SOCIO-DEMOGRAPHIC VARIABLES AS PREDICTORS OF ELECTRONIC MAIL AWARENESS AND USE BY EDUCATED OLDER ADULTS IN OYO STATE, NIGERIA

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ABSTRACT
This study investigated the influence of socio-demographic variables on email awareness and use by educated older adults in three locations (urban, semi-urban, and rural areas) in Oyo State, Nigeria. A questionnaire was used to collect data from 167 older adults who were above 60 years of age. Findings showed that across the three settings, older adults' email awareness was likely higher among young older adults who earned above ₦100,000 monthly and were computer literate, whereas, email use was likely higher among older adults who were males, with good health and computer literate. For urban older adults, email awareness included being male, highly educated, and in good health, while email use only included being young. Semi-urban adults' email awareness included being highly educated and in good health. Rural older adults' email use included being young and with higher education. However, computer literacy was the strongest predictor of email awareness and use in all three locations. Findings have shown that older adults are not a homogeneous group with similarities in their online behaviours. Hence, more interventions are required so that older adults can be more active in online activities as their use of different ICT tools for online activities can ease some of the problems associated with age-related limitations of engaging in outdoor activities.

Keywords*: Socio-demographic factors, Digital well-being, E-mail use, Educated Older adults, Oyo State Nigeria*

INTRODUCTION
Globally, older adults are living longer and every country is faced with growth in the size and proportion of this population, and the world's population of older adults is expected to double from 1 billion in 2020 to 2.1 billion in 2050 (World Health Organization [WHO], 2022). This population also continues to increase its visibility online as many older adults have embraced the use of information and communication technologies (ICT). For many older adults, being online empowers them to enjoy an independent life. It makes life more convenient for them and facilitates connections to information sources and social networks which promote mental, physical, and cognitive well-being (Yoon et al, 2020). Adoption and use of ICT tools and services also help fight isolation which increases with age (Amundsen, 2020). The Pew Research Center reported that the gap between the oldest and youngest adults in technology adoption has narrowed in the last decade. For example, the gap between the youngest and oldest adults who used the Internet shrunk from 56 percentage points in 2000 to 24 points in 2021, while social media use shrunk from 71 points in 2010 to 39 points in 2021 (Faverio, 2022). Hence, issues of universal access to online information by older adults have become more than crucial, especially considering the heterogeneity of this population (Hargittai et al., 2019).

Over the years, research on the use of ICT has progressed from focusing on younger adults who are generally perceived to be active users of ICT (Cheong, 2008; Hargittai & Hinnant,

2008; Livingstone et al., 2005; McMillan & Morrison, 2006; Schiffman et al., 2008), to compare these younger adults with the older ones (Chen & Persson, 2002; Olson et al., 2011; Vulpe & Ilinca, 2017). However, globally, research on digital inequality has shown that spectrums of differences exist in older adults' use of technology (Arcury et al., 2020; Konig et al., 2018). According to Hargittai et al. (2019, p.882), a "second-level digital divide" exists in older adults' ability to use the Internet efficiently and this deserves some attention when considering universal access to online information among older adults. Moreover, such inequalities can affect the preparedness of subgroups of older adults to adopt online activities as a substitute for outdoor activities especially when such activities have become difficult or impossible due to frail health (Leukel et al., 2021). A substantial body of literature has consistently reported age, gender, and socioeconomic status as major sources of inequalities among older adults and the majority have noted that technology use is significantly higher among young older adults compared with those in advanced age (Eastman & Iyer 2005; Friemel, 2016; Hargittai et al., 2019; Neves et al., 2013).

Even though email is one of the Internet applications used the most, very little is known about how older people interact with email systems in their daily lives and the inequalities affecting its use by this population. Different factors may play a role in the use and non-use of email by older adults. Apart from socio-demographic factors which have been shown as sources of inequalities in the use of technology by older adults, email communication in addition to requiring access to the Internet also requires the ability to use an Internet-connected computer or device, which may be problematic for some older adults as some of these older adults do not have the required skills to carry out online tasks. The lack of such skills also continues to add to the global inequalities in the number of older adults who go online compared with younger age categories (Anderson & Perrin, 2017).

A review of literature showed a dearth of studies that had investigated the role of socio-demographic variables on older adults' interaction with email systems, especially in Nigeria. The majority of studies on digital inequality among older adults focused on the use of the Internet generally, whereas an understanding of older adults' use of specific technology tools and services is essential to having a holistic view of technology use and digital inequalities that are being reported among this population of technology users. Older adults' use of different ICT tools for online activities can ease some of the problems associated with age-related limitations of engaging in outdoor activities. Specifically, the use of email helps facilitate information exchange with family and friends and strengthen social ties, which ultimately can positively affect the quality of life in aging. In other words, when older adults engage in various online activities it can facilitate their adaptation to future limitations in their mobility.

