>
- Mcleod, S. (2014). Carl Rogers theory. <http://www.simplypsychology.org/carl-rogers.html>
- Meyer, J. (2000). Qualitative research in health care: Using qualitative methods in health related action research. *BMJ*, 320(7228), 178–181. <https://doi.org/10.1136/bmj.320.7228.178>
- Silva, M. E., Mendoza, M. A., & Estacio, L. R. (2020). Addressing primary care inequities in underserved areas of the Philippines: A Review. *Acta Medica Philippina*, 54(6). <https://doi.org/10.47895/amp.v54i6.2578>
- National Privacy Commission. (n.d.). *What is data privacy?*. <https://www.privacy.gov.ph/>

- O'Sullivan, S. B., & Schmitz, T. J. (2014). *Physical rehabilitation*. Philadelphia, PA: F.A. Davis.
- Patdu, I. D., & Tenorio, A. S. (2016). Establishing the legal framework of telehealth in the Philippines. *Acta Medica Philippina*, 50(4). <https://doi.org/10.47895/amp.v50i4.763>
- Philippine Physical Therapy Association, Inc. (2000). *Code of ethics of PPTA*. <https://www.philpta.org/code-of-ethics-of-ppta>
- Philippine Physical Therapy Association, Inc. (n.d.). *Standards of practice of PPTA*. From <https://www.philpta.org/standards-of-practice-of-ppta>
- Schmeler, M. R., Schein, R. M., McCue, M., & Betz, K. (2009). Telerehabilitation clinical and vocational applications for assistive technology: Research, opportunities, and challenges. *International Journal of Telerehabilitation*: 59–72. <https://doi.org/10.5195/ijt.2009.6014>
- Serón, P., Oliveros, M. J., Fuentes-Aspe, R., & Gutiérrez-Arias, R. (2020). Effectiveness of telerehabilitation in physical therapy: A protocol for an overview in a time when rapid responses are needed. *Medwave*, 20 (7), e7970. <https://doi.org/10.5867/medwave.2020.07.7970>
- Sood, S. P., Keeroo, S., Mbarika, V. W. A., Prakash, N., & Seth, A. (2009). Medical informatics. *Handbook of Research on Distributed Medical Informatics and E-Health*: 1–16. <https://doi.org/10.4018/978-1-60566-002-8.ch001>
- Umali, M. J. P. S., Custodio, R. G., Evangelista-Sanchez, A. M., Fernandez-Marcelo, P., & Pasco, P. (2014). *Defining the ethics of ehealth and telehealth in the philippines: reviews and discussion proceedings with ethics experts, telehealth implementers, and the national telehealth center*. https://www.researchgate.net/publication/264708172_Defining_the_Ethics_of_eHealth_and_Telehealth_in_the_Philippines_Reviews_and_Discussion_Proceedings_with_Ethic

s_Experts_Telehealth_Implementers_and_the_National_Telehealth_Center

- Vega-Barbas, M., Seoane, F., & Pau, I. (2019). Characterization of user- centered security in telehealth services. *Int. J. Environ. Res. Public Health* 16(5): 693. Retrieved from <https://doi.org/10.3390/ijerph16050693>
- Velasquez, M., Andre, C., Shanks, T., & Meyer, M. J. (2010). *What is ethics?* <https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/what-is-ethics/>
- Watzlaf, V. J. M., DeAlmeida, D. R., Zhou, L., & Hartman, L. M. (2015). Protocol for systematic review in privacy and security in Telehealth: Best practices for healthcare professionals. *International Journal of Telerehabilitation*: 15–22. <https://doi.org/10.5195/ijt.2015.6186>
- Watzlaf, V. J. M., Zhou, L., DeAlmeida, D. R., & Hartman, L. M. (2017). A systematic review of research studies examining telehealth privacy and security practices used by healthcare providers. *International Journal of Telerehabilitation* 9(2): 39–58. <https://doi.org/10.5195/ijt.2017.6231>
- Zaidan, B. B., Haiqi, A., Zaidan, A. A., Abdulnabi, M., Kiah, M. L. M., & Muzamel, H. (2015). A security framework for nationwide health information exchange based on Telehealth Strategy - *Journal of Medical Systems*. <https://doi.org/10.1007/s10916-015-0235-1>
- Zhou, L., Thieret, R., Watzlaf, V., DeAlmeida, D., & Parmanto, B. (2019). A telehealth privacy and Security Self-Assessment Questionnaire for telehealth providers: Development and validation. *International Journal of Telerehabilitation*, 11(1), 3–14. <https://doi.org/10.5195/ijt.2019.6276>

APPENDICES

APPENDIX A: INFORMED CONSENT FORM

Physical Therapists' Practices on Protecting Data Privacy and Security of Patients Under Telerehabilitation in the National Capital Region, Philippines

This informed consent form is written for Physical Therapists practicing telerehabilitation who we are inviting to participate in our research entitled “Physical Therapists Practices in Protecting Data Privacy and Security under Telerehabilitation in National Capital Region, Philippines”

Name of Principal Investigator:

Borromeo, Regor John Andrei L.

Galvez, John Edward T.

Gorospe, Juwan Chrishna D.

Labarda, Nicole Ellaine G.

Name of Institution:

Emilio Aguinaldo College – Cavite

School of Physical Therapy and Respiratory Therapy

This Informed Consent Form has two parts:

Informed Sheet (to share information about the study with you)

Certificate of Consent (for signatures if you choose to participate)

To: _____

Date: _____

Part I: Information Sheet

Introduction

The researchers are students from Emilio Aguinaldo College - Cavite, School of Physical Therapy and Respiratory Therapy. The research is being done as a requirement to the completion of an undergraduate degree in BS Physical Therapy. The study was reviewed by the ethical review board of the EAC-Cavite.

The consent form is given to physical therapists in any field who are practicing telerehabilitation in NCR, Philippines who will decide to participate in this study entitled "Physical Therapists' Practices on Protecting Data Privacy and Security of Patients Under Telerehabilitation in the National Capital Region, Philippines"

Participation in the study will be fully voluntary and the information that they provided will be kept confidential as stated in the end part of this consent form. If they have other questions regarding the study, they are free to contact the researchers with the given information at the end of this form.

About the Study

Data privacy and security of patients are relevant aspects to address among healthcare providers particularly Physical Therapists through Telerehabilitation. The study will focus on the practice of PTs on protecting the concerns of patients regarding their data privacy and security. This study aims to discuss the current state of healthcare setting in PT practice about data privacy act, to identify the PT practices about the data privacy and security of the patient and to explore how the data privacy and security practices affect the outcomes of PT practice in the telerehabilitation in NCR, Philippines. The researchers will select PT professionals in different fields of rehabilitation that practices telerehabilitation in NCR, Philippines whether PT clinics, hospitals or private practices and has a background about data privacy act if they underwent training, seminar and orientation about data privacy or part of curriculum in their academic years. The

researchers will conduct a virtual interview using video calling platforms such as Google meet and zoom to gather the data of the participants. The data of the participants will be kept and secured and only the researchers have access to it. The participants will receive a certificate as a token of appreciation for participating in the study.

Types of Research Intervention

This research will involve your participation in an interview that will take up approximately one hour.

Participation Selection

You are invited to take part in this research because we believe that your experiences in practicing telerehabilitation as a physical therapist can provide information that is needed in our study and enlighten us in the current practices of PT in telerehabilitation.

Voluntary Participation

Your participation in the research study is voluntary. If you wish to, you may withdraw from the study anytime.

Procedures

A. Format of research study

We are asking you to help us learn more about PT practices in protecting data privacy and security for patients who are under telerehabilitation. We are inviting you to take part in this research study. If you agree to take part in this study, you will be asked questions about your practices in protecting data privacy and security of patients under telerehabilitation.

B. Type of questions

Participate in an interview with Regor John Andrei L. Borromeo, one of the researchers.

During the interview, the interviewer and one observer will connect with you via Google meet. If you do not want to answer any of the

questions during the interview, you may say so and the interviewer will move on to another set of questions. Other researchers will be at the Google meet but they will not speak if you do not want to. The recorded information is confidential, and no one else except the researchers (Regor John Andre L. Borromeo, John Edward T. Galvez, Juwan Chrisna D. Gorospe, & Nicole Ellaine G. Labarda) and the research adviser will have access to the information documented during the interview. The entire interview will be recorded via the record button in Google meet, your consent will be asked again before proceeding to the interview.

Benefits of the Study

The results of the study may give recommendations and help improve the physical therapists practice on protecting the data privacy and security of the patients.

The participants will not get direct benefit from the study when they agree to participate, but they will be given a certificate as a token of appreciation for participating in the study.

Possible Risks and Discomforts

The expected risks and discomfort that the participants may encounter while participating in the study is that they may feel uncomfortable answering questions through an interview because the form of data gathering that will be done by the researchers is through this process.

Measures to Address the Risks and Discomforts

The participants will be observed by the researchers with their nonverbal cues such as body language and facial expressions for any sign of discomfort. To address possible risk and discomfort the participants will be assured that the Data gathered will be treated with confidentiality and their identity will remain anonymous. However, if the participants still feel uncomfortable, they have autonomy to withdraw from the study.

Confidentiality

The data will be kept confidential and only the researchers will know about their identity. The interview will be recorded and placed to a form cloud (Google drive) but rest assured that only the researchers and the research adviser will have access to view it and the data collected will only be used for this research and will be deleted after five (5) years.

Who to contact?

If you have any clarifications or any questions regarding the study, feel free to ask the person's contact information below:

Ms. Nicole Ellaine G. Labarda
BS Physical Therapy Student
School of Physical Therapy and Respiratory Therapy
Emilio Aguinaldo College Cavite
Dasmarinas, Cavite
Telephone number: (046) 438-9590
Mobile number: 09272929633
Email address: neglabarda.cvt@eac.edu.ph

Part II: Certificate of Consent

I have received, read, and understand the information above and it has been explained to me. I had the chance to ask questions about the study and it was answered to my satisfaction. I consent voluntarily to be a participant in the study and understand that I have the right to withdraw from the study anytime.

Printed name of participant: _____

Field of practice of participant: _____

Years in practice of participant: _____

Location of workplace of participant: _____

Signature of participant: _____

Date: _____

Day / Month / Year

Statement by the researchers taking consent.

I have accurately explained the information sheet to the possible participants, and to the full extent of my ability made sure that the participant was enlightened and understands that the following will be done:

1. Interview about their practices on protecting data privacy and security of patients under telerehabilitation
2. The data will be protected and only the researchers will have access to it

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participants have been answered to the extent of by ability and correctly. I confirm that the participant has not been forced into giving consent, and the consent has been given freely and voluntarily.

A copy of this ICF has been provided to the participant.

Name of Researchers:


**BORROMEO, REGOR JOHN ANDREI L.
EDWARD T.**


GALVEZ, JOHN


**GOROSPE, JUAN CHRISHNA D.
ELLAINE G.**


LABARDA, NICOLE

Date: _____

Day / Month / Year

APPENDIX B: INITIAL INFORMATION SHEET AND SEMI-STRUCTURED INTERVIEW GUIDE

Feedback and recommendation from first interview question validator, a clinical PT and expert in law.

