Volume 3, Issue 1

Original Research Article

PREDICTORS OF DIGITAL HEALTH LITERACY AMONG OLDER ADULTS

Francis Grace Cañezo, Ma. Jhudiel Corazon V. Linogon, Christian Jomel C. Malabay, Miel Marvin S. Cardenas, Timothy Gabriel R. Jalico, Jorselle D. Lagura, Feliz Iva N. Muaña, Kurt Darylle M. Pabillon

College of Nursing, Cebu Doctors' University

Article History
Date Submitted: July 27, 2024
Date Accepted: September 17, 2024
Date Published: December 18, 2024

Corresponding Author: Francis Grace Cañezo, College of Nursing, Cebu Doctors' University, Mandaue City, Cebu, Philippines

Abstract: This study aims to determine whether family household income and educational attainment could predict the digital health literacy of older adults in Guadalupe, Cebu City. This descriptive predictive study includes 199 older adults who met specific inclusion and exclusion criteria. Digital health literacy was assessed using the eHealth Literacy Scale (eHEALS), consisting of eight items translated into Cebuano, with a Cronbach's alpha of 0.84, indicating good internal consistency. Family household income was measured using an income classification table, while educational attainment was evaluated based on the highest level of education completed. Responses were recorded using a five-point Likert scale. Results reveal a strong and statistically significant correlation between digital health literacy and both educational attainment ($V = .777$, $p < .001$) and family household income ($V = .745$, $p < .001$). Multiple linear regression analysis indicates that educational attainment ($\beta = 2.93$, $p < .05$) and family household income ($\beta = .000$, $p < .05$) significantly predict digital health literacy, accounting for approximately 62.3% of its total variance $F(2, 196) = 161.89$, $p < .05$. The study concluded that educational attainment and family household income are significant predictors of digital health literacy among older adults in Guadalupe, Cebu City. Based on these findings, the researchers recommend organizing seminars that teach older adults how to navigate online platforms for health-related information and strengthening social support systems by encouraging assistance from younger family members and community health workers.

Keywords: Digital health literacy of older adults, predictors of digital health literacy, family household income and digital health literacy, educational attainment and digital health literacy

I. INTRODUCTION

The digital world is transforming healthcare, with digital health services and information playing an increasingly important role in maintaining and improving health outcomes. However, older adults face unique health concerns, such as chronic conditions, sensory impairments, cognitive decline, and lower technological proficiency, which pose challenges in adapting to digital technologies (Pourazzavi et al., 2021; Wang & Luan, 2022). Additionally, factors such as lack of internet access, limited familiarity with devices, and skepticism towards new technologies further impede their ability to access and utilize digital health resources effectively.

The concept of digital health literacy refers to the ability to search, understand, evaluate, and use health-related information available online to make informed health decisions. It is an extension of general health literacy, which focuses on the capacity to access and comprehend health information across various mediums (Sorensen et al., 2012). Unlike traditional health literacy, digital health literacy requires specific skills, including navigating online platforms and assessing the credibility of digital information

sources. Older adults often struggle in these areas, underscoring the need for targeted strategies to address their unique challenges.

This challenge is further exacerbated by the "digital divide," a term that describes the disparity in access to digital technologies and the skills needed to use them effectively (Van Dijk, 2005). The digital divide encompasses not only internet connectivity and device ownership but also the digital literacy skills required to engage meaningfully with digital platforms. For older adults, socioeconomic factors such as lower income, limited education, and restricted access to digital tools significantly widen this gap (Hunsaker & Hargittai, 2018).

The growing older adult population underscores the urgency of addressing these issues. The World Health Organization predicts that one in six people will be 65 or older by 2030 (United Nations, n.d.). Studies highlight how socioeconomic factors like family household income, and educational attainment, are positively correlated with digital health literacy in older adults (Estrela et al., 2023; Kim et al., 2022). This means that older adults with higher incomes and education levels are more likely to possess the necessary skills to navigate digital health platforms effectively.

Understanding these challenges is essential to bridging the digital divide for older adults. Educational interventions tailored for older adults, incorporating their life experiences and focusing on their specific needs, can empower them to take charge of their health in the digital age. By addressing the unique barriers faced by this population, healthcare providers and policymakers can create inclusive digital health resources that improve health outcomes and quality of life.

II. METHODOLOGY

This study employed a descriptive predictive research design to examine how educational attainment and family household income influence older adults' digital health literacy. Additionally, the study determined the correlation between digital health literacy and both household income and educational attainment.

