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Research Article

COVID-19 Vaccine Hesitancy in Selected Middle and Old-Aged - Individuals: A Comparative Study

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ABSTRACT

Hesitancy to COVID-19 Vaccine is a deterrent to Herds Immunity. There was a percentage of middle-aged and old-aged groups who were reluctant to submit for COVID-19 Vaccination in Talisay City, Cebu. The researchers wanted to investigate the perceptions of both the Middle-aged group (40 – 59 years old) and the old-aged group (60 years old and over) toward Covid 19 in terms of confidence, complacency and convenience utilizing a Comparative study. Objectives: The researchers sought to know the similarities and differences among middle-aged and old-aged residents in Talisay City, Cebu Philippines towards the COVID-19 vaccine. The paper also investigated the gap of the study such as knowing what the impact of the reluctance of the population against the COVID-19 (Coronavirus disease 2019) vaccine would be, as well as knowing the claims of the respondents of the study regarding the concepts that deter their motivation to submit to Covid 19 Vaccination. A simple random sampling technique was used in determining the ten (10) out of 22 barangays in Talisay where the sample came from. Whereas non-probability purposive sampling was utilized in choosing the specific sample of the population based on researchers' judgment. The researchers based the number of populations in each barangay, the researchers utilized a quantitative comparative research design, using a survey questionnaire that includes knowing the demographic profile, level of understanding of the COVID-19 vaccine, and their culture that influences the respondents pertaining to the COVID-19 vaccine. Two sample T-tests, ANOVA, chi-square, and Pearson r statistical treatments were used to compare the means of middle-aged and old-aged groups in terms of COVID-19 vaccine hesitancy. Based on the result, the perception of middle and old-aged adults tells us no difference in terms of confidence, complacency, and convenience, and the old-age adults tend to be more hesitant to be vaccinated. Thus, it is recommended to use sources of vaccine information accessible in the community in order to increase awareness and vaccination among these age groups.

Keywords: COVID-19 vaccine, Old-age and middle-age, Comparative, COVID-19 vaccine hesitancy

Introduction

The occurrence of an infectious viral disease (COVID-19) caused by the SARS-CoV-2 had caused severe disruption around the world. It was believed to originate in China last December 2019, which bears pneumonia-like symptom. First known documentation was in Wuhan, Hubei Province, China, in December 2019 (Xiao et al., 2015; Zhu et al., 2020). Shortly after that, on March 11, 2020, the World Health Organization (WHO) declared the novel coronavirus an epidemic and subsequently, declared a pandemic (Buheji et al., 2020) due to the magnanimous multiplication rapid increase in the number of cases not in China alone but outside and whole world. outside China led the World Health Director-General to announce on March 11, 2020, that the outbreak was a pandemic. The world is a small-connected globe with a short travel time between its remote

parts. COVID-19 has spread globally and swiftly, with significant impacts on the health, quality of life, and economy of communities that were disrupted (Kharas and Dooley, 2021 and Canque et al., 2021).
According to Cennimo (2021), COVID-19 (Coronavirus disease) is severe acute respiratory syndrome a disease identified as severe acute respiratory syndrome coronavirus. This is believed to originate in Wuhan City, Hubei Province, China. The contagion went to its worst infecting more populations which developed a pandemic and an outbreak all over the world. The COVID-19 (Coronavirus disease 2019), which originated in China, is believed to be a carryover of an animal coronavirus that later adopted the ability to transmit from person to person. Because the virus is highly infectious, it spreads quickly and evolves continuously in the human population.
The widespread infection was a global threat (Hiscott et. al., 2020) that needed instant interventions outright (Derasin et. al, 2021). The Philippines had its first suspected case of COVID-19 (Coronavirus disease 2019) on January 22, 2020, just episodes after the disease were declared a pandemic, and the cases of COVID-19 (Coronavirus disease 2019) peaked on March 1, 2020, with a total of 633 suspected cases of the disease (Edrada et. al., 2020). As a result, there seems to be an endless population collection of positives in COVID-19 (Coronavirus disease 2019) and the increasing death toll brought about to cause the collapse of healthcare services and health facilities superimposed by overwhelming shortage of healthcare manpower across the devastating health care utilization. COVID-19 positive cases, continuously had an increasing number affected thus, health and social care system were devastated as they faced shortage of manpower due to getting the direct infection as well as vaccines /facilities thus with extreme difficulty an overwhelming catastrophic decline & crumpled accounting to be caught unaware of the morbid effect of the Coronavirus superimposed with lack of pandemic preparedness, shortage of personal protective equipment (PPE), fear, and anxiety amongst residents and service users during the pandemic (Nyashanu et. al., 2020).
With the advent of the predicament of the world population, there was not much of the right approach nevertheless offers doubts and sceptical adaptation of protocols seemed to give vague answers, grey areas towards how to settle to the right action on how to disrupt the chain of infection of Coronavirus hence vaccination came in as the ultimate answer. The invention and the arrival of vaccines resulted in an upheaval of hesitancy to some populations in the Philippines.
According to (Cordero, 2020), the Philippines Filipinos did not to get vaccinated against Corona Virus (COVID-19) as they were hesitant over the effect of Corona the vaccine due to conflicting information about its efficacy, despite the government's efforts to disseminate the advantages along with vaccination. The COVID-19 vaccine has been developed so that people in the Philippines can get it. Despite this, turnout is not as high as the government would like, with vaccine hesitancy posing a threat among, the elderly in both remote and densely populated areas.
The researchers embarked on this study based on the premise that there were issues that influenced the hesitancy of the COVID-19 vaccine to middle-aged and old-aged groups in Cebu, Philippines. This paper will serve to compare the review of the literature on vaccination hesitancy, identify the factors that influence the hesitancy by such, and to investigate on the differences and similarities of middle-aged and old aged group who were hesitant in receiving vaccination against COVID-19. Further, two sample T-test statistical treatment will be used to compare the means of middle-aged and old-aged groups in terms of COVID-19 vaccine hesitancy.