This study, therefore, presents findings from an analysis of the association between socio-demographic factors and email awareness and use among older adults in three geographic locations (urban, semi-urban, and rural areas) of South-west, Nigeria. An investigation of these relationships between socio-demographic factors and email awareness and use among older adults will not only contribute to research aimed at understanding the digital inequalities in older adults' use of technology but also has implications for future technology policy, training, and design.

LITERATURE REVIEW

Although older adults constitute a relative minority of Internet users, the technology used by this population continues to grow and the gap between the youngest and oldest adults in the use of technology has narrowed (Faverio, 2022; Gitlow, 2014). Technology use has been argued as one of the means of coping with aging among older adults (Heinz et al., 2013; Morrow-Howell et al., 2020), as various technological tools can provide support and enhance the daily lives of older people. With the rise in technology utilisation, specifically the Internet, the elderly can use the technology for information, connectivity, independence, wellness, health care purposes, and

social activities, among others. According to Selwyn (2004) and Selwyn et al. (2003), older adults' abilities to use different technologies are essential to their living in the information age as ICT offers the opportunity of ensuring active ageing for the elderly. Moreover, different technologies including mobile phones, home electronic appliances, computers, e-mails, and other various assistive technologies provide support for older adults and make independent living easier. However, despite the crucial role of technology in the lives of many older adults, several studies have continued to report the existence of digital inequalities among this population especially based on their demographics and their socioeconomic status (Berner et al., 2015; Hargittai et al., 2019; Konig et al., 2018; Koopman-Boyden & Reid, 2009).

Studies on the role of socio-demographic factors on the use of ICTs by older adults are multidisciplinary and have been carried out across different continents, varying from being general to examining their influence on specific uses. For example, Koopman-Boyden and Reid (2009) investigated predictors of Internet or email usage among 1,680 older adults aged 65 to 84 years in New Zealand. The findings indicated that Internet or email usage was significantly predicted by age, gender, education, income, work, and household composition. Similar findings were reported by Koopman-Boyden and Reid (2009) among 6,443 community-dwelling older adults in the USA. A later study by Campana and Ortega (2021) also investigated the influence of socio-demographic variables on Internet use by 4,036 older adults aged 65 years and older in Spain. The study examined the influence of socio-demographic variables on the time spent by older adults searching for information and communication. Results from regression analyses showed that being male positively influenced the time spent searching for information while the effect of age on this activity was negative. A very high level of education and very good health also positively influenced the time spent on both activities. In the city of Mönchengladbach, Germany, Schehl et al. (2019) surveyed 1,222 older adults 65 years and above, to understand the role of socio-demographic factors on their specific online activities. Findings showed that, while younger older adults with higher education were likely to engage in all online activities, the probability of males engaging in informational and instrumental online activities was greater than that of females. A later study by Leukel et al. (2021) in a German city investigated the influence of individual factors on older adults' Internet use among 1,136 older adults aged 65 to 90 years and also reported that being male, younger, and having an academic degree had a positive association with the Internet use.

Other studies have also shown that in addition to individual factors, social contexts influence older adults' technology use. One such study is Vroman et al. (2015) which examined patterns of ICT use among older adults 65 years and above living in the New England region. The study found that in addition to age and education, older adults living with a spouse or partner were more likely to use ICT. A much larger study by König et al. (2018) involving seventeen European countries, investigated how elderly Europeans use the Internet. Using responses from 61,202 adults 50 years and above, the authors found that in addition to the influence of demographic factors on Internet use and prior computer experience, the use of the Internet by social networks such as partners positively influenced Internet use. Similarly, in China, a study involving 669 older adults above 60 years of age reported that in addition to individual factors, the number of friends and social participation influenced older adults' use of the Internet (Sun et al., 2020).

Beyond Internet use, some scholars have emphasised the need to understand the inequalities in Internet skills among older adults. One such study was carried out by Hargittai and Dobransky (2017). Based on a national survey in the United States involving 2,281 older adults, the study investigated digital inequalities in Internet use and skills among this population. Findings showed that the oldest among the older adults were the least likely Internet users and had the lowest web use skills. Also, education and income significantly influenced older adults' Internet use and web skills. Results from this study were further complemented by a later study by Hargittai et al. (2019). The study which was carried out among 505 older adults in the United States, aged

60 years and above, found significant variation in Internet skills by age and education but not gender. The authors also reported the influence of socioeconomic status, and specific income on older adults' autonomy in Internet use.

However, Berner et al. (2015) have shown the role of location context on the influence of socio-demographic factors on Internet use among older adults. The study was carried out in Sweden among 7,181 older adults between the ages of 59 to 100 years and living in midsize cities and rural areas. Findings showed that while in both locations being younger and highly educated influenced Internet use, other factors which influenced its use among urban adults were being male, living with someone, and having good cognitive functioning.