Appendix A: Information sheet

Physical Therapists' Practices on Ensuring Data Privacy and Security of Patients under Telerehabilitation in the National Capital Region, Philippines

Good day! We are BS Physical Therapy students in Emilio Aguinaldo College — Cavite. As part of our undergraduate requirements, we are conducting a study entitled "Physical Therapists' Practice in Ensuring Data Privacy and Security of Patients Under Telerehabilitation in the NCR, Philippines"

We are requesting for your time to answer this questionnaire. Your participation and response will be a great help in our study and will be treated with confidentiality. Thank you!

Your responses are protected by RA 10173, Data Privacy Act of 2012. The data collected will be treated with confidentiality.

Proceed

PERSONAL INFORMATION:

Name: _____

Age: _____

Years in practice: _____

Novice PT (Less than 3 years)

Expert PT (More than 5 years)

When did you get your license?

Field of practice:

CARDIAC

NEUROLOGIC

ORTHOPAEDICS

PEDIATRICS

SPORTS

WELLNESS

OTHERS, PLEASE SPECIFY BELOW:

Workplace location: _____



I think this is sufficient, no need to ask whether they're Novice or Experts. You can categorize them during your own analysis. Also, you have a space between, how do you categorize those with 3-5 years of practice?

TEREHABILITATION EXPERIENCE

What are your insights about telerhabilitation? Cite some examples

How did you know about telerhabilitation?

How long have you been practicing telerhabilitation?

With the number of (months/years) you have stated, in comparison with your practice prior to the pandemic, can you expound its differences?

INTERVIEW ABOUT PRACTICES AS A PT

Are you willing to be one of our research participants?

YES

NO

Refer to question above: If yes, please provide contact details in the answer box. If no, please state your reason below.



I think you need to ask more specific questions. Insights are too vague, or perhaps add a follow up question that might help you understand what their feelings/thoughts about it before they started doing it. Were they for it? Against it? Never considered it at all? Why? What advantage/ disadvantage did they see then? How about now? Why do they think this is?



If this is your consent form, may I recommend adding a data privacy provision? Something like this...

Pursuant to Republic Act No. 10173 or the Data Privacy Act of 2012, which seeks to protect an individual's personal data and communication systems in the government and private sector, we kindly seek your consent in sharing your personal information with us.

Rest assured that all information provided herein will remain confidential, data used for the study will be anonymized.



Are you really planning to ask that here? Shouldn't you ask beforehand? Then make them sign an informed consent form? Are you planning to report the reasons for them declining to do the interview? If so, might be a good idea to limit the possible answers, such as: [] Don't practice Telerhab, [] Not interested, [] Don't have time, [] Privacy issues, [] Others, why? _____

Appendix B: Interview Questions

Dear participants,

This contains the questions that will be asked to you during the interview that are meant to describe your practices on ensuring data privacy and security concerns of patients under telerehabilitation as a PT. Your honest answers, sharing of experiences, and knowledge in this field will be a huge help in the outcome of the research. Thank you.

Instruction: On the succeeding pages, you will see the interview questions prepared by the researchers. Please answer the questions honestly according to your experiences as a PT during the scheduled interview.

Interview Questions:

1. How do you conduct your PT sessions during telerehabilitation? (Ask for usual routine of practice)
 - a. How do you set up the environment?
 - b. How do you prepare yourself in providing healthcare services through telerehabilitation?
2. How do you gather pertinent information, especially confidential ones from your patients during telerehabilitation? Discuss the process.
 - a. How do you make use of the gathered information from your patients?
3. How well do you know about existing laws related to the practice of ensuring data privacy and security of patients' information, particularly the R.A. 10173 or the Data Privacy Act?
 - a. How did you acquire your knowledge about this law? Is it part of your curriculum, did you undergo a seminar, attended a seminar or webinar or policy of your workplace?
 - b. In the sections of R.A 10173, what are the areas you are most familiar with?
4. Regarding your practice, how do you handle the patients' information during telerehabilitation?
 - a. How do you store the health information of the patients who are under telerehabilitation?
 - b. How do you transfer the health information of the patients who are under telerehabilitation?



Some questions which I think might prove helpful to add:

- How do you conduct your Telerehab? (online/ What platform do you use? Telephone?)
- Is your program fully online/ by telephone? Or do you require occasional face-to-face sessions?
- If fully online/by telephone, how do you request/send documents or information to each other? How do you ensure the data's privacy and security?
- May we see a copy of your informed consent? If not, can you describe its contents?
- Where do you store the data you collect? How do you ensure security and limit access? Do you have a policy for when data is inadvertently leaked or stolen?
- Do you have an opt-out provision?
- How long do you plan to keep the data? Do you have a policy for its future destruction?

- c. How do you retrieve the health information of the patients who are under telerehabilitation?
5. How do you ensure the data privacy and security of the patients' information during telerehabilitation? Cite examples and narrate the scenario.
6. What do you think is the importance of ensuring data privacy and security in our practice?
 - a. What do you think are the advantages of implementing this law during telerehabilitation particularly in patients' information?
 - b. What are the challenges you have encountered in ensuring the data privacy and security of the data of your patients during telerehabilitation?
 - i. How do you resolve these challenges? Please expound.
 - ii. What are the strategies you performed to address the technical difficulties you have encountered during telerehabilitation?
 - c. How did you manage the concerns of the patients in data privacy and securing their data?
7. How do you think integrating data privacy and security of the patients' information will affect PT practice?
 - a. How about to the patients, PT institutions and other healthcare workers particularly PTs?

Feedback and recommendations from the second information sheet and interview guide validator, an expert clinical PT with years of experience, was able to perform face to face and telerehabilitation patient care, handled diverse cases such as orthopedic, geriatric, pediatric and neurological cases. Currently practices telerehabilitation in the NCR, Philippines.

Feedback Section:

TELEREHABILITATION EXPERIENCE:

- You can include advantages and disadvantage on your question regarding telerehab
- Platform/Application used for telerehab that is advisable for the data privacy act

INTERVIEW ABOUT PRACTICES AS A PT:

- Criteria on how to validate if the patient condition/status is for telerehab session or for face to face • Scope and limitation of the telerehab session
- How to you document specific SOAP information of the patient
- Is there a consent form provided? Verbal and written consent by the patient?
- How did you make the consent form? Do you copy or make a personal consent form based on the data privacy act for the patient?
- Limitation of patients information to different allied health professionals

Comments and recommendations from the third and final information sheet and interview guide validator, a medical doctor, educator, juris doctor and has an expertise in the field of data privacy.

October 3, 2021

Dear

Thank you for the inviting me to validate your questionnaire.

I have reviewed the questions in relation to your research objectives. My comments are in the succeeding paragraphs. I hope that you will find the feedback useful as you move forward in your study.

Best Regards,

Preliminary Comment

"Your responses are protected by RA 10173, Data Privacy Act of 2012. The data collected will be treated with confidentiality."

This statement is unclear to me. What does it mean that responses are protected by R.A. No. 10173? If this serves as notice, this is insufficient. You may want to add a statements to the effect that if they have concerns on data privacy or the processing of their personal information, they may contact a particular person. You may also give a link or a site for a full privacy notice.

Comment on Interview Questions

Question 1

What are the expected statements of the researchers? The questions may be too broad. How do you set up the environment – what does this mean? Specific questions may be helpful. For instance, where do you conduct telerehabilitation? (Because you want to know whether they are thinking of physical privacy, minimize interruptions) What equipment do you use? (To look into whether they have appropriate security measures) What communication is provided to patients prior and during telerehabilitation session? (Are they being transparent?) I recommend that researchers have an idea of what answers they are expecting in relation to the objectives so that the questions can elicit specific responses.

Question 2

What do you mean by gathering information? Does this refer to whether they record the session, whether they create medical records? If the intention is to distinguish how they collect confidential and non-confidential information - the question is vague. For instance--What is confidential? Should you ask what information they consider confidential? The questions are also lumped together and distinction may not be possible. If the intent is just to ask how they collect information, then the "especially clause" may not have added value.

Question 3

I think the question is difficult to answer. The participants may have difficulty describing how well they know the law. You may either provide a scale by which they can give an answer (Understand the law and applying it, Heard of the law, Or Strongly Agree, Agree, ... replies to a statement). Another option would be to ask directly about specifics related to the law (Do you know the National Privacy Commission? Did you or your institution register at NPC? Are you aware of your rights as data subjects?). Questions in letter "a" will be helpful.

Question 4

"How" is too broad. Your preliminary/pilot interviews might reveal challenges in answering these questions but I recommend modifying it already to be more directed. For instance, Do you make paper-based medical records or are your files electronic? Where do you store them? Who do you share these records with? How do you share or transfer the records?

Question 5, 6, 7

In general, the questions are reasonable. I anticipate though that to a person who may not have a full understanding of data privacy, the questions may be difficult to understand. For instance data privacy and security are used together often, giving the impression that they mean the same thing. There is mention of "technical difficulties" but no question specific to other potential challenges.

Recommendations:

I recommend reviewing the questions. Mapping them out in relation to objectives of the research may be helpful in revising the questions, in order to ensure that they will elicit responses relevant to the issues being studied.

Pretesting the interview questions will of course be useful but the researchers may save time by improving on these questions even before the pretest.

APPENDIX C: INFORMATION SHEET

Physical Therapists' Practices on Ensuring Data Privacy and Security of Patients under Telerehabilitation in the National Capital Region, Philippines

Good day! We are BS Physical Therapy students in Emilio Aguinaldo College – Cavite. As part of our undergraduate requirements, we are conducting a study entitled "Physical Therapists' Practice in Ensuring Data Privacy and Security of Patients Under Telerehabilitation in the NCR, Philippines"

We are requesting for your time to answer this questionnaire. Your participation and response will be a great help in our study and will be treated with confidentiality. Thank you!

Email *

Your email _____

Name: *

Your answer _____

Sex *

- Male
 Female
 Prefer not to say

Age: *

Your answer _____

Years in PT Practice: *

Your answer _____

Field of Practice: *

- Cardiac
- Neurologic
- Orthopaedics
- Pediatrics
- Sports
- Wellness
- Others, please specify in the answer box below:
- Other: _____

Workplace Location *

Your answer _____

If associated in any institution, what institution are you working with? *

Your answer _____

Do you practice telerehabilitation? *

- Yes
- No

APPENDIX D: FINAL SEMI-STRUCTURED INTERVIEW GUIDE QUESTIONS

Dear participants,

This contains the questions that will be asked to you during the interview that are meant to describe your practices on protecting data privacy and security concerns of patients under telerehabilitation as a PT. Your honest answers, sharing of experiences, and knowledge in this field will be a huge help in the outcome of the research. Thank you.