Methods and Materials

This study employed a comparative quantitative design to investigate the similarities and differences between the two populations, namely the middle-aged and the old-aged group utilizing statistical analysis.
The researchers used the simple random sampling technique in determining the five (5) out of 22 barangays in Talisay where the sample came from. Non-probability purposive sampling was used to determine the specific sample from the population. The researchers based the number of populations in each barangay, Camp IV, Lagtang, Linao, Población, and Tabunoc. Another barangay from Talisay, which is the barangay Tangke was used as the research locale for the pilot testing. In this regard, the researchers specifically chose those who were within the age bracket of 40 – 59 years old, for the middle–aged group, while 60 years old and above for old – the aged group, who do not want to be vaccinated against COVID-19 (Coronavirus disease 2019), as the study suggests to know a comparison between the middle-aged and old-aged group in terms of COVID-19 vaccine hesitancy in Talisay City, Cebu Philippines.
Moreover, the researchers calculated the sample size needed for the study through Cochran's formula, with a confidence level of 95% and a 5% margin of error over the 3911 population of middle–aged and old–aged in the selected barangays of Talisay City, Cebu Philippines.
Moreover, the research instrument that was utilized was **r**esearchers' constructed survey questionnaires a checklist instrument yet a universally validated compendium from the World Health Organization (WHO) designed to tailor targeted interventions aimed at increasing vaccine acceptance and, ultimately, immunization rates, a universally validated compendium of survey questions is required at the global, national, or subnational level (World Health Organization, n.d.). The standardized Vaccine Hesitancy Survey (VHS) questions made by the SAGE Working Group have not been psychometrically evaluated, however a study by (Domek et al., 2018), conducted a field testing of the WHO SAGE Working Group Vaccine Hesitancy Survey Questions and results have shown that the VHS offers a strong initial step towards understanding, evaluating, and monitoring vaccine

hesitancy in a global setting. As such, Likert scale questions from VHS were identified to have two underlying constructs that had an eigenvalue of 1.0 or greater. The first eigenvalue yielded 59.6% while the second eigenvalue represented 76.3%. The survey prepared by the researchers consists of 38 open-ended questions that are answerable in 15 minutes. The questions being made aim to know the comparison COVID-19 vaccine among the middle-aged group and old-aged group in Talisay, City.

The survey entails knowing the (1) level of perception of middle-aged and old-aged residents of COVID-19 vaccine hesitancy in terms of confidence, complacency, and convenience, (2) identifying any significant association between the profile and COVID-19 vaccine hesitation tendency of the respondents, and (3) the frequency and sources of information of COVID-19 vaccine.