METHODOLOGY

A survey research design was adopted for the study. The location of the study is three towns (urban, semi-urban, and rural) in Oyo State, Nigeria, which was selected to have a comparison among the three classifications and to know if there would be differences in the use of e-mail based on the location of the older adults. The population of the study is educated older adults above the age of 60. The Ibadan metropolis (urban) has five Local Government Areas (LGA), Saki (semi-urban) is the headquarters of the Saki West local government area, while Igboora (rural) is the headquarters of Ibarapa Central LGA. The elderlies were selected by convenience and snowball sampling techniques because their population is unknown. A self-constructed questionnaire, containing both open and close-ended questions, was used for data collection. Measurement items were adopted from Berkowsky, Sharit, & Czaja, 2018; Gatto & Tak, 2008; Haase et al., 2021; Yates & Brunner, 2009). For the Users, the instrument collected information about the older adults' demographics (age, gender, ethnicity, educational level, marital status, religion, occupation, financial and health status, devices used, use of e-mail, frequency of e-mail use, purposes used for, motivation for use, benefits derived from using, challenges face for using, and intention to continue to use. For the Non-users, the instrument collected information about their demographics, awareness of e-mail, reasons for non-use of e-mail, and intention to use e-mail in the future. Some of the data collected however will be used in a later study. The content and face validity of the instruments were established by two lecturers from the Department of Data and Information Science, University of Ibadan, Nigeria. A pilot test was conducted with 20 respondents from Igbeti in Oyo state, which is outside the scope of the study. The Cronbach Alpha test of reliability shows all variables have values above 0.70.

RESULTS

Demographic Information of the Respondents

A total of 167 older adults participated in the study. Tables 1 and 2 present the description of the respondents. Almost 50 percent were from the Ibadan metropolis which represents the urban category. The majority were between 61 to 70 years of age (65.2%) and mostly males (56.3%). A breakdown of the educational status showed that 32.9% had Bachelors' degrees, 30.5% NCE, 10.2% Master's degrees, and 21.6% had either primary, secondary, standard 6, Modern 3, or Grade II/I certificate. Also, the majority were married (74.3%), mostly Christians (68.3%), and Civil Servants (67.1%). A large percentage earned between ₦51,000 to ₦100,000 (47.9%) followed by ₦101,000 to ₦200,000 (24.6%). Over 50 percent reported not having any existing ailment and the participants generally rated their health status as good (55.7%), very good (21.6%), and fair (18.6%). More respondents rated themselves as not being computer literate (52.1%). However, most of them possessed smartphones (73.7%), and basic mobile phones (68.3%), while only a few possessed laptops (15.0%), iPad (7.2%), and desktop computers (5.4%).

Table 1: Demographic Information of the Respondents

Characteristics	Categories	Frequency	Percentage
Location	Ibadan (Urban)	79	47.3
	Saki (Semi-Urban)	51	30.5
	Igboora (Rural)	37	22.2
Age	61-65 years	61	36.5
	66-70 years	48	28.7
	71-75 years	27	16.2
	Above 75 years	31	18.6
Sex	Male	94	56.3
	Female	73	43.7
Educational Qualification	Basic (Primary to Grade II/I)	36	21.6
	NCE	51	30.5
	OND	2	1.2
	HND	4	2.4
	Bachelors	55	32.9
	Masters	17	10.2
	Doctoral	2	1.2
Marital Status	Married	124	74.3
	Separated	7	4.2
	Divorced	4	2.4
	Widowed	32	19.2
Religion	Christianity	114	68.3
	Islam	47	28.1
	Traditional	4	2.4
	No Religion	2	1.2
Occupation	Civil Servant	112	67.1
	Professional	9	5.4
	Trading	27	16.2
	Artisans	18	10.8
	Others	1	0.6
Income (monthly)	Less than 50,000	26	15.6
	51,000 – 100,000	80	47.9
	101,000 – 200,000	41	24.6
	Above 200,000	20	12.0
Health Status	Poor	1	0.6
	Fair	31	18.6
	Good	93	55.7
	Very Good	36	21.6
	No response	6	3.5
Existing Ailment	Yes	69	41.3
	No	85	50.9
	No response	13	7.8
Computer literacy	Yes	79	47.3
	No	87	52.1
	No response	1	0.6

Relationship between Socio-demographic Variables and Awareness of Email

This section presents findings on the relationship between socio-demographic variables and email awareness among participants at the three locations (Table 2). The association between email awareness and each variable is subsequently discussed.