Participants were selected based on specific inclusion criteria. The participants had to be adults aged 60 years and above, residing in Barangay Guadalupe, Cebu City, and were active members of the Barangay Guadalupe Senior Citizen Chapter, Banauan Guadalupe Senior Citizen Chapter, or the Guadalupe Parish Senior Citizen Chapter. Participants should be able to provide informed consent and attend the barangay's monthly meetings. Excluded from the study were individuals with severe cognitive impairments or physical disabilities that hindered them from participating in the survey, as well as those who were not fluent in Cebuano or English, to ensure comprehension of the survey tool.

Transmittal letters were sent to the Dean of Cebu Doctors' University (CDU) College of Nursing and the Barangay Captain of Guadalupe to request permission to conduct the study. The CDU Institutional Ethics Review Committee (IERC) approved the conduct of the study. Data collection was conducted during the monthly meetings of the senior citizen groups at the barangay hall. A complete enumeration sampling method was employed, recruiting a total of 199 older adult participants from the three community groups: Barangay Guadalupe Senior Citizen Chapter (93), Banauan Guadalupe Senior Citizen Chapter (60), and the Guadalupe Parish Senior Citizen Chapter (60).

The eHealth Literacy Scale (eHEALS) assessed the perceived skills at using information technology for health and aided in determining the fit for eHealth programs and consumers. The tool consists of 8 items rated on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree),

yielding a total score ranging from 8 to 40. A median score of 31 was used as the cut-off point to classify participants into high (31 or higher) or low (less than 31) eHealth literacy. The Cebuano version of the eHEALS demonstrated excellent content validity, achieving an I-CVI and S-CVI/AVE of 1.0. Pilot testing with 30 respondents from Barangay Tipolo, Mandaue City, showed high internal consistency reliability with a Cronbach's alpha of $\alpha = 0.89$. Descriptive statistics, including frequencies and percentages, were used to profile respondents based on their educational attainment and family household income. To examine the relationship between the variables, Spearman's Rank Correlation Coefficient was utilized to determine the strength and significance of correlations. The predictive ability of educational attainment and family household income on digital health literacy was assessed using multiple linear regression analysis. The model's fit and significance were evaluated based on F-statistics, beta coefficients, and *p* values, with a significance level set at $p < .05$.

III. RESULTS AND DISCUSSION

Table 1. Demographic Profiles of Older Adults in Barangay Guadalupe (*N = 199*)

Profiles		*f*	%
Educational Attainment	Elementary Undergraduate	39	19.59%
	Elementary Graduate	31	15.57%
	Highschool Undergraduate	38	19.09%
	Highschool Graduate	37	18.59%
	College Undergraduate	24	12.06%
	College Graduate	30	15.07%
Family Monthly Household Income	Poor (<Php10,957)	91	45.70%
	Low Income (Php10,958–Php21,194)	50	25.12%
	Low Middle Class (Php21,195–Php43,828)	33	16.58%
	Middle Class (Php43,829–Php76,669)	23	11.55%
	Upper Middle Income (Php76,670–Php131,484)	2	1.00%

Table 1 shows the educational attainment of 199 older adults, revealing that 39 (19.59%) were elementary undergraduates, 31 (15.57%) elementary graduates, 38 (19.09%) high school undergraduates, 37 (18.59%) high school graduates, 24 (12.06%) college undergraduates, and 30 (15.07%) college graduates. The results show that older adults in Guadalupe, Cebu City who had received more education tend to have a better grasp of digital health information. This means that if someone graduated in a higher level of education, he or she is likely to understand health information better when it is presented online or through digital tools. Conversely, those with a lower educational attainment would likely have low digital health literacy. A study by Estrela et al. (2023) supports this by stating that there is a positive correlation between high digital health literacy and high educational level.

Health literacy, while related to education, is not equivalent. Van Der Heide et al. (2013) found that even highly educated individuals can have poor health literacy, highlighting the need for personalized communication strategies in healthcare. Jansen et al. (2018) supported this, emphasizing tailored communication to empower individuals regardless of their education level. Continuous education and empowerment are essential for maintaining optimal digital health literacy throughout life.

The majority of the older adults (45.70%, 91) had a monthly income below Php10,957, classifying them as poor. An additional 25.12% (50) were within the low income group. The remaining participants were low middle class (33, 16.58%) or upper middle class (2, 1.00%). No older adults fell into the high-income or rich categories.