Subsequently, the survey question has (3) three parts namely, (1) the demographic profile, which intends to know their age, gender, marital status, educational attainment, their source of income, as well as their comorbidities, if present. (2) Factors that contribute to COVID-19 Vaccine hesitancy among middle-aged and old–aged residents in Talisay, City Cebu Philippines which is divided into (4) sections: confidence, complacency, convenience, and source of information on the COVID–19 vaccine. This part of the survey question tends to seek why vaccine hesitancy against COVID-19 exists, what the reasons of the respondents, and what possible intervention could be done to lessen their hesitancy with the COVID–19 vaccine. It contains a total of 30 narrative statements pertaining to the reasons for vaccine hesitancy where the respondents will answer on a scale of 1 – 5 which corresponds to the following: 1 – poorly knowledgeable; 2 – slightly knowledgeable; 3 – somewhat knowledgeable; 4 – moderately knowledgeable; 5 – strongly knowledgeable. The respondents will answer to each question based on their level of perception or understanding of the statement presented. Furthermore, (3) COVID–19 vaccine probability is the third and last part of the survey question which aims to know what are the odds that the respondents will agree to be vaccinated against COVID–19 as well as the possible reasons why they are hesitant to get vaccinated against COVID-19.

Prior to collecting the data, a Pilot Study was conducted separately, utilizing a minimum of ten (10) respondents to a different research locale to a specific middle-aged group. Subsequently, the same survey questions were conducted to old, aged groups. This is to test the reliability of the survey questions prepared since there is a new culture that was applied. The researchers conducted this survey via online survey through Google Forms. The responses were collected through Google Forms that are saved in Google drive. The samples were then analyzed by the researchers through a Cronbach's alpha score that assessed the reliability and the strength of consistency of the questions in the survey. The researchers made corresponding corrections and refinements if the need warrants.

Data Analysis

The survey questions were given to the respondents of the study who belong to the middle-aged group and old-aged group, to identify the COVID-19 vaccine hesitancy of the respondents in Talisay City, Cebu. Moreover, an Annova statistical treatment was utilized for two (2) sample means of middle-aged and old-aged residents in terms of COVID-19 vaccine confidence, complacency, and convenience to determine significant difference between two groups. Whereas Chi-square statistical treatment was used in identifying significant association between the profile and the COVID-19 vaccine hesitation of middle and old-aged residents in Talisay City, Cebu Philippines. The survey question that was provided entails a scale of 1 – 5 choices ranging from 1 as poorly knowledgeable and 5 as strongly knowledgeable, thus allowing the data gathered by the researchers to be interpreted easily. Additionally, the questionnaire that was given by the researchers to the respondents via Google Forms online, to easily keep the responses of the respondent in Google Drive, which then be transferred to the excel for easy analysis.

Ethical Consideration

The survey questions were provided via Google forms to comply with the rules mandated by the University. As such, the researchers asked for an ethics clearance from the Dean of the College of Nursing and Allied Health Sciences (CNAHS) and Barangay Captain of Talisay City, Cebu prior to data collection. Afterwards, the researchers proceed with the data collection by providing the link for the survey questions via Google Forms.

The ethical principles that were observed in this study are beneficence, confidentiality, veracity, and respect for human dignity.

Informed consent – prior collecting the data, an absolute consent was provided to the respondents to ensure that no respondents has been coerced to answer or participate in the study. Additionally, this consent has intended to allow the respondents to voluntarily participate in the study with full information about what it means for them to be part of the study.

Beneficence – this principle upholds and ensures that there is no harm done upon conducting the data collection. As such, whatever the respond of the respondents may be, respected by the researchers. Additionally, this principle ensures the respondents that are not exposed to any risk while participating in the study.

Confidentiality – part of the study is collecting personal data from the respondents such as their age, gender, address, comorbidities, as well as their responses to the survey. As such, all data gathered from the respondents is protected and kept in full confidentiality. By all means the identity of the respondents is protected and kept.

Veracity – this ethical principle allows the respondents to have full knowledge of the purpose, process, as well as result of the study.
Respect for human dignity – safeguards the privacy and personal information of the respondents thus also ensuring the welfare of the respondents who participated in the study.
After the ethics clearance had been granted to the researchers, data collection in Talisay City, Cebu respondents was done through online survey questions. Subsequently, a recruitment poster was posted on the Facebook page of the researchers as well as in Facebook groups of the targeted barangay to inform the residents that there is a study that addresses the issue in their barangay. As such, the respondents have been handed out consent forms first to ensure that the respondents will be participating in the study on their own and not out of force by the researchers. If the patient had given their consent to push through with the study, the researchers then provided instructions and explained to them the purpose and benefits of the study. In addition to that, the researchers also highlighted providing strict confidentiality with the personal information provided by the respondents and that, the data that was collected namely their name, age, address, gender, as well as their answers to the survey questions is be solely used for the analysis of the study and was
not be shared by any third party.

