A Correlational Study on Health Literacy and Polio Vaccine Hesitancy among Filipino Parents

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Abstract: - Health literacy is important because it facilitates health-based decision-making. As many Filipinos are reluctant to get vaccinated, it became a topic of discussion. This study aimed to determine if there was a significant association between health literacy and Polio vaccine hesitancy among Filipino parents of children aged 2 months to 6 years. Purposive sampling was used to select 152 parents from selected places in Luzon. Data on health literacy and polio vaccine hesitancy was collected through Google Forms. Partial least squares-path modeling was used to determine the association between health literacy and Polio vaccine hesitancy. External based health care presented a significant association with all factors of Polio Vaccine Hesitancy. Moreover, it was also negatively associated with two factors, and positively associated with the remaining two factors. Disease prevention presented a significant association with contextual influences and positive vaccine issues while Health promotion presented a significant association with positive vaccine issues only. Generally, health literacy presented a significant relationship with polio vaccine hesitancy. The association of health literacy and polio vaccine hesitancy may help the health sector understand the need to address polio vaccine hesitancy and create programs to improve the health literacy of parents.

Key Words: — ***Health literacy, Polio Vaccine Hesitancy.***

I. INTRODUCTION

Vaccine hesitancy is defined by the World Health Organization (WHO) as a delay in acceptance or refusal of vaccines despite availability of vaccination services which has been present in the past in other parts of the world and it has worsened in the Philippines due to the Dengvaxia controversy in 2017. Dayrit, M.M., R. U. Mendoza and S.A. Valenzuela[1] states that a year after the Dengvaxia controversy, only 66% of children are fully immunized, remarkably below the country's 95% target, which means that 2.9 million Filipino children are at risk of contracting life-threatening diseases. Moreover, according to Larson, H.J., K. Hartigan-Go and De Figueiredo,[2] vaccine confidence from 93% dropped to 32% in 2018.

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With regards to vaccine safety perceptions, there was a drop from 82% agreeing that vaccines are safe in 2015 to 21% in 2018, whereas the percentage of respondents agreeing that vaccines are important for children has also dropped from 99.5% in 2015 to 76.2% in 2018. Additionally, Fatima and Syed state that the fear resulting from the Dengvaxia controversy has led to parents' refusal of vaccinating their children in resistance to other diseases that can also be prevented by immunization, giving rise to vaccine hesitancy.[3] The steadily growing number of parents in both developed and developing nations refusing to be vaccinated and have their children immunized has prompted the WHO to declare vaccine hesitancy as one of the top ten major threats to global health in 2019 as mentioned by Kashyap et al.[4].

This phenomenon, many Filipinos rejected vaccines, which led to the re-emergence of the previously eliminated polio. Polio, caused by the Poliovirus, from the family *Picornaviridae*, is a viral infection claimed to have been eradicated in the year 2000 through the development of a vaccine that helped prevent the spread of infection. However, on September 19, 2019, polio was confirmed to have re-emerged in the Philippines as

vaccine-derived poliovirus (VDPV) after several years of polio being supposedly "eradicated." This is a rare strain that is prominent within areas that have poor sanitation. In severely under-immunized communities, an excreted vaccine poliovirus can mutate and cause acute flaccid paralysis.[5]

Health literacy such as comprehending complex information is becoming increasingly important as a larger portion of responsibility for health comes from the patients' hands. A study conducted by Khowaja et al.[6] presents that some parents refuse to have their children vaccinated with the polio vaccine, as they consider it ineffective due to lack of knowledge about the disease. As reported in 2019, it was acknowledged by the Philippine Department of Health that vaccine hesitancy was one of the challenges faced by the rapid coverage assessment teams of the polio outbreak immunization response.[7] This would be brought about by biased media opinions after the Dengvaxia controversy as it enabled social media to be driven with false narratives such as the hasty conclusion that the dengue vaccine caused deaths without solid evidence, along with the distortion of scientific and regulatory information by some health professionals.[2] To put it clearly, health literacy has been defined by the Institute of Medicine as the degree to which individuals have the capacity to acquire, process, and understand basic health information and services needed to come up with appropriate health decisions.[8]