Instruction: On the succeeding pages, you will see the interview questions prepared by the researchers. Please answer the questions honestly according to your experiences as a PT during the scheduled interview.

Interview Questions:

1. How do you conduct your PT sessions during telerehabilitation? (Ask for usual routine of practice)
 - How do you prepare yourself in providing healthcare services through telerehabilitation?
 - How do you set up the environment?
 - Where do you conduct your telerehabilitation?
 - What factors do you consider in setting up your environment? (Do you consider physical factors like tidiness, well-lit & privacy to minimize interruptions?)
 - What platform do you use? (Specify the applications or website you use)
 - What are the reasons for using the platform? (Was it recommended by your institution)
 - Do you have other means of communication such as text messaging or call?
 - Do you use the SAME platform for asynchronous & synchronous sessions; OR
 - Do you use DIFFERENT platforms for asynchronous & synchronous sessions? Specify.
 - What device do you use? Does your device have appropriate security measures? What are those? Specify. (Password, pin, fingerprint, etc.)

- What instructions are provided to patients prior and during telerehabilitation sessions?

2. How do you gather pertinent information? Discuss the process.

- Is there a consent form provided? Verbal and/or written consent by the patient?
- How did you make the consent form? Is it based on the Data Privacy Act?
- Can you describe the contents of your informed consent?
- Do the patients have an option to withdraw from the therapy?
- If you allow, can you send a copy to us after the interview?
- Regarding the verbal or written consent, when do you usually request for their permission? How often? Is there a specific situation such as performing assessment, etc.
- What types of information do you consider confidential & not-confidential? How do you differentiate these types of information? What are your considerations?
- How do you perform documentation? Do you make paper-based medical records or are your files electronic? follow up by when do you usually make a documentation?
- If paper-based, do you take a picture of the document then transfer it electronically? OR not?
- What email address do you use? Institutional/personal?

3. Regarding your practice, how do you make use of the gathered information from your patients?

- How do you store the health information of the patients who are under telerehabilitation?
- Where do you store the data, you collect? Do you store it in flash drive/usb or Google drive? Do you use personal or institutional mail?
- Who do you share these records with?
- How do you ensure security and limit access?

- Do you transfer the health information of the patient you handle?
- How do you transfer the health information of the patients who are under telerehabilitation? Do you use external devices, flash drives or via email, other applications?
- Do you have a policy for its future destruction? What are the method/s for destruction?
- Do you retrieve data of the patient after its destruction? What is the purpose of retrieving the data?
- How do you retrieve the health information of the patients who are under telerehabilitation?
- How long are the health information of the patients retained?

4. Do you know about existing laws related to the practice of ensuring data privacy and security of patients' information, particularly the R.A. 10173 or the Data Privacy Act?

- Can you describe your knowledge about the Data Privacy Act or R.A. 10173 especially the areas of the law you are most familiar with?
- How did you acquire your knowledge about this law?
- Is it part of your curriculum? (Did you have a brief introduction about the topic/ in-depth lecture?)
- Did you undergo a seminar, attended a seminar or webinar or policy of your workplace?
- How do you ensure the data privacy and security of the patients' information during telerehabilitation? Cite examples and narrate the scenario. *(If the question is already answered, the interviewer will ask to clarify, "aside from", "as mentioned earlier".)*

5. What do you think is the importance of ensuring data privacy and security in our practice?

- What do you think are the advantages of implementing this law during telerehabilitation particularly in patients' information?
- What are the challenges you have encountered in ensuring the data privacy and security of the data of your patients during telerehabilitation?

- How do you resolve these challenges? Expound.

6. How do you think integrating data privacy and security of the patients' information will affect PT practice? How about to the patients, PT institutions and other healthcare workers particularly PTs?

APPENDIX E: TABLE OF CHARACTERISTICS OF PARTICIPANTS

*Pseudonym assigned to participants**

PILOT STUDY				
Participants (Pseudonym)	Years of practice	Duration of Telerehabilitation practice	Common Condition Handled	Practice setting
Pilot participant 1	<1	~3 months	PT Intern	PT Intern
Pilot participant 2	5 years	1 year	<ul style="list-style-type: none"> • Cardiac • Neurologic • Orthopedics • Pediatrics • Neuroscoliosis • Metabolic 	Private Clinic

ACTUAL IMPLEMENTATION

Participants (Pseudonym)	Years of practice	Duration of Telerehabilitation practice	Common Condition Handled	Practice setting
Participant 1 (Artemis)	7 years	1 year	<ul style="list-style-type: none"> • Neurologic • Orthopedics • Pediatrics 	Public Hospital
Participant 2 (Brenda)	4 years	1 year	<ul style="list-style-type: none"> • Neurologic • Orthopedics • Pediatrics • Sports • Wellness 	Independent practice and Private clinic
Participants 3 (Cathryn)	3 years	1 year and 6 months	<ul style="list-style-type: none"> • Cardiac • Neurologic • Orthopedics • Pediatrics • Wellness • Geriatrics 	Private Hospital
Participant 4 (Danielle)	12 years	1 year	<ul style="list-style-type: none"> • Neurologic • Orthopedics • Sports • Wellness • Education 	Independent practitioner and Private clinic
Participant 5 (Ericka)	8-9 years	2 years	<ul style="list-style-type: none"> • Pediatrics 	Private Clinic
Participant 6 (Ferb)	3 years	Less than 1 year	<ul style="list-style-type: none"> • Orthopedics • Workers' compensation 	Independent practitioner

Real-time Object Recognition-based School Uniform Monitoring System using the You Only Look Once Algorithm

Authors: ¹Alejandro, John Michael C., ¹Murillo, Mary Amvihanabelle M., ¹Oliveros, John Alfren S.

¹*School of Engineering and Technology, Emilio Aguinaldo College-Cavite, Dasmariñas City, Cavite*

corresponding author: Jmcalejandro.cvt@eac.edu.ph

contact number: 09167314114

KEYWORDS:

- Artificial Intelligence
- Computer Vision
- Darknet Framework
- mean Average Precision
- Smart System

Abstract. As the Coronavirus disease (COVID-19) pandemic springs up, smart systems and application development became popular. The purpose of the design project was to develop a Real-time Object Recognition-based School Uniform Monitoring System using the You Only Look Once Algorithm, Student Violation Monitoring Dashboard, and evaluate the prototype's recognition accuracy or its mean Average Precision (mAP).

In the part of dataset training from Darknet Framework, 93.63% mAP value was the output in the 8000th iteration and it is the highest achieved value. As the researchers used the paired sample t-test and descriptive statistics, this study analyzed that there was a huge positive impact in promoting the school uniform policy. This concludes that the researchers developed successfully the School Uniform Monitoring System connected to Violation Monitoring Dashboard using Java programming language and MySQLCommunity Workbench for the database of the prototype.

Real-time Object Recognition-based School Uniform Monitoring System using the You Only Look Once Algorithm

INTRODUCTION

The Real-time Object Recognition-based School Uniform Monitoring System using the You Only Look Once Algorithm allows the recording of violations and identify students who complies with the school uniform policy. The system components were divided into two parts; the server and client computer. The software development part was also be dissected into two parts; the Uniform Monitoring System and the Violation Monitoring Dashboard. The proponents utilized Machine Learning and Convolutional Neural Networks capabilities of the algorithm. Integration of hardware components such as computers, camera, sensors, microcontrollers and barcode scanner in order to develop the design project that aims to provide a better throughput and consistent monitoring as well as reliable violation data handling.

Various studies were conducted on the You Only Look Once Algorithm and Student Management System-related in support on this study. The foundation of the object recognition for the proposed system will be the You Only Look Once v3 (YOLO v3) algorithm that will utilize Convolutional Neural Network (CNN) [5-7]. As stated in the article by Redmon and Farhadi (2016) entitled "YOLO9000: Better, Faster, Stronger", is considered as state-of-the-art object recognition that provides an accurate, fast and wide variety of object recognition with the use of neural networks and detection frameworks. It was also proven that it can performs on par with other object recognition frameworks as it has a 78.6% mean Average Precision [8]. In the study entitled "Convolutional Neural Network for Person and Car Detection Using YOLO Framework", the system is built on a modified YOLO architecture

that uses Convolutional Neural Network to operate in real time, while it can perform with a mean Average Precision of 59.2% [9]. While the Object Detection Based on YOLO Network by Liu et al. (2018) stated that the use of YOLO network with degenerative model training applied in the degraded images provides promising results of 87.75 mean Average Precision [10]. The increase of mean Average Precision (mAP) improves as more training images are added, this was supported by the paper of Luis Fung-Lung et. al. (2019) entitled "An Image Acquisition Method for Face Recognition and Implementation of an Automatic Attendance System for Events" as the image sample required for system training should be at least consist of 50 images per sample, the required images should also be in different angles for accuracy and other conditions [11]. In order to achieve the desire precision and performances, the article of Sibbaluca et al. (2020) named "Pneumonia and COVID-19 Detection using Convolutional Neural Networks" states that a decent hardware such as Intel® Core™ i7-8700 CPU with a clock speed of 4.60Ghz and 16GB RAM are vital in the overall performance which allows the system to run stable and efficient [12]. The concept for the development of the System dashboard were based on a system developed by LakshmiSudha et al., 2015 entitled "Barcode Based Student Attendance System" (BSAS) that utilized barcode scanners that can be use in combine with barcode on the Identification Cards (IDs) of the students. This would address the problem of keeping registry and violation log books that are prone to falsification, modification and physical damage by providing an automation and computerized log system that can be only accessed by school administrators [13-14].

Theoretically, the design project will improve the uniform implementation policy in Emilio Aguinaldo College-Cavite where traditional uniform inspection performed by security personnel can be affected by different factors, it will also avoid compromising the data as the physical log book method can be damaged, stolen or counterfeited.

METHODOLOGY

A. Pre-Prototyping Assessment

In the Pre-Prototyping Assessment phase of the research, the

researches gathered the necessary hardware, programming software and object recognition algorithm to be used in the Real-Time Object Recognition-based School Uniform Monitoring System using the You Only Look Once Algorithm. The hardware used in the system is as follows; A computer unit with a specification of Intel Core TM i7 – 8700 @ 3.20Ghz – 4.60Ghz CPU, 16GB RAM, NVIDIA GTX 1060 (6GB) GPU, and a 240GB SSD. It also has and Arduino UNO Board, 1080p Webcam and a Barcode Scanner. Java Eclipse, and Python are used for the system development, MySQL for the database and You Only Look Once version 3 (Yolov3) for the algorithm.

A cooperation with the Office of Student Affairs (OSA) was done for implementation of the said system to its designated locale which is in the main entrance of the Emilio Aguinaldo College-Cavite (EAC-C). Multiple requests were also done with the School of Criminology, Engineering, Dentistry and Medical Technology to have their students as the research population since the time the researchers conducted the experiment, they are engaging in limited face to face classes. A Pre-Prototyping Survey was also conducted, this survey is inclined to a two-part survey process to measure the user satisfaction.