A study done by Estrela et al. (2023) concluded that one who has a high level of digital health literacy tends to be from a place with a high socioeconomic status. The finding underscores the socioeconomic dimension of digital health literacy, highlighting the potential barriers posed by financial constraints in accessing and utilizing digital health resources.

Alleviating family poverty is a critical factor in enhancing digital health literacy among older adults. The implementation of inclusive interventions and the promotion of lifelong learning opportunities can empower older adults to improve their socioeconomic well-being. This, in turn, can lead to increased income levels and greater access to essential digital health resource.

Table 2. Distribution of Digital Health Literacy Levels Among Older Adults of Barangay Guadalupe (*N = 199*)

Level of Digital Health Literacy	*f*	%
Low	101	50.8%
High	98	49.2%

Table 2 shows that nearly half (50.8%) of the 199 older adult respondents exhibited low levels of digital health literacy (DHL).

Beyond merely reflecting the broader digital divide, this deficiency in DHL among older adults underscores the pressing need to address barriers to accessing and effectively utilizing digital health resources. The implications extend beyond individual health outcomes to broader systemic challenges. A population with inadequate DHL poses challenges to healthcare providers and policymakers striving to implement digital health solutions effectively. Without addressing this issue, efforts to improve healthcare accessibility and efficiency may falter, ultimately hindering progress toward broader public health objectives.

Effectively addressing this disparity in DHL necessitates a multifaceted approach. The development and implementation of user-friendly digital health platforms, specifically designed to accommodate the needs and preferences of older adults, can significantly reduce barriers to access and utilization.

Furthermore, the establishment of targeted training programs focused on enhancing DHL within older populations is crucial. Additionally, the cultivation of intergenerational support networks can facilitate the transfer of knowledge and the development of essential skills, ultimately empowering older adults to navigate the digital healthcare landscape with confidence.

Table 3. Correlation of Digital Health Literacy to Household Family Income and Educational Attainment Among Older Adults

Profiles	Correlation Coefficient	Interpretation*
Educational Attainment	V = .777	Significant
Family Household Income	r_s = .745	Significant

* Significant at $p < .001$

Table 3 shows that educational attainment (V = .777, $p < .05$) and family household income ($r_s = .745$, $p < .05$) significantly correlated with digital health literacy.

Recognizing the correlation between digital health literacy, educational attainment, and family household income can guide the development of tailored interventions for older adults. Nurses have the opportunity to develop educational initiatives adjusted to the diverse educational and financial statuses of older individuals. By taking these elements into account, such interventions can be more successful in boosting digital health literacy among the elderly, thereby enhancing overall health results and encouraging proactive participation in managing their own health.

The findings indicate a significant association between educational attainment and digital health literacy. Specifically, the majority of elementary undergraduate respondents (97.43%) exhibited low digital health literacy. Conversely, college graduates demonstrated high digital health literacy. This suggests that higher levels of educational attainment positively influence digital literacy competencies.

The policymakers within both legislative and educational spheres can enact impactful measures to facilitate the attainment of at least a high school diploma for the educational system. This strategic approach would proactively ensure that these individuals, as they transition into older adulthood, possess the requisite level of digital health literacy. Consequently, they would be well-equipped to adeptly navigate the evolving landscape of health monitoring and effectively leverage online digital platforms to access and evaluate credible health information.

Table 4. Multiple Linear Regression Analysis of Digital Health Literacy to Household Family Income and Educational Attainment Among Older Adults

Variable	*β*	*t*	R	Interpretation*
(Constant)	10.369	11.020	0.789	Significant
Educational Attainment	2.935	8.484	$R^2 = .623$	
Family Household Income	.000	5.426		

* $F(2, 196) = 161.89$, $p < .05$

Based on Table 4, multiple linear regression analysis shows that 62.3% of the variation in digital health literacy was influenced by the educational attainment and family household income among older adults (R = .789, *p* value < .05). Using the unstandardized coefficients, the Educational Attainment predicted an increase in digital health literacy at 2.935. This finding suggests that higher levels of education are associated with greater digital health literacy among older adults. As supported by Liu et al. (2023), a better level of digital health literacy is potentially attributed to the diverse health information resources.

These findings underscore the importance of expanding educational opportunities for older adults to facilitate their effective utilization of digital health resources. Furthermore, the results emphasize the necessity of incorporating educational background considerations into the design and development of digital health tools and programs tailored for older adult populations.