Table 2: Chi-Square tests for Socio-Demographic Variables and Awareness of Email

Socio-demographic variables	Value	df	Asymptotic Significance (2-sided)	Decision
Urban (Ibadan metropolis)				
Age	13.634	3	0.003	Significant
Sex	7.322	1	0.007	Significant
Monthly Income	8.020	3	0.046	Significant
Educational Qualification	20.708	10	0.023	Significant
Health status	8.953	2	0.011	Significant
Existing Ailment	0.837	1	0.658	Insignificant
Computer Literacy	32.243	1	0.000	Significant
Semi-Urban (Saki)				
Age	14.045	3	0.003	Significant
Sex	0.345	1	0.557	Insignificant
Monthly Income	9.195	3	0.027	Significant
Educational Qualification	21.597	5	0.001	Significant
Health status	10.874	2	0.004	Significant
Existing Ailment	0.262	1	0.608	Insignificant
Computer Literacy	32.794	1	0.000	Significant
Rural (Igboora)				
Age	9.515	3	0.023	Significant
Sex	2.658	1	0.103	Insignificant
Monthly Income	9.423	3	0.024	Significant
Educational Qualification	11.763	6	0.067	Insignificant
Health status	5.703	3	0.127	Insignificant
Existing Ailment	1.153	1	0.283	Insignificant
Computer Literacy	19.658	1	0.000	Significant

2.1 Age

As shown in Table 2, a significant relationship was observed between age and older adults' awareness of email in all the 3 locations (Urban - χ^2=13.634, p=0.003; Semi-urban - χ^2=14.045, p=0.003; Rural - χ^2=9.515, p=0.023). The Cramer's V values of 0.429 (urban), 0.507 (rural), and 0.525 (semi-urban) also showed that the association observed between these two variables was relatively strong. A greater tendency to be aware of the email was found among urban 61–65-year-olds, as well as rural and semi-urban 61–70-year-old. The tendency for older adults aged 71 years and above to be aware of the email was not found in any of the 3 locations.

2.2 Sex

A statistically significant relationship between sex and awareness of email was only observed among urban older adults (χ^2=7.322, p=0.007) and was relatively moderate (Phi value= 0.315). Male older adults tended to know more about email than females. However, among both rural (χ^2=2.658, p=0.103) and semi-urban (χ^2=0.345, p=0.557) older adults, a statistically significant relationship between sex and awareness of email could not be established. This implies that in these 2 locations, there is no significant difference in the awareness of email by both sexes.

2.3 Monthly incom*e*

Chi-square results showed a significant association between monthly income and email awareness among older adults in the 3 locations (Urban - χ^2=8.020, p=0.046; Semi-urban - χ^2=9.195, p=0.027; Rural - χ^2=9.423, p=0.024). The relationship was however strongest among rural older adults (Cramer's V = 0.505) compared to urban (Cramer's V = 0.329) and semi-urban (Cramer's V = 0.425) locations. In all the 3 locations, a greater tendency to be aware of the email

was observed among those earning above ₦100,000 monthly. This was however not found among any category lower than ₦100,000 monthly. This finding implies that email awareness is a function of how much an older adult receives as income monthly.

2.4 Educational qualification

As shown in Table 2, a significant association was found between educational qualification and email awareness among older adults in urban (χ^2=20.708, p=0.023) and semi-urban (χ^2=21.597, p=0.001) locations. The Phi value of 0.629 and 0.651 for urban and semi-urban respectively, indicates a relatively strong association between the two variables. For urban older adults, those who were OND, Bachelor, Masters, and Ph.D. holders had greater tendencies to be aware of the email, and this was also observed among semi-urban older adults who were HND, Bachelor, and Master's holders. This suggests that in these locations, the higher the educational qualification of the older adults the higher the tendency to be aware of email. The result however showed no statistically significant association between educational qualification and email awareness among rural older adults (χ^2=11.763, p=0.067).

2.5 Health status

Health status had a significant but moderate association with email awareness among urban (χ^2=8.953, p=0.011, Cramer's V= 0.350) and semi-urban (χ^2=10.874, p=0.004, Cramer's V= 0.481), but not among rural (χ^2=5.703, p=0.127) older adults. For urban adults, results of the cross-tabulation of the two variables showed that older adults who described their health as at least good tended to be aware of email whereas those who described their health as fair tended not to be aware. Also, among semi-urban older adults, those who described their health as very good tended to be aware of the email.

2.6 Existing ailment

In all the 3 locations, the presence of an existing ailment had no significant association with email awareness (Urban - χ^2=0.837, p=0.658; Semi-urban - χ^2=0.262, p=0.608; Rural - χ^2=1.153, p=0.283).

2.7 Computer literacy

As seen in Table 2, a statistically significant association was found between computer literacy and email awareness in all the 3 locations (Urban - χ^2=32.243, p=0.000; Semi-urban - χ^2=32.794, p=0.000; Rural - χ^2=19.658, p=0.000). This association was also very strong as the Phi value shows 0.660, 0.802, and 0.729 for urban, semi-urban, and rural older adults respectively. In all cases, older adults who rated themselves as being computer-literate tended to be aware of email, whereas those who were not computer-literate tended not to be aware.