Slovin's Formula was used in order to determine the exact number of students needed in the data collection; such number was taken from the total number of populations from the researcher's target educational program.

B. Prototyping Phase

In the Prototyping Phase, the researchers gathered all the necessary equipment used in the research and set up the needed hardware. The sensors and peripherals are placed in their respective slots in the design's frame and tested their functionalities. The use of Windows 10 operating system is installed together with the main system dashboard. The Arduino UNO board, barcode scanner and camera are plugged into the computer.



Figure 1. Sample images from the Dataset

The object recognition algorithm required images of students from the researcher's target population with uniform. They consist of Criminology, Engineering, Dentistry and Medical Technology. Images were collected with proper approval from the student's department and with the student's consent.

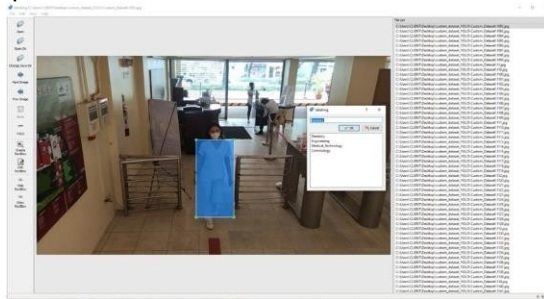


Figure 2. Sample annotated images from the Dataset

For the Dataset Training, the uniform of the student was annotated and was categorized depending on their specific program. A total of 5530 images which includes images from the researcher's target programs and some background only images for better accuracy on the locale.

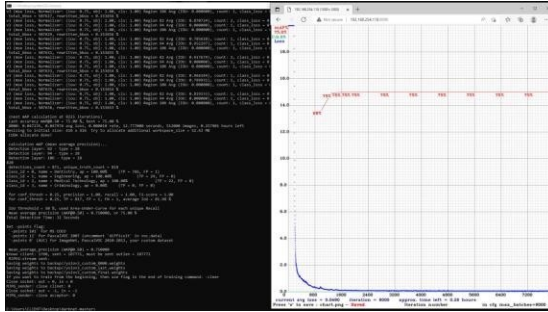


Figure 3. Dataset Training

The dataset training requires 2000 iteration per image class. Since the database has a total of 4 classes, the total iterations are 8000. The training took 16 hours and 30 minutes to finish.



Figure 4. Prototype Design

Placement of the Prototype in the main entrance of the campus. Approved by the Office of Student Affairs, Property Office and Office of the Vice President of Academic Affairs and with guidance of the school security personnel.

C. Post-Prototyping Assessment

In this phase, the prototype for the research is complete and ready to use. As seen in Figure 4 where the prototype is installed in the locale, it will then be tested by the respondents from the researcher's target population. After the execution of the system, researchers will assess the overall effectiveness of the system in terms of dataset accuracy based on mean Average Precision (mAP). A Post-Prototyping survey is conducted to measure the user satisfaction of the system. Paired Sample T-Test was used to determine the significant difference or the impact of the design prototype from before and after its application. Statistical data

based on the feedbacks of the respondents as well as numerical output of the algorithm benchmark will be the primary source of data.

Ethical Consideration

The research was processed for an Ethics Review Evaluation where a request was sent together with the Ethics Review Evaluation Form and was sent to the Research and Development Office for approval. It was then given an Ethics Review Certification with an EAC ERC Code of 2021-01-045 togetherwith a note from the Ethics Review Board stating that there were no found ethical issues in the said research.

Furthermore, permissions from various offices and departments were submitted and was then approved in order to collect needed data, participation and for the research to proceed. The following offices and departments are as follows: Office of Student Affairs, Office of the Registrar, Office of the Facilities and Transport, Office of the Vice President of Academic Affairs, Property Office, School of Criminology, School of Dentistry, School of Engineering and Technology, and lastly, School of Medical Technology.

Consent of the students who will stand as research respondents was also requested and considered.

RESULTS

A. Dataset Evaluation

The darknet architecture generated a total number of 11 dataset weights file that was tested using the School Uniform Monitoring System validate its precision as well as the error detection rate. The table below shows the average precision per programs as well as the overall mean Average Precision per iteration file.

Table 1
mean Average Precision per each Iteration

Dataset Iterations	Programs Covered				mAP
	AP Criminology	AP Dentistry	AP Engineering	AP Medical Technology	
1000	60.93%	59.24%	76.62%	62.67%	64.87%
2000	91.84%	96.47%	72.56%	83.71%	86.14%
3000	88.62%	99.67%	91.60%	90.33%	92.56%
4000	99.40%	96.53%	74.80%	80.47%	87.80%
5000	86.27%	99.80%	66.49%	92.27%	86.21%
6000	91.53%	97.78%	88.93%	86.80%	91.26%
7000	95.31%	100.00%	81.33%	96.47%	93.28%
8000	96.93%	100.00%	84.27%	93.27%	93.62%
Final	96.40%	100.00%	84.27%	93.27%	93.48%
Best	92.47%	91.49%	75.00%	90.36%	87.33%

The images used to validate the mean Average Precision (mAP) for each dataset iteration are obtained from the actual and uncontrolled testing environment captured by the A4tech PK-920H webcam. As the training progresses, accuracy increases at a stable level, this is due to the dataset being familiar with the continuous iteration that improves its prediction value for each bounding boxes within the image.

B. Student Satisfaction Assessment

The researchers chose the Paired Sample T-Test as basis for the user satisfaction, this is for the researchers to know whether there is a significant effect or impact from before the system was implemented and after the system was implemented.

Table 2
Comparison of T-Test Result and Reference from T-Test Table

T-Values on Each Factor	
Consistency and reliability of the system	13.04 > 3.496
Provides a fast and unbiased way of inspecting student's information	14.6 > 3.496
Provide an easy and hassle-free way of recording digital violation logs.	14.15 > 3.496
Reduction of the student's time in the school entrance writing their information	12.76 > 3.496
Use of AI that reduces the duration and provides unbiased inspection of student's uniform	11.85 > 3.496

According to Table 2, the use of the paired T-Test shows that there is a significant difference from the pre-prototyping up to the post-prototyping. The prototype shows consistency and reliability, is fast and unbiased, provides hassle-free of recording digital logs, reduces time on writing student information and the use of AI is effective on inspecting school uniforms.

DISCUSSION

With the highest value of 93.62%, the School Uniform Monitoring System was able to exceed the mAP of the previous YOLO-related studies. The similarity of the environment where the training images and the actual testing are obtained are considered to be the main factor of the promising mAP value. Previous YOLO and other object recognition-related studies with a mAP value ranging from 50%-80% suggested that the redundant use of images with different angles and lighting condition improves the precision of the algorithm. And also, the implementation of this kind of technology such as Machine Learning, Convolutional Neural Network and Smart Systems provides an impact on the perception of students on the implementation of uniform policy through the use of the design project.

Conclusion

Based on the results of the design project that was conducted, the researchers finished the testing of the developed prototype. The researchers concluded that it could capture and recognize the image. A working dashboard has been developed with the uniform recognition system with working functions and features such as student listing, violation logbook, suspended student tracking, and log file generation. The system has the highest mAP or mean average precision on the iteration 8000 from the training with a mAP value of 93.63% and has a false detection rate as low as 5%.

Recommendation

Based on the results and conclusions, the following recommendations are suggested by the researchers and respondents to provide guidance and aide future researchers on how to develop a studentuniform violation system and enhance object detection and recognition capabilities. Some respondents recommended the use of RFID to improve ID scanning time. The system should be working online, accessible through a mobile platform, and developed for other operating systems.

References

Why School Uniforms are a Bad Idea (2018, April 2). LiveAbout.

<https://www.liveabout.com/the-arguments-against-school-uniforms-2101087>

The Benefits of Schools Uniforms and Why Schools Have Them. (2020, July 25). Nord Anglia International School Manila.

<https://www.nordangliaeducation.com/ourschools/philippines/manila/international/article/2020/7/24/the-benefits-of-schools-uniformsand-why-schools-have-them?fbclid=IwAR12LG3g4SjISUsa8NV0rW28WU8FTTWKvodaOTYLUle4S8RtXLMoWb3y8>

Gregory, S. L. (2013, April). Perceptions of High School Students of the Impact of a School Uniform Policy. University of Arkansas.

Emilio Aguinaldo College Student Manual 2017 Edition: Vol. Section 3 (Section 3 ed.). (2017). Emilio Aguinaldo College.

Saha, S. (2021, December 7). A Comprehensive Guide to Convolutional Neural Networks — the ELI5 way. Medium.

<https://towardsdatascience.com/a-comprehensive-guide-to-convolutional-neural-networks-the-eli5-way-3bd2b1164a53>

Hernandez, A. A., Reyes, F., & Fajardo, A. (2020, March). Convolutional Neural Network for Automatic Speech Recognition of Filipino Language. Technological Institute of the Philippines.

Chen, C., Huang, R., & Pedoeem, J. (2018, November). YOLO-LITE: A Real-time Object Detection Algorithm Optimized for Non-GPU Computers. IEEE.

Redmon, J., & Farhadi, A. (2017). YOLO9000: Better, Faster, Stronger (A. Farhadi & J. Redmon, Eds.). IEEE.

<https://doi.org/10.1109/cvpr.2017.690>

Putra, M. H., Yussof, Z. M., Lim, K. C., & Salim, S. I. (2016). Convolutional Neural Network for Person and Car Detection using YOLO Framework. Convolutional Neural Network for Person and Car Detection Using YOLO Framework, 10(1-7), 1-7.

Liu, C., Tao, Y., Liang, J., & Chen, Y. (2018). Object Detection Based on YOLO Network. China University Mining and Technology.

Fung-Lung, L., Nycander-Barua, M., & Shiguihara-Juarez, P. (2019). An Image Acquisition Method for Face Recognition and Implementation of an Automatic Attendance System for Events. IEEE.

Militante, S. V., Dionisio, N. V., & Sibbaluca, B. G. (2020, October). Pneumonia and COVID19 Detection using Convolutional Neural Networks. 2020 Third International Conference on Vocational Education and Electrical Engineering (ICVEE).
<https://doi.org/10.1109/icvee50212.2020.9243290>

Sudha, K. L., Shinde, S., & Thomas, T. (2015). Barcode based Student Attendance System (Volume 11-No. 2). Sies Graduate School.