IV. CONCLUSION

The study shows that low levels of education and income were common among the older adults in Barangay Guadalupe. These factors were significantly correlated with low digital health literacy. The study also found that educational attainment and family household income were significant predictors of digital health literacy among these older adults.

The researchers recommend several actions to improve digital health literacy among older adults in Barangay Guadalupe. They suggest that student nurses use community-based programs and seminars to share information effectively while maintaining patience and composure, as older adults may face challenges in understanding digital health concepts. Older adults are encouraged to attend outreach programs to learn how to use online health platforms and to seek assistance from younger family members or community workers. Healthcare providers should develop digital literacy screening tools and improve website designs to be more user-friendly, providing step-by-step guides to make navigation easier. Nursing informatics should focus on designing accessible, user-friendly digital tools with familiar interfaces and multilingual options. Lawmakers are encouraged to create policies that ensure a higher level of education and digital literacy for future older adults, as well as invest in digital literacy programs and develop accessible health information platforms.

For future studies, the researchers recommend focusing on specific health conditions, such as hypertension or diabetes, to explore how digital health literacy influences disease management. Increasing the sample size and ensuring the cultural relevance of educational materials are also advised, along with assessing the accessibility of digital technology and the preferences of older adults regarding health information sources. Additionally, future research should examine factors such as perceptions of online health resources and barriers like language and cultural differences, which may affect digital health literacy. These actions aim to improve older adults' ability to manage their health and access digital tools effectively.

References

Estrela, M., Semedo, G., Roque, F., Ferreira, P. L., & Herdeiro, M. T. (2023). Sociodemographic determinants of digital health literacy: A systematic review and meta-analysis. *International Journal of Medical Informatics, 177,* 105124. https://doi.org/10.1016/j.ijmedinf.2023.105124

Hunsaker, A., & Hargittai, E. (2018). A review of internet use among older adults. *New Media & Society, 20*(10), 3937–3954. https://doi.org/10.1177/1461444818787348

Jansen, T., Rademakers, J., Waverijn, G., Verheij, R., Osborne, R. H., & Heijmans, M. (2018). The role of health literacy in explaining the association between educational attainment and the use of out-of-hours primary care services in chronically ill people: a survey study. *BMC Health Services Research, 18*(1). https://doi.org/10.1186/s12913-018-3197-4

Kim, S. H., Kim, S., Kwon, H.-J., & Kim, Y. (2023). Socioeconomic disparities in digital health literacy and its associations with health outcomes in older adults in Korea. *Archives of Gerontology and Geriatrics, 108,* 104942. https://doi.org/10.1016/j.archger.2023.104942

Liu, S., Lu, Y., Wang, D., He, X., Ren, W., Kong, D., & Luo, Y. (2023). Impact of digital health literacy on health-related quality of life in Chinese community-dwelling older adults: The mediating effect of health-promoting lifestyle. *Frontiers in Public Health, 11.* https://doi.org/10.3389/fpubh.2023.1200722

Pourrazavi, S., Hashemiparast, M., Bazargan-Hejazi, S., Ullah, S., & Allahverdipour, H. (2021). Why older people seek health information online: A qualitative study. *Advances in Gerontology, 11*(3), 290–297.

https://doi.org/10.1134/s2079057021030115

Sorensen, L. G., Neighbors, K., Martz, K., Zelko, F., Bucuvalas, J. C., & Alonso, E. M. (2014b). Longitudinal study of cognitive and academic outcomes after pediatric liver transplantation. *The Journal of Pediatrics, 165*(1), 65-72.e2. https://doi.org/10.1016/j.jpeds.2014.03.032

United Nations. (n.d.). *Ageing*. https://www.un.org/en/global-issues/ageing

Van Der Heide, I., Wang, J., Droomers, M., Spreeuwenberg, P., Rademakers, J., & Uiters, E. (2013). The relationship between health, education, and health literacy: Results from the Dutch Adult Literacy and Life Skills Survey. *Journal of Health Communication, 18*(sup1), 172–184. https://doi.org/10.1080/10810730.2013.825668

Van Dijk, J. a. G. M. (2005). *The deepening divide: Inequality in the information society.* Sage. https://archive.org/details/deepeningdividei0000dijk

Wang, X., & Luan, W. (2022). Research progress on digital health literacy of older adults: A scoping review. *Frontiers in Public Health*, *10* . https://doi.org/10.3389/fpubh.2022.906089\