Relationship between Socio-Demographic Variables and Use of Email

This section presents findings on the relationship between socio-demographic variables and the use of email by the participants at the three locations – urban, semi-urban, and rural. Table 3 shows the results of Chi-square tests showing the association between these variables.

Table 3: Chi-Square tests for Socio-Demographic Variables and Use of Email

Socio-demographic variables	Value	df	Asymptotic Significance (2-sided)	Decision
Urban				
Age	12.238	3	0.007	Significant
Sex	4.331	1	0.037	Significant
Monthly Income	3.672	3	0.299	Insignificant
Educational Qualification	14.965	10	0.133	Insignificant
Health status	13.880	2	0.001	Significant
Existing Ailment	1.809	2	0.405	Insignificant
Computer Literacy	24.199	1	0.000	Significant
Semi-Urban				
Age	4.795	3	0.187	Insignificant
Sex	5.031	1	0.025	Significant
Monthly Income	4.033	3	0.258	Insignificant
Educational Qualification	9.128	5	0.104	Insignificant
Health status	7.199	2	0.027	Significant
Existing Ailment	0.183	1	0.669	Insignificant
Computer Literacy	19.448	1	0.000	Significant
Rural				
Age	11.613	3	0.009	Significant
Sex	3.892	1	0.049	Significant
Monthly Income	6.848	3	0.077	Insignificant
Educational Qualification	14.537	6	0.024	Significant
Health status	8.295	3	0.040	Significant
Existing Ailment	1.846	1	0.174	Insignificant
Computer Literacy	20.546	1	0.000	Significant

3.1 Age

Results of the Chi-Square analysis found a significant association between age and email use among urban (χ^2=12.238, p=0.007) and rural (χ^2=11.613, p=0.009) older adults but not among semi-urban (χ^2=4.795, p=0.187). The association was also observed to be stronger among rural older adults as seen in the Phi value of 0.560 compared to 0.407 for urban older adults. More urban older adults aged 61 to 65 years had the tendency to use email than other age categories, while their rural counterparts aged 61 to 70 years also had this tendency. Although crosstabulation showed that more semi-urban older adults aged 61 to 65 years used email, this association was not however statistically significant.

3.2 Sex

A statistically significant association between sex and email use was found in all locations (Urban - χ^2=4.331, p=0.037; Semi-urban - χ^2=5.031, p=0.025; Rural - χ^2=3.892, p=0.049). In all the locations, more male older adults tended to use email than females. However, the Phi value which ranged from 0.242 to 0.324 showed that the association was relatively weak.

3.3 Monthly income

No statistically significant association was found between older adults' monthly income and email use in the three locations (Urban - χ^2=3.672, p=0.299; Semi-urban - χ^2=4.033, p=0.258; Rural - χ^2=6.848, p=0.077).

3.4 Educational qualification

Findings showed an insignificant association between educational qualification and use of email among older adults in the urban (χ^2=14.965, p=0.133) and semi-urban (χ^2=9.128, p=0.104) locations. However, this association was significant among rural older adults (χ^2=14.537, p=0.024) as older adults with a minimum of Bachelor's degrees tended to use email more than other categories. The Phi value of 0.627 also showed that the association was relatively very strong.

3.5 Health status

In the three locations, a statistically significant association was seen between health status and older adults' use of email (Urban - χ^2=13.880, p=0.001; Semi-urban - χ^2=7.199, p=0.027; Rural - χ^2=8.295, p=0.040). The association was also considered moderate with Phi values of between 0.391 and 0.480. The higher observed values compared to the expected values in the cross-tabulation of both variables showed that older adults who described their health status as good and very good tended to use email more than those who described their health status as fair or poor. On the other hand, more semi-urban and rural older adults who described their health as very good tended to use email more than the other categories.

3.6 Existing ailment

This study found no statistically significant association between email use and older adults having an existing ailment. This was observed in all three locations (Urban - χ^2=1.809, p=0.405; Semi-urban - χ^2=0.183, p=0.669; Rural - χ^2=1.846, p=0.174). This finding implies that the use of email by these older adults is not in any way related to the presence of an existing ailment.

3.7 Computer literacy

Computer literacy and email use had a statistically significant association in all three locations (Urban - χ^2=24.199, p=0.000; Semi-urban - χ^2=19.448, p=0.000; Rural - χ^2=20.546, p=0.000). Results from the cross-tabulation of these two variables showed that the observed values of older adults in the three locations who used email were significantly more than the expected values. Moreover, Phi values of 0.572, 0.618, and 0.745 for urban, semi-urban, and rural locations respectively showed that the association was strongest among rural older adults.