**Jam, J. R. (2018, April). Face Detection and Recognition Student Attendance System (No. K1557901).
https://www.researchgate.net/publication/326986115_Face_Detection_and_Recognition_Student_Attendance_System**

The Effects Of Online Reviews on the Consumer's Perception in Choosing Casual Dining Restaurants in Sm City Dasmariñas

**Authors: ¹Besira, Lyzette Daphne V., ¹Lim, Ma.
Pamela C., ¹Manguera, Irish Claire P., ¹Pelin,
Patricia Laline A.**

*¹School of Tourism and International Hospitality Management, Emilio
Aguinaldo College - CaviteDasmariñas City, Cavite*

corresponding author: patricialalinepelin@gmail.com
contact number: 09999155956

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- **Electronic Word of Mouth**
- **Customer Satisfaction**
- **Brand Image**
- **Anecdotal Evidence**
- **Casual Dining Competency**

Abstract. Consumer perception is critical in any business because it can determine whether it succeeds or fails. It can either increase a business's profit or cause it to lose money. This study examines two critical variables: online reviews and consumer perception. Online is a vast world in which people can communicate and share ideas regardless of their physical location. People are now addicted to technology,

and almost everything they do involves it. Consumers view online restaurant reviews as a forum for sharing their unique perspectives. Additionally, online reviews holds wealth of details about the establishment's food and beverage, guest

service, surroundings, quality, and cost. When it comes to picking a casual dining restaurant, consumers factor in customer ratings and online reviews. All of these factors are becoming increasingly important in the decision-making process of consumers. This paper focuses on determining the factors affecting consumers' decision of the influence of online reviews in terms of food quality, service quality, price of the meal and ambiance. Throughout the completion of "The effects of online reviews on the consumer's perception in choosing casual dining restaurants in SM City Dasmariñas", the researchers completed reviews of related literature to gain better understanding on how online reviews affect consumers in choosing casual dining restaurants. Using quantitative research design, the researchers surveyed 400 consumers of casual dining restaurants and checking online reviews around Dasmariñas City, Cavite, Philippines, asking about their perception on choosing casual dining restaurants through online reviews.

The Effects of Online Reviews on the Consumer's Perception in Choosing Casual Dining Restaurants in Sm City Dasmariñas

INTRODUCTION

Dining out is an important part of joyful festivities as the food sector has evolved over time (Tanner, 2019). Customers can discover the ideal mix of high-class and atmospheric restaurants in casual dining restaurants, which give exceptional flavor and a reasonable price. The menu of a casual dining restaurant may not be at par with the quality that fine dining restaurants offer, it caters to a different variety of consumers or target market. A casual dining restaurant is one that delivers reasonably priced food in a relaxed setting. Casual dining is a middle ground between fast food and gourmet dining. A casual restaurant offers a more drawn and relaxed atmosphere in a welcoming environment. Casual dining restaurants are one of the biggest trends lately and they're found almost everywhere. Casual dining restaurants provides a variety of food ranging from salads, burgers, rice meals, and pastas. Casual dining restaurants also offer convenience. Once the customers are done eating, they can leave if the bill is settled with the waiter or waitress. They are also easily found. Casual dining restaurants offer a lot to customers without them having to spend a lot. And SM Supermalls is one of the popular establishments that offer variety of casual dining restaurants in the Philippines.

SM Supermalls are known for having everything, as their tagline states, "We've got it all for you". From necessities to luxuries, SM Supermalls offer a wide variety of products and services. SM Supermalls originated in 1958 as Shoemart, a tiny shoe store located in Carriedo, which became SM Department Store in the 1960s and 1970s, with a chain of strategically situated stores across Metro Manila (SM Supermalls, 2020). They also dabbled in supermarkets and home appliances, but it wasn't until 1985 that they really embraced the nature of a shopping mall

chain with the inauguration of their first supermall, SM City North EDSA. This became the start that they totally embraced the status of a shopping mall company.

SM City Dasmariñas is the second SM Supermall located in Cavite, Philippines (Cavite Government, n.d.). It covers 12.7 hectares and has a total gross floor space of 206,231 square meters (Malls Store Directory, 2019). SM City Dasmariñas is also Cavite's largest retail mall, larger than its sister mall, SM City Bacoor. It is also the seventh largest SM Supermall in the Philippines. According to Asia Firms (2020), SM City Dasmariñas attracts an estimated 400,000 visitors on weekends and 150,000 on weekdays which make it one of the highest sources of profit and successful SM Supermalls created and run by the world's largest mall developer. SM City Dasmariñas offers numerous food choices under casual dining.

Here is the list of casual dining restaurants in SM City Dasmariñas: Bacolod Chicken Inasal (BCI, 2021), Bianca's Firebrick Chicken (Bianca's, 2021), Classic Savory (Classic Savory, 2016), Giligan's (Giligan's, 2021), Gringo Grill (Gringo Grill, 2018), Kenny Rogers (Kenny Rogers Roasters International, 2018), Kuya J (Kuya J Restaurant, 2021), Max's Restaurant (Max's, 2021), Mesa (Mesa, 2016), Shakey's (Shakey's, 2021).

Bacolod Chicken Inasal is one of the casual dining restaurants offers in SM City Dasmariñas. This Philippine restaurant chain was originated in 1993 by the Tanalgo siblings. Toto is the name of the boy mascot of the said restaurant. It started as a small stall in Mandaluyong where customers buy their food in the store anytime. (Bacolod Chicken Inasal, 2021) It is very famous for their inasal and other food that price starts from 63 pesos above, you can experience the food in this food chain restaurant. The restaurant offers huge facilities that can accommodate large groups that offers good condition of their furniture such as couches and tables to feel more comfortable.

Bianca's Firebrick Chicken is serving firebrick chicken and a lot of gourmet meals. This casual dining restaurant offers you a wide variety of foods that offers 99 pesos and less than 800 pesos. Bianca's Firebrick Chicken SM City Dasmariñas dedicated an affordable healthy food with a good ambiance of their store.

Classic Savory is a casual dining restaurant with a laid-back

environment and a cheap menu. Ting brothers' classic delicious has been the best casual location for almost 60 years. When World War II ended, the company began operations. It all began in 1950 in Quiapo's bustling district, as a modest panciteria serving only lomi to predominantly Chinese customers. They offer foods that range from 55 pesos and above. Over time, they began to develop new recipes that helped the business become known among Filipino customers.

Giligan's was established in January 1997. The restaurant's name was taken from the combination of their father's name Guillermo or Guilly and a tv series entitled Giligan's Island. Before the restaurant began to operate, their family is engaged in a catering business. The idea of opening a restaurant came from their customers. Their first venture was on Blue Ridge, Quezon City. Since it was a successful venture, they started expanding and open another branch. Today, they have more than 100 branch operating nationwide. Giligan's provide a great interior and good food with reasonable price. Their price ranges from 80-1,050 (Giligan's 2021).

Russell Ybarra first opens the main branch of Gringo Grill on January 11, 1993. The original chicken is flavored with varied herbs and spices and baked to gorgeously in the oven, while the baby back ribs are cooked for hours with the restaurant's signature marinade and barbecue-style sauce. (Garcia 2018) Alongside with their signature chicken they also have side dishes like pico dello, fries, and different kinds of pasta. Their menu is starting from 50 PHP – 1400 PHP.

Kenny Roger Roaster was founded by country musician which is Kenny Rogers and former Kentucky governor John Y. Brown Jr. In 1991, Kenny Rogers Roasters was first opened in Florida. It is basically a casual dining restaurant with roast chicken, their best seller and accompanied with variety of delicious of side dish and different kinds of beverages. All these food and drinks are served to the guest in a friendly and comfortable way with a price starts from 55 pesos and up.

One of the successful and booming casual dining restaurants in the Philippines that has a huge number of 106 branches is Kuya J Restaurant. (Abadilla, 2018) Kuya J expects to have around 200 stores by the year 2020 by opening franchising for their innovative and successful plan. Kuya J restaurant was founded in the year

2013 that commence as an eatery at Escario, Cebu. They served Filipino cuisine food especially dishes in Cebu. Kuya J have a good ambiance, harmonious and elegant place to eat in SM City Dasmariñas. The consumers experienced table service in this restaurant. The furniture and decor are quite unique and pleasing to the eye of the diner because of the good and relaxing atmosphere. When it comes to their food, Kuya J offers moderately price from 65 PHP and above, consumers can experience wide variety of food in Kuya J Restaurant.

Max's restaurant started their operations in in 1945 after World War II. Maximo Gimenez became friends with the American troops that is stationed in Quezon City. The soldiers regularly visit Maximo for a drink. The troops always pay for their drinks. It inspires Maximo to build a cafe where they can enjoy food and drinks. It initially served chicken, steak, and drinks. Max's became famous because of their signature fried chicken that was created by Maximo's niece Ruby. Over the years they were known as "The House of Fried Chicken Built". Price range starts from 90php-5000php if you order the family set. (Max's 2021).

Mesa Restaurant was a modern theme Filipino cuisine it was established in 2009 by co-owners Sharon Cuneta and husband Senator Kiko Pangilinan. Mesa served Filipino cuisine like bistek, adobo , chicken binacol kare kare and boneless pata . (Duadra - Balibay 2016) There price menu is ranging from 140 php -1500 php.

Shakey's Pizza was established in 1954 by Sherwood "Shakey" Johnson. It was first opened in a grocery store in Sacramento California. It was first named as "Ye Public House". On 1975, it was brought Japan and the Philippines. Shakey's Philippines was under the ownership of San Miguel Corporation mainly to promote San Miguel beer. The first branch in the country was on Makati Ave. then later expand in Metro Manila. In 1977 it was transformed into a fast-food franchise, only in 2003 it was re-engineered as a family oriented casual dining brand. Their menu ranges from 89-3,000 php.

In 1999, the first internet reviews appeared. They were first confined to specialize seller websites such as eBay, but three primary challengers emerged: Epinions, RateltAll, and Deja. They compiled a total of 1,146,201 customer reviews for a variety of items and services in various industries (Sprague, 2019). Many

businesses started posting accounts on the fast-growing network in 2007, Facebook. This prompted Facebook to launch the Pages for businesses function. By the end of the year, over 100,000 firms had signed up and were planning to advertise on Facebook (Sprague, 2019). Facebook allows users to leave reviews for various establishments not just locally but worldwide as well. Online shopping platforms and food delivery applications such as Shopee, Lazada, Food Panda, and Grab Food have a feature for users to leave feedback and reviews about the products that they purchased (Jones, 2018).

As per Bright Local survey, nearly 90% of consumers stated that they check reviews of local businesses (Bowman, 2019). This shows that consumers value the feedback provided by other consumers who already tried the products and services that they would like to try. Online reputation management entails marketing and other customer service which is being aware of the discussions and reviews online by consumers (Pitman, 2019). This may include various forms such as asking customers to leave reviews and monitoring the social media reputation of the business.

In recent years, reviews have become increasingly important to a restaurant's performance, since every restaurant owner is aware that positive ratings can improve popularity and profitability, but negative reviews can even lead to the closure of a business (Arevalo, 2017). According to Arevalo (2017), it's also worth noting that roughly 34% of diners prefer restaurants exclusively based on information provided by peer reviews or feedback. This means that most guests usually don't mind the restaurant's website or social media pages, preferring to rely on information found on review sites, which increases their prominence and market power. The impact of online reviews can't be overstated because they entail a lot of weight when people are seeking for a new place to eat. According to Guta (2018), a survey conducted from 2017 confirmed this, with 97 percent of respondents saying they read reviews and feedback online. This shows that customers decide whether to spend money on a restaurant based on reviews that they found online.