Results And Discussion

This part presented the analysis and the presentation of data. The first part presents the demographic profile of the respondent. This is followed by the Level of perception of the respondents in terms of confidence, complacency, and convenience.
Table 1. Demographic Profile
Gender
The study intended to find out the gender distribution of the respondents. The data showed that out of 350 respondents, there were 195 female respondents (67.9%), 95 from which are from middle aged and 99 from the old aged while 154 were male (53.9%). The findings suggested that more female respondents responded to the online survey questionnaire.

DEMOGRAPHIC PROFILE	**f**	**%**
GENDER		
Female	195	55.7
Male	155	44.3
TOTAL	**350**	**100**
AGE		
40-59	175	50
60-85	175	50
TOTAL	**350**	**100**
CIVIL STATUS		
Married or Domestic partnership	180	51.4
Separated	40	11.4
Single	19	5.5
Widowed	111	31.7
TOTAL	**350**	**100**
EDUCATIONAL ATTAINMENT		
College Graduate	49	14
College Undergraduate	74	21.1
Elementary Undergraduate and below	66	18.9
High-school Graduate	91	26
High-school Undergraduate	52	15
No Grade Completed	18	5
TOTAL	**350**	**100**
COMORBIDITIES ACCORDING TO GROUP AGE		
Allergies	28	8
Cancer	18	5.1
Cardiovascular disease	58	16.6
Diabetes 1 & 2	25	7.1
Immunocompromised	8	2.3
None	213	60.9
TOTAL	**350**	**100**

Age
The study also has two age groups which are the middle-aged group which ranges from 40 to 59 and the old-aged group which ranges from 60 to 85. The data showed that out of 350 respondents, 175 of them were in the middle-aged group which is 50% of the total population. The data also shows that the other 175 of the respondents belonged to the old aged group which is the other half of the total population. According to studies, age above 25 years old, higher educational attainment, and employer recommendation improved the likelihood of vaccination acceptance, whereas unemployment increased the risk of vaccine hesitation (Joshi et al., 2021).

Civil Status
The study further shed light on the civil status allocation of the respondents. The data showed that out of 350 respondents, 180 were married or had a domestic partnership (51.4%), 40 were widowed (11.4%), 19 were single (5.5%), and 111 were separated from their spouses (31.7%). The study shows that most of the respondents have partners or are married and a lot were also separated. The study of Liu et al. (2023), explained that during the early stages of the pandemic, when the vaccine was first widely accessible, divorced/separated older persons had much lower COVID-19 vaccination uptake than their married counterparts. Likewise, Khubchandani et al. (2021) expanded that older persons who are divorced or separated have less knowledge about health issues, which could explain why they are less aware of vaccines or are more hesitant to get them than married adults.

Educational attainment
In terms of educational attainment, the majority are high school graduates with ninety-one (91) respondents (26%). Moreover, another seventy-four respondents (21.1% are college undergraduates. According to Larson et al. (2016), Individuals with lower education levels may be discouraged from vaccination due to gaps in understanding regarding the effectiveness and safety of vaccines or to rigid anti-vaccine views.

Table 2. Level of perception of the respondents in terms of confidence, complacency, and convenience.

Inferential Statistics Summary: Analysis on Variables and Age Group					
	F-value	P-Value	Statistical Statement (ANOVA)	chi-square test	Test Statistic
CONFIDENCE	0.5302	0.4670	Fail to Reject Null Hypothesis: The means are equal	9.4877	0.5324
COMPLACENCY	2.5651	0.1101	Fail to Reject Null Hypothesis: The means are equal	7.8147	6.2337
CONVENIENCE	0.0723	0.7881	Fail to Reject Null Hypothesis: The means are equal	9.4877	6.4684

The level of perception of the middle- aged and old- aged residents in terms of COVID 19 vaccine hesitancy were examined through statements that was assessed how much they have learned about the vaccine. Each statement can be answered on a scale of 1-5 where 1 is poorly knowledgeable, 2 as slightly knowledgeable,3 as somewhat knowledgeable, 4 as moderately knowledgeable, and 5 as strongly knowledgeable. The table below shows the average scores of confidence, complacency, and convenience among middle-aged and old–aged residents. Analysis of Variance (ANOVA) was used to compare the means of middle and old–age group. The test revealed a score of approximately 0.4670 for confidence, 0.1101 for complacency, and 0.7881 for convenience. The result was revealed to fail in rejecting the null hypothesis, which means the means of both middle and old-aged groups are equal. Subsequently, a Chi-Square test was done to check whether the middle-aged and old-aged groups are likely to be related to the Covid vaccine confidence, complacency, and convenience. The results of the Chi-Square test are as follows: Confidence – 4.4877, complacency- 7.8147, and convenience- 9.4877. The results of the three categories are all higher than the statistical test which means it fails to reject the null hypothesis and that the average scores of both variables and the three Cs are independent, hence no difference.
Analysis 2. Morbidity in old-aged and middle-aged