Socio-Demographic Variables as Predictors of Email Awareness and Use

Binary logistic regression analysis was carried out to determine the predictive power of all the variables on each email awareness and use. However, for numerical reasons, this could only be tested on the entire sample and not by location. Findings are presented as shown below.

Predictors of Awareness of Email

The binary logistic regression analysis was carried out using the Enter method. The fitness of the model was tested as shown in Table 4.

Table 4: Omnibus tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	107.428	23	.000
	Block	107.428	23	.000
	Model	107.428	23	.000

A test of the full model against a constant-only model was statistically significant (Chi square=107.428, p=0.000 with df=23) at a significance level of 0.05 (Table 4) showing that the independent variables as a set reliably predicted whether older adults in these three locations are aware of email or not. Also, the prediction success overall was 87.4% as shown in Table 5 (85.5% for YES, 89.7% for NO).

Table 5: Classification table

	Observed		Predicted		
			Awareness of Email		Percentage Correct
			Yes	No	
Step 1	Awareness of Email	Yes	71	12	85.5
		No	7	61	89.7
	Overall Percentage				87.4

From Table 6, only the variable 'computer literacy' (p=0.000, df=1) predicted email awareness. The Exp(B) value of 20.069 shows that for each point increase in the computer literacy of older adults, the odds of an older adult's email awareness increases by 20.069.

Table 6: Variables in the equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1	Age			3.450	3	.327			
	Age(1)	-.936	.770	1.479	1	.224	.392	.087	1.773
	Age(2)	.402	.928	.187	1	.665	1.494	.242	9.210
	Age(3)	.572	.941	.370	1	.543	1.772	.280	11.194
	Sex(1)	-.429	.575	.556	1	.456	.651	.211	2.010
	Education			6.767	10	.747			
	Education(1)	-17.683	40193.221	.000	1	1.000	.000	.000	.
	Education(2)	-17.595	40193.221	.000	1	1.000	.000	.000	.
	Education(3)	-19.613	40193.221	.000	1	1.000	.000	.000	.
	Education(4)	-17.690	40193.221	.000	1	1.000	.000	.000	.
	Education(5)	-17.784	40193.221	.000	1	1.000	.000	.000	.
	Education(6)	-41.098	46542.441	.000	1	.999	.000	.000	.
	Education(7)	-16.967	40193.221	.000	1	1.000	.000	.000	.
	Education(8)	-19.230	40193.221	.000	1	1.000	.000	.000	.
	Education(9)	-18.949	40193.221	.000	1	1.000	.000	.000	.
	Education(10)	-37.379	48986.804	.000	1	.999	.000	.000	.
	Monthly_Income			2.853	3	.415			
	Monthly_Income(1)	-.853	.914	.871	1	.351	.426	.071	2.555
	Monthly_Income(2)	-1.786	1.089	2.691	1	.101	.168	.020	1.416
	Monthly_Income(3)	-1.452	1.318	1.214	1	.271	.234	.018	3.098
	Health_Status			.795	3	.851			
	Health_Status(1)	-21.155	40193.208	.000	1	1.000	.000	.000	.

	Health_Status(2)	-21.162	40193.208	.000	1	1.000	.000	.000	.
	Health_Status(3)	-21.840	40193.208	.000	1	1.000	.000	.000	.
	Ailment			.022	2	.989			
	Ailment(1)	-.095	.642	.022	1	.882	.909	.258	3.200
	Ailment(2)	-21.152	40192.970	.000	1	1.000	.000	.000	.
	Comp_Literacy(1)	2.999	.635	22.275	1	.000	20.069	5.776	69.732
	Constant	39.223	56842.225	.000	1	.999	10819941553217 4560.000		

Predictors of Use of Email

Using the binary logistic Enter method, Table 7 presents the result of the fitness of the model tested.

Table 7: Omnibus tests of model coefficients

		Chi-square	df	Sig.
Step 1	Step	98.824	23	.000
	Block	98.824	23	.000
	Model	98.824	23	.000

At a significance level of 0.05, a test of the full model against a constant-only model was statistically significant (Chi square=98.824, p=0.000 with df=23), showing that the independent variables as a set reliably predicted whether older adults in these three locations use the email or not. Also, the prediction success overall was 82.9% as shown in Table 8 (83.1% for YES, 82.8% for NO).

Table 8: Classification table

	Observed		Predicted		
			Email Use		Percentage Correct
			Yes	No	
Step 1	Email Use	Yes	49	10	83.1
		No	16	77	82.8
	Overall Percentage				82.9

Table 9 shows that only the variable ‘computer literacy’ (p=0.000, df=1) predicted email use. The Exp(B) value of 46.662 shows that for each point increase in the computer literacy of older adults, the odds of an older adult’s email use increased by 46.662.