Online reviews are now a fast growing market phenomenon that is playing an progressively important role in consumer dining

out decisions, thanks to the increasing availability and popularity of web-based opinion platforms.

According to this study, consumer-generated ratings of restaurant food quality, environment, and service, as well as the volume of online consumer reviews, are completely associated with the online popularity of restaurants. In general, brand popularity measures how widely a brand is consumed by customers. (Chua, Karim, Lee et al, 2020)

Customers trust and interact with online reviews on a regular basis and these reviews are still quite significant when it comes to purchasing decisions. A satisfied customer is the most honest and impactful advocate and technology has amplified the power of every customer's voice (Fullerton, 2017). The finest advertising of a business is done by happy customers, and they do it for free. Many companies, on the other hand, miss out on a fantastic chance to engage and communicate with their brand champions and help them tell their stories online. This shows that the effect of online reviews is valued by numerous customers before making a purchase.

Food industry is one of the most reviewed industries online. The Philippine food service industry which includes casual dining produced P535.9 billion in sales in 2016 because of the country's 84,503 foodoutlets (Marasigan, 2019). According to Marasigan (2019), revenues reached P616 billion for 2019, with 3,126 more food service outlets open than in 2016.

According to Wirth (2019), business in the casual dining segment has been improving in the previous years. Casual dining restaurants are a notch up compared to fast-food and fast-casual eateries, with a more relaxed ambience (Walnut Room, 2019). In a casual dining restaurant, table service is present which means that your order is taken by a server while you are seated at a table. Your food is delivered to the table by a food server.

Casual dining industry involves consumer perception. Consumer perception refers to the process by which a customer gathers and interprets information about a product to generate a meaningful image (Zhang, 2019). Consumer opinion of a company may make or ruin it. When customers have a pleasant experience and receive their products on time, they form an opinion of the establishment. Receiving products that are exactly

as described in the product description also creates a pleasant impression with the consumers.

Consumer perception is deemed important in any business as it can make it popular or make it fail. It may boost a business' profit or make it incur losses. Two important and relevant variables are found in this study which are online reviews and consumer perception. Online is a vast world wherein people get to communicate and share ideas with one another regardless of distance. People are now hooked online and almost everything that they do involves the internet (Sherrad, 2018). This study will allow businesses, especially those in the casual dining industry, to realize the importance of online reviews to the consumer's perception which will have an impact to the overall performance of the business. This will help businesses in the food industry to increase their potential and chances of being successful especially in the trying times of pandemic.

Due to the rapid growth of social media, the restaurant business has benefited from numerous opportunities. As a result, a sizable proportion of customers through online depend on review websites, forums, and personal blogs. (Yang et al. 2017) Similarly, online reviews manage other users in determining whether a restaurant is worth exploring. In principle, the framework of online reviews allows users to see how many people recommend a specific product or service, which has a big influence on customers' purchase decisions. Online restaurant evaluations are seen as a forum for customers to express their individual viewpoints. Additionally, online restaurant reviews provide a wealth of information about the food, service, physical atmosphere, quality, and price of the food of the establishment (Yang, et al., 2017). When it comes to choosing a casual dining restaurant customers include customer ratings and online reviews into their decision-making processes. All these factors are becoming increasingly essential in customers' decision-making. (Smith and Anderson 2016).

According to Gunden (2017), these online reviews displayed restaurant aspects (e.g., food quality, service quality, and environment), and restaurant consumers perceived the quality of a restaurant by reading these online reviews. Some researchers investigate the characteristics of restaurants by looking at online

reviews. By examining internet evaluations, investigate the features of restaurants, and the results of the study reveal that the quality of the food is the most frequently mentioned type of aspect from the consumer's perspective. When restaurant patrons are unfamiliar with a restaurant, they frequently rely on online reviews, which include both positive and negative consumer experiences. Consumer reviews on the internet are a form of electronic word of mouth in the restaurant selection process, and they have aided consumers in obtaining detailed information that is trustworthy and credible, as opposed to information provided by the industry, which may be viewed with skepticism and possibly disbelief. As a result, most consumers focus their attention on online reviews prior to making a purchase.

Statement Of the Problem

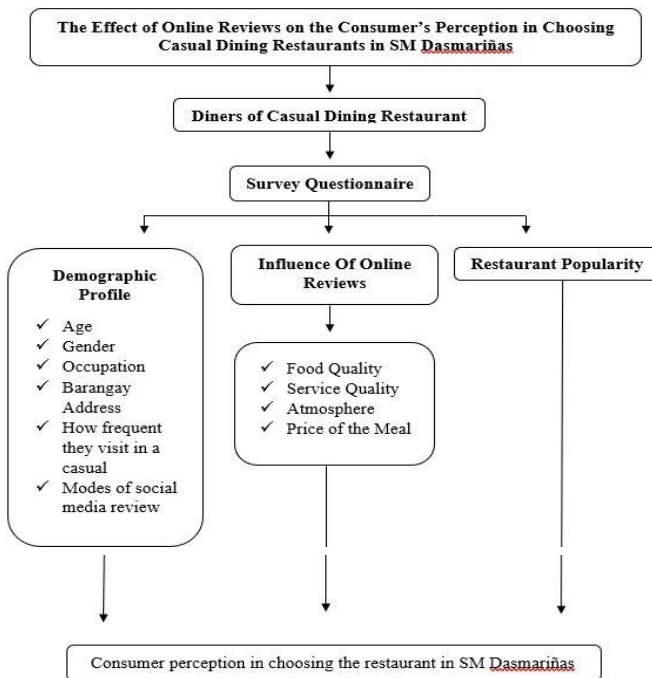
This study aims to assess the effect of online reviews on the consumer's perception in choosing casual dining restaurants. The goal of this study is to determine the impact of internet consumer reviews on how people select restaurants. The study also adds to marketers' expertise by offering insights into customers' views and behavior, which can be used by marketers to better respond to and target these consumers to overcome consumer choice obstacles. Based on studies, the stronger the connection between restaurants and consumers through feed backs the more beneficial it is in the business.

1. What is the demographic profile of the respondents in terms of?
 - 1.1 Age
 - 1.2 Gender
 - 1.3 Occupation
 - 1.4 Barangay Address
 - 1.5 How frequent they visit in a casual dining restaurant
 - 1.6 Modes of social media review

2. What are the factors affecting consumers decision of the influence of online review in terms of:
 - 2.1 Food Quality?
 - 2.2 Service Quality?
 - 2.3 Price of the Meal?
 - 2.4 Ambiance?
3. What is the level of popularity of the casual dining restaurant in SM City Dasmariñas?
4. Is there any significant relationship between the demographic profile of the consumers and the consumer perception in choosing the restaurant in SM City Dasmariñas?
5. Is there any significant relationship between consumers decision in choosing casual dining restaurant based on the influence of reviews and popularity of the restaurant?

Conceptual Framework

The framework of this study was based on the independent variable into dependent variable. Framework is technically used to make conceptual distinctions and organize ideas. The research paradigm is:



METHODOLOGY

Research Design

The study being conducted is a quantitative research, a systematic and organized investigation to seek solution to problem by obtaining numerical data. Quantitative study includes quantifying and analyzing variables to come at results. (Shread 2018) Quantitative research can be classify into survey research, correlation research, experimental research.

A descriptive research design can assess one or more variables that used a variety of research methods. Unlike experimental research, the researcher does not change or manipulate the variables; instead, these are observed and measured. (Mccombes 2020) Descriptive method can use to identify the trends, characteristic, and categories. Descriptive research is a type of quantitative research. The study isdescriptive survey method that is designed to collect information about the phenomenon being studied. It used to gather information concerning the status of the phenomena to describe “what is” or “what was” with respect to variables in a situation. Specifically, the descriptive survey method is the most appropriate mean of evaluating the effect of online reviews on the consumer's perception in choosing casual dining restaurant in SM City Dasmariñas.

Research Locale

From the dream of selling a good pair of shoes to every Filipino, SM founder Henry Sy, Sr. has laid the groundwork and piloted the development and evolution of SM Investments Corporation (SMIC) into one of the country's largest holding companies in the Philippines today (SM Investments Corporation, 2020).SM Supermalls is now one of Southeast Asia's largest developers and the operator of 72 malls in the Philippines. SM Supermalls offers family-friendly experiences through collaborating with well-known brands and events (Supermalls, 2021). The SM City Dasmarias branch has been one of the largest in thePhilippines.

This study was conducted in SM City Dasmariñas which is located at Governor's Drive, Emilio Aguinaldo Highway, Brgy

Sampaloc 1, Dasmarias City, Cavite. It is the second and largest SM that had already opened in Dasmariñas City, Cavite. (SM City Dasmariñas, 2017). The researchers chose this location because SM City Dasmariñas offers a lot of casual dining restaurant which is more convenient for the researchers to gather data.

Research Participants

The researchers chose the respondents who are currently living in Dasmariñas City, Cavite and with the age bracket of 18 years old and above. It is only limited to the consumers of casual dining restaurant in SM City Dasmariñas who check online reviews in any kind of platform. The primary source of data will come from the 703,141 residents of Dasmariñas City, Cavite based on May 01, 2020 census. Out of 703,141 residents, only 400 of them will be the target respondents of the study. The researchers chose to study about The Effect of Online Reviews on the Consumer's Perception in Choosing Casual Dining Restaurants in SM City Dasmariñas.

The researchers used slovin's formula to compute the sample size needed to know the number of respondents.

Formula:

$$N/(1+Ne^2)$$

Where:

n = no. of samples N = total population

Sampling Technique

The researchers chose non-probability sampling, the snowball sampling. Amidst pandemic, the researchers preferred the best and convenient way to reach their respondents. Snowball sampling is under non-probability sampling technique which the people are selected based on non-random criteria, and not every individual has a chance to include it. (Macombs, 2019). Snowball Sampling is a selection design process which is typically carried out using networks. It is useful when the researcher understands little about the team or organization to be researched. The study sample selection will be beneficial in terms of

communication, decision-making, and sharing of knowledge to people. (Bala K. 2017)

The researchers conveniently reach out their respondents easily because of this snowball sampling technique. The respondents are consumers in casual dining restaurants and who are checking online reviews in any online review platforms.

Research Instrument

A questionnaire was used in gathering data. A self-made questionnaire was made to support the statement of the problem. The survey questionnaire by means of Google form in the form of likert scale was send through their active social media platform for the safety of the researchers and the respondents amidst pandemic. Likert scale was used since the researchers were looking about a certain degree of answer on the effect of online reviews. In addition, it is appropriate because the questions can be answered at the respondents' convenience given that they are busy to their respective nature of work.

The questionnaire consists of three sections: the first part is to know the respondent's profile, the second area is to identify their engagement in casual dining restaurant and online reviews, last part is to rate the ten casual dining restaurants in SM City Dasmariñas based on their preferred restaurant and understand the attributes of it depending on options presented. The researcher's made this in a rating system wherein the most and least are indicated to the questionnaire.