Inferential Statistics Summary: Coping Processes and Age Groups			
CHI-SQUARE TEST			
	chi-square test	Test Statistic	Statistical Statement (CHISQ)
MORBIDITY	11.0705	44.8444	Reject Null Hypothesis: Comorbidity is dependent from Age Group
DEPENDENCY	3.8415	13.4587	Reject Null Hypothesis: Dependency is dependent from Age Group

This table presents whether the comorbidity of the variables - to morbidity average is different, and a comorbidity and age group are dependent or independent of one another. The form analysis used ANOVA to see if there are differences in the average scores of variables whereas, the latter used the Chi-Square test an interdependence to see if both variables are dependent on one another.
As seen in the table, the middle has a p-value of 0.3970 which means it failed to reject the null hypothesis. Therefore, this implies that the means of the comorbidity among the middle-aged are equal. Whereas the p-value of the old age yielded to 0.0076, which depicts to reject the null hypothesis, which can be interpreted as the means of the comorbidities among the old- aged are equal. Additionally, as the third column shows the total respondents' p value resulting in 0.0232 which also rejects the null hypothesis.

PEARSON'S R TEST			
	t Test	Test Statistic	Statistical Statement (PEARSON)
LIKELIHOOD TO VACCINATE (Middle Aged)	1.0000	6.7368	Reject Null Hypothesis; There is relationship between Average stimuli scores and Likelihood to get vaccination
LIKELIHOOD TO VACCINATE (Old Aged)	1.9736	3.6602	Reject Null Hypothesis; There is relationship between Average stimuli scores and Likelihood to get vaccination

This table sought to determine if there is a significant association between the profile and vaccine hesitation tendency of the middle-aged and old-aged group. The Pearson r test was used to see if there is any correlation/association between vaccine hesitancy of the two - aged groups. Whereas the table below shows that the likelihood to vaccination in the middle- aged and old-aged individuals show a significant relationship between average stimuli score and likelihood to get vaccination with a result of 1.0000 for the middle-aged and 1.9736 for the old- age.

Conclusion

After conducting the research methodologies and undergoing with the statistical treatment of the study, the similarities, and differences of middle–aged and old–aged individuals in Talisay Cebu were determined. The research respondents of the study, having a total of 350 middle and old - and old-aged individuals revealed that middle-aged and old-aged residents have similarities in perception of the COVID-19 vaccine in terms of confidence, complacency, and convenience as well as in vaccine likelihood. The perception of the COVID-19 vaccine among middle and old - and old-aged individuals has no significant difference since their mean averages are equal. hence, it does not matter to any stimuli scores such as confidence, complacency, and convenience. Subsequently, the middle–aged and old–aged individuals differ in terms of comorbidities and dependency as it shows that in both categories, the old–aged group are more likely to be hesitant in having vaccinated against COVID–19 due to the abovementioned reason. Furthermore, Analysis of Variance (ANOVA) was used to determine if there are any significant differences among the variables, namely the middle–aged and old–aged individuals when it comes to COVID–19 vaccine hesitancy while another statistical tool was used to measure the relationship between the average stimuli scores and the likelihood to COVID – 19 vaccinations. The latter revealed a positive result to Pearson R, approximately 1.0000 for the middle–aged and 1.9736 for the old–aged group which indicates to rejection of the null hypothesis and thus reveals an implication that there is a relationship between average stimuli scores and the likelihood to get vaccinated in both middle and old – aged group.

Recommendation

Based on the given the findings of present study the vaccine-hesitant population the result showed strong feeling against the COVID vaccine hence the researchers suggested the following:

1. Use information sources trusted by these people that will improve their feelings towards the vaccine.
2. Making the vaccine available and easy to access, especially to older adults, The result of this study showed the difficulty in the access of the vaccine due to a lack of information about the vaccination sites. The researchers suggest that direct home vaccinations be lifted in order for unvaccinated citizens could avail of the vaccine.
3. The researchers suggest community health training like home visits and information campaigns which are the most common. Community activity for systematic engagement of home visits improves program acceptance and utilization of immunization services.

4. Interventions such as reminder calls, SMS, and emails were adopted as media-based strategies to address vaccine hesitancy. Low income, negative attitude towards immunization, and lack of knowledge were the most recorded reasons for vaccine hesitancy. The overall study outcome with this intervention strategy suggests reminder calls, SMS, and emails to set as reminders

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