Health literacy has also become a point of discussion with vaccine hesitancy, as many Filipinos are reluctant to avail the vaccine due to mistrust of healthcare professionals or lack of financial support. In other countries, vaccine hesitancy had also become prevalent and led to the rise of many vaccine-preventable diseases, including polio due to poor health literacy according to a study by Pugliese-Garcia et al.[9] Moreover, Shah et. al. concluded that the low health literacy and poor information dissemination in multimedia outlets regarding the accuracy of the oral polio vaccine had caused the lack of trust of people towards the Pakistani government, which led them to become hesitant towards the OPV[10]. Tested for a correlation between their respondents' exposure to multimedia to their uptake of the polio vaccine and other vaccines during the 2013 silent polio outbreak in Israel and concluded that there was a significant association between exposure to multimedia and the uptake of the polio vaccine and other vaccines Sagy, et. al.[11]

The health literacy and polio vaccine hesitancy in the Philippines intended to introduce a third inactivated polio vaccine among Filipinos in selected regions by distributing a pre-introduction and post-introduction survey which yielded a positive result as the respondents stated that they were comfortable with a third vaccine, thus connecting health literacy through surveys with vaccine acceptance. There is a need to further understand vaccine hesitancy as a phenomenon and its possible correlational factors, such as health literacy, to effectively address the polio vaccine hesitancy, meet the desired target vaccination coverages, and eventually achieve polio eradication in the Philippines once again Lopez, et. al.[12]. Having said this, the researchers intended to correlate how health literacy affects a parent's opinion in terms of his/her child's vaccination against polio. A descriptive correlation was used to determine the association among Filipino parents towards immunization and health literacy.

II. METHODS

2.1 Instrumentation

The participants completed a three-part questionnaire that included a survey of open-ended questions pertaining to the respondent's socio-demographic profile, whereas the second and third parts of the survey consisted of close-ended questions based on health literacy and vaccine hesitancy, respectively which were adapted and modified from two studies, the second part from the European Health Literacy Survey Questionnaire (HLS-EU-Q47) with a four-point Likert scale which is from a study by Domanska et al.13. Whereas the third part of the survey from the World Health Organization with a five-point scale14. Pretesting was done to assure the reliability and to assess the internal consistency of instrument variables before the actual float of the questionnaire. To assess the internal consistency of the variables of the instrument, McDonald's Omega and Cronbach's Alpha were performed. Pretesting was done per instrument category and upon analysis, it yielded values between 0.849 to 0.930 on each item which indicates that all items were acceptable to good.

2.2 Data Gathering Procedure

Due to the pandemic, the gathering of participants from wider areas was restricted and the sampling design that was utilized gives the authors the will to set their own sample or quota. Thus, a total of 152 participants were non-randomly selected as they met the inclusion and exclusion criteria set by the researcher using purposive sampling. The participants would be provided with a form through Facebook Messenger that included informed consent and a choice to take the survey in either English or Filipino. The response rate was 100 % for Filipino parents with children aged 2 months to 6 years old

within the locale around the areas of Luzon particularly in selected municipalities of the following provinces: Cagayan Valley, Bataan, Batangas, Pampanga, and Metro Manila.

2.3 Ethical Considerations

The researchers presented consent forms to all the selected participants. The researchers assured confidentiality in the identity of the respondents and all pertinent information were kept private. The study was reviewed and granted approval for implementation by the University of Santo Tomas Faculty of Pharmacy Research Ethics Committee (FOPREC) with study protocol code FOP-REC-2021-01-056. Therefore, all measures, conditions and data exclusion are reported.

2.4 Statistical analysis

The significant association between health literacy, involving health care, disease prevention, and health promotion, and polio vaccine hesitancy, was determined by partial least squares-path modeling (PLS-PM) where in the final set of scales used were evaluated based on acceptable convergent validity, internal consistency, composite reliability and discriminant validity which is done with WARP-PLS software.

III. RESULTS

A total of 152 individuals participated in this study. The mean age of these participants was 32.75 years with a standard deviation of 7.643 years; the youngest age was 20 years, while the oldest age was 61 years.

Table.1. Profile of respondents

Variable	Frequency	Percent
Place of residence		
Bataan	25	16.45
Batangas	50	32.89
Cagayan Valley	26	17.11
Metro Manila	26	17.11
Pampanga	25	16.45
Distribution of children at most 4 years of age		
	Frequency	Rank
2 to 5 months old	22	3
6 to 11 months old	17	4
1 to 3 years old	77	1
4 to 6 years old	60	2

Table.1. shows the profile of the participants in terms of residency as well as the distribution of their children aged 6 years or younger which are solely for identification and not for analysis. Other demographic factors such as socioeconomic and educational status in association with health literacy as well as gender are not included in the objectives of this study.