Data Gathering Procedure

The researchers asked for the approval of their research adviser of School of Tourism and International Hospitality Management, statistician from Arts and Science in Emilio Aguinaldo College – Cavite and manager of McDonald's Antlers to conduct a survey and to validate the questionnaire.

After securing the permission to conduct a survey and validation of questionnaire prior to the data collection gathered data through online survey questionnaire by means of google form. This form will be sent through their active

social media platform. Data gathering in the form of survey questionnaire was conducted to achieve the objectives of the study. These questions are the information of the participant's profile and factors affecting consumer's perception in terms of such attributes. The questionnaire also includes the participants insight about relationship of online reviews and popularity of the restaurant in choosing casual dining restaurant.

The data collected was tallied, tabulated, compiled and analyzed statistically. These data became the basis of analysis and interpretation.

Data Analysis

To analyze the data about consumer's perception in choosing casual dining restaurant, the following statistical treatment was used to treat the data for the basis of analyzing the data gathered.

Frequency and Percentage

Frequency and percentage are the statistical tools that were used to determine the respondents' profile to simply count the number of times that each variable occurs. Percent means "per hundred" and the symbol used to express percentage is %. The frequency of a particular observation is the number of

number one.

Formula:

$P = \frac{f}{N} \times 100$ Where:

P = Percentage
f = frequency

N = total number of respondents

Standard Deviation

The standard deviation is a statistical technique used to calculate the average distance between the data values in a collection and the mean. A low standard deviation suggests that the measured values are extremely near to the mean; a

large standard deviation shows that the data points are dispersed throughout a broad range of values. (lumenlearning.com, 2021).

It was used identify factors affecting consumers decision of the influence of online review in terms of food quality, service quality, price of the meal and ambiance. This answers statement of the problem number two.

Formula:

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$$

σ = population standard deviation
 N = the size of the population
 x_i = each value from the population
 μ = the population mean

Mean Rank (Kruskal-Wallis Test)

Average ranks for all observations in each sample are referred to as the mean rank. The Kruskal-Wallis test uses the H-value, which calculates using the mean rank. (Minitab, 2020). It was used inlevel of popularity of the casual dining restaurant in SM City Dasmariñas. This answers statement of the problem number three.

Formula:

The combined samples are ranked. The smallest observation is assigned a rank of one, the second smallest observation a rank of two, and so on. If two or more observations are tied, the average rank is assigned to each tied observation. It computes the average rank for each sample.

Chi Square

The Chi-Square is an inferential statistic which is used to represent and verify the inter - dependenceof two or more independent variables. Is a test that determines how well a model matches observed data.The data used to calculate the chi-square statistic must be random, unprocessed, mutually exclusive, derived from independent variables, and drawn from a sufficiently large sample size. (Adam Hayes 2021). This was used to identify if there is a significant relationship

between demographic profile of the consumers and the consumer perception in choosing restaurant in SM City Dasmariñas. This formula will be used to answer the statement of the problem number four.

Formula:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

The Formula for Chi-Square Is

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

where:

c = Degrees of freedom

O = Observed value(s)

E = Expected value(s)

Pearson Correlation

Pearson Correlation is a type of inferential statistics used to identify a statistical proof for direct and linear relationship in the two quantitative variables (Kent State University, 2021).

This was used to identify if there is a significant relationship between consumers decision in choosing casual dining restaurant based on the influence of reviews and popularity of the restaurant. This formula will be used to answer the statement of the problem number five.

Formula:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

RESULTS

Table 1.1

	<i>Age Group</i>	
	Frequency	Percent
18-24	234	58.5
25-31	147	36.8
53-59	1	.3
Total	400	100.0

The table 1.1 shows that most of the respondents who are involved in the online reviews are in the age group of 18-

24 year old (234 respondents or 58.5%) and 25-31 year old(147 respondents or 36.8%).

Table 1.2
Gender

	Frequency	Percent
Valid Female	194	48.5
Male	206	51.5
Total	400	10.0

The table 1.2 shows that 206 respondents are male while 194 respondents are female. It shows that male is most involved in the online reviews than female.

Table 1.3

Occupation

	Frequency	Percent
Teacher	41	10.25
Agriculture	1	.25
Students/Others	103	25.75

The table 1.3 shows that student (103 respondents or 25.75%) has the most frequency. Next with the second most frequency is teacher/professor (41 respondents or 10.25%) and the third most frequency is tourism and hospitality industry (40 respondents or 10%). The students are the most involved in the online reviews among all the occupation stated above.

Table 1.4
Barangay Address in Dasmariñas City, Cavite

	Frequency	Percent
Langkaan II	20	5.0
San Agustin II	53	13.3
San Manuel I	1	.3
San Miguel II	1	.3
Santa Maria (Barangay 20)	1	.3
Santo Niño II	1	.3
Total	400	100.0

The table 1.4 shows that Barangay San Agustin II (53 Respondents or 13.3%) has the most frequency. Next with the second most frequency barangay is Langkaan II (20 Respondents or 5%) and the third most frequency is Buro I with (18 Respondents or 4.5%). The people in barangay San Agustin II have the most involved in the online reviews among the barangay in Dasmariñas.

Table 1.5
Frequency of visits to a casual dining restaurants

	Frequency	Percent
Occasionally	3	.9
Every month	108	27.0
Every week	185	46.3

The table 1.5 depicts that most of the consumers often go to casual dining restaurant is everyweek (185 respondents or 46.3%). Next with the second most frequency is every month (108 respondents or 27%).

Table 1.6
Modes of Social Media Review

	Frequency	Percent
Facebook	144	36.0
Instagram	72	18.0
TripAdvisor	13	3.3
Total	400	100.0

The most used modes of social media review are Facebook (36% or 144 respondents) Instagram (18% or 72 respondents), Vlogs (13.5 % or 54 respondents), Grab food and Foodpanda (12.5% or 50 respondents), Blogs (9.25% or 37 respondents), Twitter (7.5 or 30 respondents), TripAdvisor (3.25 or 13 respondents).

Table 2.1
Food Quality

	Mean	Std. Deviation	Interpretation	Rank
Appearance	3.807	0.4538	Excellent	2
Flavor/Taste	3.82	0.422	Excellent	1
Texture	3.455	0.5601	Good	4
Nutritive Value	3.445	0.6065	Good	5
Freshness of the Food	3.685	0.5113	Excellent	3

The table 2.1 shows that the flavor/taste is the most important factor affecting consumers' decision on the influence of online review while the nutritive value is the least factor affecting consumers' decision on the influence of online review.

Table 2.2

Service Quality

	Mean	Std. Deviation	Interpretation	Rank
Politeness of Staff	3.730	.4927	Excellent	1
Promptness of Service	3.578	.5289	Excellent	6
Services provided as ordered	3.655	.5212	Excellent	2
Appearance of Staff	3.570	.5796	Excellent	7
Attentive Employees	3.583	.5375	Excellent	5
Friendly and Helpful Employees	3.615	.5315	Excellent	4
Staff's service attitude	3.625	.5339	Excellent	3

The table 2.2 shows that the politeness of staff is the most important factor affecting consumers decision on the influence of online review while the appearance of staff is the least factor affecting consumers decision on the influence of online review.

Table 2.3

Price of the Meal

	Mean	Std. Deviation	Interpretation	Rank
Good value for the price	3.655	.5260	Excellent	1
Reasonable price	3.620	.5351	Excellent	2

The table 2.3 shows that the good value for the price is the most important factor affecting consumers' decision on the influence of online review while the reasonable price is the least factor affecting consumers' decision on the influence of online review

Table 2.4

Ambiance

	Mean	Std. Deviation	Interpretation	Rank
Cleanliness of facilities	3.760	.4668	Excellent	1
Dining area environment	3.555	.5269	Excellent	5
Level of comfort in the dining	3.663	.5285	Excellent	3
Music & Lighting	3.558	.5810	Excellent	4
Room		.4894	Excellent	2
Temperature, Interior Design, Furniture and Decoration	3.690			

The table 2.4 shows that the cleanliness of facilities is the most important factor affecting consumers decision on the influence of online review while the dining area environment is the least factor.

Table 3

Level of Popularity

	Sum	Rank	Interpretation	
Bacolod Chicken Inasal	6.485	10.0	Least popular	
Bianca's Firebrick Chicken	5.988	9.0		
Classic Savory	5.735	8.0		
Giligan's	5.343	5.0		
Gringo Grill	5.478	7.0		
Kenny Roger Roaster	5.380	6.0		
Kuya J	5.268	4.0		
Max's	5.085	1.0		Most popular
Mesa	5.138	3.0		
Shakey's Pizza	5.103	2.0		

The table presents that Max's Restaurant is the most popular restaurant with the mean rankof 5.085 while

Bacolod Chicken Inasal is the least restaurant with the mean rank of 5.085.

Table 4.1

Food Quality

Demographic Profile	Chi-square statistic value	df	p-value	Interpretation/ Implication
Age	9.036	10	0.5287	Not Significant/ The perception of respondents on food quality does not depend on age
Gender	.361a	2	0.8350	Not Significant/ The perception of respondents on food quality does not depend on gender
Address	114.182a	132	0.8662	Not Significant/ The perception of respondents on food quality does not depend on address
Occupation	276.455a	266	0.3169	Not Significant/ The perception of respondents on food quality does not depend on occupation
How frequent they visit in a casual dining restaurant	164.800a	34	0.000	Significant/ The perception of respondents on food quality depend on how frequent they visit in a casual dining restaurant

Table 4.1 (continued)

Demographic Profile	Chi-square statistic value	df	p-value	Interpretation/ Implication
Modes of social media reviews would most influence restaurant selection for dining out	30.969a	12	.002	Significant/ The perception of respondents on food quality depend on social media reviews

The table 4.1 shows that there is a significant relationship between the perception of respondents on food quality and how frequent they visit in a casual dining restaurant and modes of social media reviews that influence restaurant selection for dining out.

Table 4.2

Service Quality

Demographic Profile	Chi-square statistic value	df	p-value	Interpretation/ Implication
Age	4.359a	10	0.9297	Not Significant/ The perception of respondents on service quality does not depend on age.
Gender	1.243a	2	0.5372	Not Significant/ The perception of respondents on service quality does not depend on gender.

Table 4.2 (continued)

Demographic Profile	Chi-square statistic value	df	p-value	Interpretation/ Implication
Address	162.228a	132	0.0379	Significant/The perception of respondents on service quality depend on residence
Occupation	253.549a	266	0.6983	Not Significant/ The perception of respondents on service quality does not depend on occupation
How frequent they visit in a casual dining restaurant	98.187a	34	0.000	Significant/ The perception of respondents on service quality depend on how frequent they visit in a casual dining restaurant
Modes of Social media reviews would most influence restaurant selection for dining out	30.967a	12	.002	Significant/ The perception of respondents on service quality depend on social media reviews.

The table 4.2 shows that there is a significant relationship between the perception of respondents on service quality and place of residence, how frequent they visit in a casual dining restaurant and modes of social media reviews that influence restaurant selection for dining out.