Table 9: Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1	Age			2.884	3	.410			
	Age(1)	.220	.622	.125	1	.724	1.246	.368	4.213
	Age(2)	-.647	.943	.471	1	.493	.524	.083	3.323
	Age(3)	1.518	1.152	1.738	1	.187	4.565	.478	43.635
	Sex(1)	.604	.535	1.275	1	.259	1.829	.641	5.216
	Education			3.804	10	.956			
	Education(1)	-17.097	40193.120	.000	1	1.000	.000	.000	.
	Education(2)	-16.738	40193.120	.000	1	1.000	.000	.000	.
	Education(3)	-17.976	40193.120	.000	1	1.000	.000	.000	.
	Education(4)	2.853	41230.395	.000	1	1.000	17.331	.000	.
	Education(5)	-18.092	40193.120	.000	1	1.000	.000	.000	.
	Education(6)	-39.625	47489.223	.000	1	.999	.000	.000	.
	Education(7)	-17.848	40193.120	.000	1	1.000	.000	.000	.
	Education(8)	-16.887	40193.120	.000	1	1.000	.000	.000	.
	Education(9)	-17.879	40193.120	.000	1	1.000	.000	.000	.
	Education(10)	-37.147	48906.970	.000	1	.999	.000	.000	.
	Monthly_Income			4.189	3	.242			
	Monthly_Income(1)	.330	1.093	.091	1	.763	1.391	.163	11.839
	Monthly_Income(2)	1.559	1.180	1.745	1	.187	4.756	.470	48.091
	Monthly_Income(3)	.264	1.286	.042	1	.837	1.303	.105	16.197
	Health_Status			3.128	3	.372			
	Health_Status(1)	-17.190	40193.157	.000	1	1.000	.000	.000	.
	Health_Status(2)	-18.460	40193.157	.000	1	1.000	.000	.000	.
	Health_Status(3)	-18.930	40193.157	.000	1	1.000	.000	.000	.
	Ailment			.167	2	.920			
	Ailment(1)	.234	.573	.167	1	.683	1.264	.411	3.886
	Ailment(2)	-41.166	41230.249	.000	1	.999	.000	.000	.
	Comp_Literacy(1)	3.843	.826	21.669	1	.000	46.662	9.252	235.327
	Constant	33.697	56841.822	.000	1	1.000	43112014 6374077.6 00		

DISCUSSION OF FINDINGS

Findings from this study have revealed diversity in email awareness and use among older adults based on their demographic and socio-economic characteristics. A significant and moderate association between age and email awareness among older adults in all three locations was observed, while age and email use were only significantly associated among urban and rural older adults. Urban older adults in the 61 to 65 years category tended to be aware and use email more than other age categories, while this was also observed among rural older adults in the 61 to 70 years category. Among semi-urban older adults, there was a tendency for older adults aged 61 to 70 years to be aware of the email. Although semi-urban older adults in the 61 to 65 years category also had a greater tendency to use email, this was not statistically significant. There is a dearth of literature that has examined diversity in email use among older adults and which is a limitation of this study. However, findings from this study clearly showed that awareness and use of email "differ within the cohort of older adults" (Neves et al., 2013, p.2), and such generational effect has been supported by previous studies that have investigated the use of ICT by older adults (Eastman & Iyer 2005; Friemel, 2016; Konig et al., 2018). In the current study, it was not a surprise that the tendency to be aware or use email was not high among older adults above 70

years of age. The use of the web started in Nigeria in 1996 and internet access was fully granted by 1998. However, internet access was not available for use by everyone as it is now. Before now, many Nigerians accessed the Internet through cybercafés and paid for sending and receiving e-mail messages due to excessively high internet subscriptions (Adomi, 2005). Hence, the majority of the oldest of the older adults in the current study were mostly advanced in age by the time email began to be well used in Nigeria and were thus least likely to have used the email at work or home.

Although a significant association between sex and email awareness was observed only among urban older adults, the association between sex and email use was statistically significant in all three locations. In these two instances, male older adults had a greater tendency to be aware and use email than females. Studies on gender differences in the use of ICT are diverse in their findings. For example, Friemel (2016) observed no significant relationship between older adults' online presence and gender when all other socio-demographic factors were controlled. A similar finding was reported by Arcury et al. (2020) in a study of Internet use by older adults who visited clinics for low-income populations. However, others such as Konig et al. (2018) which was carried out among older adults in 17 European countries, and Leukel et al. (2021) among older adults in a city in Germany, reported that males frequently used the Internet more than female older adults. Schehl et al. (2019) also found that the probability of their male respondents engaging in informational and instrumental online activities was greater than that of the females. Yu et al. (2016) on the other hand, observed greater use of the Internet by female older adults than males. A likely reason for the finding in the current study is the marital status of the women that participated in the study. The majority of them are married and may have relied on their husbands in using ICT devices for activities outside communication through voice calls and using social networking apps. Notwithstanding, the association between the variables was however weak and this might likely indicate that the gender divide in older adults' email use in the current study may be closing in the nearest future.