Questionnaires were directly sent to the parent who primarily makes health decisions for their children. The mean age of these participants was 32.75 years with a standard deviation of 7.643 years; the youngest age was 20 years, while the oldest age was 61 years. In addition, a total of 17.11% were residents in Metro Manila and Cagayan Valley, 16.45% were from Bataan and from Pampanga, while 32.89% were residents of Batangas. From the same table, we have noted the rank of each age range of the respondents' children based on their frequency. Topping the list would be 1-3 years old, then 4-6 years old ranked as the second, followed by 2-5 months old, and 6-11 months old, respectively.

Table.2. Profile of parents based on over-all health literacy level

Categories	Frequency	Percentage
Excellent	22	14.47
Sufficient	64	42.11
Problematic	49	32.24
Inadequate	17	11.18

Table.2. shows the overall health literacy level of the respondents. It can be gleaned that 64 (42.11%) respondents have an overall health literacy level classified as sufficient, and 22 (14.47%) are of excellent level. A total of 49 (32.24%) have a "problematic" level, while 17 (11.18%) have an "inadequate" level of overall health literacy.

Table.3. Summary of over-all polio vaccine hesitancy score

	Values
Valid	152
Mean	3.604
Median	3.550
Mode	3.000
Std. Deviation	.501
Minimum	2.65
Maximum	4.90

Table.3. shows that the mean polio vaccine hesitancy score is 3.604 with a standard deviation of .501. The lowest score is 2.65, while the highest score is 4.90. The median score is 3.55, while the mode or most common score is 3.0.

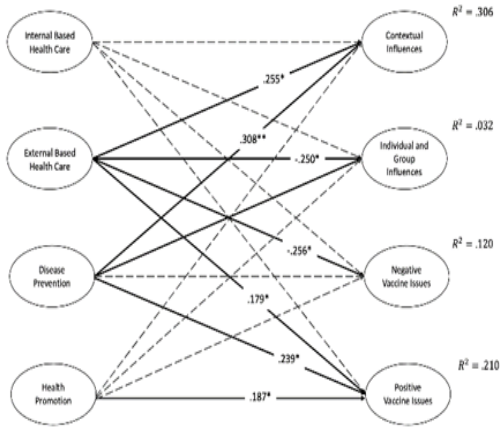

Fig.1. Structural model to show significant paths

External based health care is positively and significantly associated with contextual influences (b = .255, p < .05) and positive issues about the vaccines (b = .179, p < .05). On the other hand, external based health care is negatively and significantly associated with individual and group influences (b = -.250, p < .05) and negative issues about the vaccines (b = -.256, p < .05). Meanwhile, disease prevention is positively and significantly associated with contextual influences (b = .308, p < .01) and positive issues about vaccines (b = .239, p < .05). Finally, health promotion is positively and significantly associated with positive issues about polio vaccines, b = .187, p < .05 (Fig. 1).

IV. Discussion

4.1 Main Findings of This Study

The responses regarding health literacy, involving healthcare, disease prevention, and health promotion, present a significant association with polio vaccine hesitancy with regards to contextual influences, individual or group influences, and negative and positive vaccine issues. This is in agreement with a study conducted by Pugliese-Garcia et.al.9, which stated that vaccine hesitancy was linked to poor health literacy. As presented in the results, the different variables of health literacy had presented significant association with the different variables regarding Polio Vaccine Hesitancy. The associative factors such as external based health care which means obtaining information on health issues, is positively and significantly associated with contextual influences that pertain to any effect to the individual caused by significant past events. This highlights a positive association in participant's willingness to receive polio vaccine. External based health care is also positively associated with positive issues about vaccines which is a variable to be associated with the factors and statements that are good to hear such as respondents being able to understand and apply what the doctor says. This deduces availability of vaccines when needed, the immunization programs of the government and free access to these polio vaccines in the country. The study of Taylor et al.15 points out that it is of great importance to strengthen the trust in community-government relationship and partnership.

External based health care is negatively and significantly associated with individual and group influences and negative issues and about vaccines. Individual and group differences connote that various existing religious and cultural reasons, and other serious reactions after getting vaccination hinder vaccination. Appropriate interventions were needed to break these complex and multiple barriers to promote vaccination.16 Meanwhile, negative issues highlight the efficacy of polio vaccines, presence of barriers and cost of vaccinations in preventing children from being vaccinated.