Table 4.3

Price of the Meal

Demographic Profile	Chi-square statistic value	df	p-value	Interpretation/ Implication
Age	72.584a	10	0.0000	Significant/The perception of respondent on price of meal depend on age.
Gender	2.275a	2	0.3207	Not Significant/ The perception of respondents on price of meal does not depend on gender.
Address	99.702a	132	0.9837	Not Significant/ The perception of respondents on price of meal depend on place of residence
<i>Occupation</i>	277.495a	266	0.3015	Not Significant/ The perception of respondents on price of meal does not depend on occupation
<i>How frequent they visit in a casual dining restaurant</i>	232.162a	34	0.000	Significant/ The perception of respondents on price of meal depend on how frequent they visit in a casual dining restaurant
<i>Modes of social media reviews would most influence restaurant selection for dining out</i>	30.965a	12	.002	Significant/ The perception of respondents on price quality does not depend on social media reviews.

The table 4.3 shows that there is a significant relationship between the perception of respondents on price of meal and age, how frequent they visit in a casual dining restaurant and modes of social media reviews that influence restaurant selection for dining out.

Table 4.4

<i>Ambiance</i>				
Demographic Profile	Chi-square statistic value	df	p-value	Interpretation/ Implication
Age	3.606a	10	0.9634	Not Significant/ The perception of respondents on ambiance does not depend on age.
Gender	.133a	2	0.9355	Not Significant/ The perception of respondents on ambiance does not depend on gender.
Address	143.920a	132	0.2256	Not Significant/ The perception of respondents on ambiance depend on place of residence
Occupation	209.554a	266	0.9956	Not Significant/ The perception respondents on ambiance does depend on occupation

Table 4.4 (continued)

Demographic Profile	Chi-square statistic value	df	p-value	Interpretation/ Implication
How frequent they visit a casual dining restaurant	94.413a	34	0.000	Significant/The perception of respondents on ambiance depend on how frequent they visit in a casual dining restaurant
Modes of social media reviews would most influence restaurant selection for dining out	30.963a	12	.002	Significant/ The perception of respondents on ambiance depend on social media reviews.

The table 4.4 shows that there is a significant relationship between the perception of respondents on ambiance and how frequent they visit in a casual dining restaurant and modes of social media reviews that influence restaurant selection for dining out.

References

- Arevalo, M. (2017). The Impact of Reviews on the Restaurant Market.
https://modernrestaurantmanagement.com/the-impact-of-reviews-on-the-restaurant-market-infograph-ic/?fbclid=IwAR3-y0_JMqZ0Wlg7oxO2fA5UmyqE0yByZOUQg1tZN4yP0gqvpaNnunG1wzU
- Asia Firms. (2020). SM City Dasmariñas.
<https://ph.asiafirms.com/calabarzon/sm-city-dasmariñas-391101.html>
- Bowman, M. (2019). Online Reviews And Their Impact On The Bottom Line.
https://www.forbes.com/sites/forbesagencycouncil/2019/01/15/online-reviews-and-their-impact-on-the-bottom-line/?sh=81ff8ad5bdeb&fbclid=IwAR1Y2wSTNr-ng4pHqMo7d7i1s7xa3JhO00lcyaffA9kFP1_CJ-J4DVhcWHxY
- Cavite Government. (n.d.). SM Dasmariñas.
<http://cavite.gov.ph/home/2017/02/09/sm-dasmariñas/>
- Fullerton, L. (2017). Online Reviews Impact Purchasing Decisions for Over 93% of Consumers, Report Suggests.
https://www.thedrum.com/news/2017/03/27/online-reviews-impact-purchasing-decisions-over-93-consumers-report-suggests?fbclid=IwAR0QJzMQtDMVciRZcCnPiaei_BWgV8sZUZoxv2iy5m_52wq5F4_bOtvssSh8
- Guta, M. (2018). 94% of Diners Will Choose Your Restaurant Based on Online Reviews.
https://smallbiztrends.com/2018/06/how-diners-choose-restaurants.html?fbclid=IwAR1Si8AEIePPihqNF9NNTmQNdD-G_vGNAIDpho4mslPmoPqb_9sZgh5ipkc
- Jones, M. (2018). It's All About Trust: A Brief History of Online Reviews.
<https://webpunch.com/a-brief-history->

[of-online-reviews/](#)

Malls Store Directory. (2019). SM City Dasmariñas Stores Directory.

<http://mallstoresdirectory.com/sm-city-dasmarinas>

Marasigan, A. (2019). Trends in the food industry.

<https://www.bworldonline.com/trends-in-the-food-industry/>

Pitman, J. (2019). What Is Online Review Management?

<https://www.brightlocal.com/learn/what-is-online-review-management/>

Sherrred, K. (2018). More Than 80% of Diners Choose Restaurants that Respond to Online Reviews.

https://www.restaurantdive.com/news/more-than-80-of-diners-choose-restaurants-that-respond-to-online-reviews/540764/?fbclid=IwAR1yPHa-BaAEGiwDRxr3eN2esXz7P9S8cl3SFhowAzut_LMZ3p5Ur_XD_Olw

SM Supermalls. (2020). 10 Surprising Facts You Didn't Know About SM Supermalls (But Should).

<https://www.smsupermalls.com/whats-new/10-facts-about-sm-supermalls/>

Sprague, D. (2019). The History Of Online Reviews And How They Have Evolved.

<https://5stars.shopperapproved.com/the-history-and-evolution-of-online-reviews/>

The Walnut Room. (2019). Fine Dining Vs. Casual Dining.

<https://thewalnutroomgb.com/blog/fine-dining-vs-casual-dining/>

Zhang, Y. (2019). Why Customer Perception Matters and How to Improve it?

<https://hapticmedia.com/blog/customer-perception/>

Wirth, S.R. (2019). What do Consumers Want From Casual

Dining?

<https://www.restaurantbusinessonline.com/consumer-trends/what-do-consumers-want-casual-dining>

Gunden N. (2017). How Online Reviews Influence Consumer Restaurant Selection.
<https://digitalcommons.usf.edu/cgi/viewcontent.cgi?article=7904&context=etd>

Chua, Karim, Lee et.al (2020). Customer Restaurant Choice: An Empirical Analysis of Restaurant Types and Eating-out Occasions.
<https://www.mdpi.com/1660-4601/17/17/6276>

Arevalo (2017). The Impact of Reviews on the Restaurant Market (Infographic).
<https://modernrestaurantmanagement.com/the-impact-of-reviews-on-the-restaurant-market-infographic/?fbclid=IwAR12xjRspVhkWdNw87Q18ulkGRkSswj6fRpZE2QL82ZH8jWoKVaq7MsZrZc>

Bacolod Chicken Inasal (2021).
<https://www.bacolodchickeninasal.com/>

Giligan's (2021). <https://www.giligansrestaurant.com/about-us>

Abadilla (2018). Philippine Daily Inquirer 'Kuya J' chain sees no letup in expansion.
<https://www.pressreader.com/philippines/philippine-dailyinquirer1109/20180915/281921658948516>

Garcia (2018). NO {TORTILLA} CHIP ON HIS SHOULDER "gringos grill".
<https://www.gringostexmex.com/about-gringos/>

Max's Restaurant (2021).
<https://www.maxschicken.com/page/about-us>

Dudra – Balibay (2016). Mesa Filipino Moderne restaurant opens.
<https://www.sunstar.com.ph/article/182314/Local-News/MesaFilipinoModerneRestaurantOpens#:~:tex>

[t=Mesa%20was%20conceptualized%20and%20realized,The%20Terraces%2C%20Ayala%20Center%20Cebu](#)

Mccombes (2020). Descriptive Research.
<https://www.scribbr.com/methodology/descriptive-research/>

Shread (2020). An introduction to quantitative research.
<https://www.scribbr.com/methodology/quantitative-research/>

SM DASMARINAS (2017). <https://www.smsupermalls.com/>

SM Investments Corporation (2020).
<https://www.sminvestments.com/about-us/our-history/>

Mcombs (2019). Snowball Sampling:
Definition, Method, Advantages and
Disadvantages.
<https://www.questionpro.com/blog/snowball-sampling/>

Bala K (2017). Sampling and sampling methods.
<https://medcraveonline.com/BBIJ/sampling-and-sampling-methods.html>

SM Supermalls (2021).
https://www.smsupermalls.com/aboutus/?gclid=Cj0KCQiAqbyNBhC2ARIsALDwAsByYyLLWofvRwuBHmoDI4HnYT7dcXcMXPxAAPwvsnp3uDAgxHL1JsaAkxXEALw_wcB

mvorganizing.org (2021). What is percentage research?
https://www.mvorganizing.org/how-do-you-write-a-percentage-in-a-research-paper/?fbclid=IwAR0IKu07KkM3SUUpJuFuoMlhYFb_VTlgcEdDOxDJEgT7EdMrjh9SReridw

lumenlearning.com (2021). Describing Variability.
<https://courses.lumenlearning.com/boundlessstatistics/chapter/describingvariability/#:~:text=A%20lo>

[w%20standard%20deviation%20indicates,a%20large%20range%20of%20values](#)

Minitab (2020). Interpret all statistics for Kruskal-Wallis Test.
<https://support.minitab.com/en-us/minitab/19/help-and-howto/statistics/nonparametrics/how-to/kruskal-wallis-test/interpret-the-results/all-statistics/>

Kent State University (2021). SPSS TUTORIALS: PEARSON CORRELATION.
<https://libguides.library.kent.edu/SPSS/PearsonCorr>

Hayes (2021). Chi-Square (χ^2) Statistic.
<https://www.investopedia.com/terms/c/chi-square-statistic.asp>

Moon and Zhong (2020). What Drives Customer Satisfaction, Loyalty, and Happiness in Fast-Food Restaurants in China? Perceived Price, Service Quality, Food Quality, Physical Environment Quality, and the Moderating Role of Gender.
<https://www.mdpi.com/2304-8158/9/4/460>

Mendoza (2020). #Let's Eat: Group ordering behavior of Filipino millennials in selected casual dining restaurants of Manila.
https://www.ajhtl.com/uploads/7/1/6/3/7163688/article_48_vol_9_2_2020_philippines.pdf

Espiritu (2018). Classic Savory.
<https://prezi.com/p/yvynapndnasu/classic-savory/>

Dong, Han et al. (2018) Evolutionary food quality and location strategies for restaurants in competitive online-to-offline food ordering and delivery markets: An agent-based approach
<https://www.sciencedirect.com/science/article/abs/pii/S0925527318302020>

Smith and Anderson (2016). Online Shopping and E-commerce (New technologies are impacting a wide range of Americans' commercial behaviors, from the way they evaluate products and services to the way they pay for things they buy).

https://assets.pewresearch.org/wpcontent/uploads/sites/14/2016/12/16113209/P_2016.12.1OnlineShopping_FINAL.pdf



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City of Dasmariñas, Cavite 4114, Philippines
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Local 7139