Disease Prevention means making informed decisions on health risk factors, presenting a positive and significant relationship with both Contextual Influences and Positive Vaccine Issues. This implies that due to sufficient literacy regarding disease prevention, there is a positive association with the respondent's willingness to accept information and administration of vaccines. The results also imply that due to sufficient literacy, there is also a positive association with the respondent's confidence in the availability and access to the vaccine when necessary.

Health Promotion means informing oneself on health determinants, showing a positive and significant relationship with only positive issues regarding polio vaccine. This suggests that this domain of health literacy positively affects the confidence of the respondents regarding polio vaccine availability, trust on immunization programs run by the government and the access of polio immunization in this country is easy. In a study by Furman et al.[17], vaccine confidence has increased due to activities focused on health promotion which are managed by health authorities through social media, one of the effective tools used to increase knowledge and awareness on vaccination and this platform should be used as a public health promotion channel which provides scientific knowledge about the vaccination. Furthermore, a study by Zhang et al.[18] revealed that when including various information processing competencies in their

health literacy model, only better competence of finding and evaluating information was associated with better vaccination-related capacity. This holds the implication that health promotion through information accessibility and appraisal should be given particular weight when it comes to developing programs for vaccine promotion, as well as disease screening and intervention.

4.2 What Is Already Known On This Topic

Trends in vaccines gain much interest over the decades. With the novelty of vaccines and the vaccine-preventable diseases, much hesitancy was seen among people not only in the Philippines but also in the world. With the issues arising from vaccine hesitancy, health literacy is one important aspect in the decision-making process of health care. The responses regarding health literacy, involving healthcare, disease prevention, and health promotion, present a significant association with polio vaccine hesitancy with regards to contextual influences, individual or group influences, and negative and positive vaccine issues. This is in agreement with a study conducted by Pugliese-Garcia et al.9, which stated that vaccine hesitancy was linked to poor health literacy.

4.3 What this study adds

The study showed that health literacy involving the three variables, namely health care, disease prevention, and health promotion, were found to be significantly associated with some aspects of polio vaccine hesitancy regarding contextual influences, individual and group influences and negative and positive vaccine issues. Both health literacy variables, health care and disease prevention, were positively associated with the contextual influences and positive issues about the polio vaccine, while health promotion was the only variable that was positively associated with positive issues related to the polio vaccine. However, health care is presented to be negatively associated with individual and group influences and negative issues related to the polio vaccine.

4.4 Limitations of This Study

The foremost limitation of this study was the limited number of respondents due to the social restrictions and limitations of the pandemic. The purposive nature of the sampling frame limits the generalizability of the results to the whole population. As data were collected through online surveys, the researchers may have not reached vulnerable groups, such as those with lower socioeconomic backgrounds and those who are illiterate. Individuals with poor access to vaccines and awareness-raising interventions—whether they have a lower level of education or live in remote areas —are more likely influenceable by some determinants of polio vaccine hesitancy and are underrepresented in the sample9. Thus, the findings of the study may inevitably be affected by selection bias, as well as potential confounders, such as socioeconomic background, level of education, and especially, one's community. Different communities may have different determinants of vaccine hesitancy, as stated in the literature19. Given that a correlational study was conducted, it can be interpreted in the findings that health literacy is correlated to polio vaccine hesitancy.

However, it cannot be interpreted that health literacy is necessarily a cause of polio vaccine hesitancy. Moreover, the study primarily focused on health literacy and did not cover other determinants that could describe polio vaccine hesitancy. Thus, further research is necessary to identify other determinants and establish if they are associated with polio vaccine hesitancy. This is considering that although health literacy is a significant factor, it alone may not be enough to explain the problem of polio vaccine hesitancy. There is still a lack of evidence about factors associated with vaccine hesitancy in the Philippines, as mentioned in literature19. Furthermore, the study focused only on polio vaccine hesitancy and did not include other vaccine-preventable diseases.

V. CONCLUSION

The findings of the study reflected that the purpose of health literacy in determining polio vaccine hesitancy is influenced by various factors, including the influences of the context, individual or group, and issues of the vaccine in terms of its negativity and positivity. This knowledge could help the health sector understand the need for a multidimensional approach

in addressing polio vaccine hesitancy because based on the results both external based health care and disease prevention are positively associated with contextual influences and positive issues about vaccines, whereas health promotion is only associated with positive issues about polio vaccine. Current and future programs on increasing the health literacy of parents can be planned to target the significant factors of polio vaccine hesitancy found in the study. Furthermore, the results of the study may be used to enable health authorities and parents to work together in creating well-considered and informed solutions and decisions concerning their health and the health of their children, with polio immunization.

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