Monthly income had no significant association with email use in all three locations despite a significant association with email awareness. Older adults in the category of those who earned above N100,000 monthly had a greater tendency to be aware of email than those who earned lower. This association varied from being relatively weak among urban older adults to moderate among semi-urban and rural older adults. Also, a relatively strong association was found between email awareness and educational qualification among urban and semi-urban older adults as findings suggested that older adults who were at least OND holders were aware of the email. This relationship was not significant among rural adults. On the other hand, the association between educational qualification and email use was significant only among rural older adults and the relationship was observed to be relatively strong. Findings showed a greater tendency for older adults with at least a Bachelor's degree to be in the category of email users. These findings showing no association between email use and income in all three locations as well as showing an association between email use and educational qualification only among rural older adults is surprising because various studies have reported on the significant relationship between each income and educational level with the use of the Internet and internet related services These studies have consistently shown that a higher income and higher level of education are linked with being online (Anderson & Perrin, 2017; Arcury et al., 2020; Hargittai & Dobransky, 2017; Hargittai et al., 2019; Konig et al., 2018; Yoon et al., 2020). Emailing requires being connected to the Internet. However, these findings from the current study have shown that this activity should be treated separately when conducting studies on the socio-demographic influence of internet use among this population. A further study on the association between these two variables and general internet use among this population of older adults could provide more understanding of this variation observed as using email is just one of the numerous activities carried out with internet access. However, the fact that higher education was significantly associated with email

use among rural older adults could be because background findings about this population showed that the majority of the rural older adults who used email were retirees from high positions in the government's civil service who relied on the email for notifications on official information from government and others such as pension payments and bank notifications. Moreover, a recent study found that rural older adults in Nigeria are victims of digital exclusion (Ekoh et al., 2021). Hence, it is not unlikely that the majority of those who strived to use email among them were highly educated.

The presence of an existing ailment had no significant association with email awareness and use in all three locations. However, moderate but significant associations were found between health status and older adults' email awareness in only urban and semi-urban locations, whereas, the association between health status and email use was moderate and statistically significant in all three locations. Older adults who rated their health as at least good were more in the category of email users in the three locations. This finding is in line with previous studies that have reported on the association of older adults' health status and use of the Internet, with a majority of these showing that older adults with reported higher health status had a greater tendency to use the Internet than those with reported lower health status (Berner et al., 2015; Konig et al., 2018; Schlomann et al., 2020; Seifert et al., 2017). Understandably, the use of email as with other internet-related activities might reduce among older adults with self-reported lower health status. Old age comes with disabilities and multiple morbidities. For example, poor memory, reduced vision, and other cognitive limitations can make online activities including email use cumbersome for older adults. This can especially be complicated when such older adults do not have around them family members or others to support the use of this technology. Hence, such older adults with limited health might resort to using other alternatives to email.

A major finding from this study is that only computer literacy had a relatively strong and significant association with both email awareness and email use in all three locations and this relationship was observed to be stronger among semi-urban and rural older adults. Moreover, despite the significant level of association between the seven independent variables and each of email awareness and use, binary logistic regression analysis which included all the seven variables showed that only computer literacy significantly predicted email awareness and use by these older adults. This showed a greater tendency for older adults who were computer literate to be aware and use email. A greater readiness to use a new technology was earlier reported among older adults with highly self-assessed internet skills (Berkowsky et al., 2017). Konig et al. (2018) also found that older adults' previous work experience involving computer use promoted internet use. The current study did not collect data on details of respondents' work experience to understand this statistically significant association between computer literacy and email awareness and use. However, this finding from the current study corroborates several other studies which have shown that a lack of skills limits older adults' comfort with technology use (Hargittai et al., 2019; Schreurs et al., 2017; Seifert et al., 2021; van Houwelingen et al., 2018). It is safe to assume that in the current study, notwithstanding all the associations between email awareness and use, and all the other six variables, the main predictor of older adults' awareness and use of email in this population is their ability to use the email technology and services well. The finding has shown that older adults irrespective of whether they live in urban, semi-urban, or rural locations would likely use email as long as they have the required skills to do so.

CONCLUSION AND RECOMMENDATIONS

This study has significantly contributed to the knowledge of the inequalities in the use of ICT tools by older adults based on demographics and socioeconomic factors. This study has revealed that across all three settings, older adults' email awareness was likely higher among young older adults who earned above ₦100,000 monthly and were computer literate. For the urban older

adults, this included being male, highly educated, and with good health; and semi-urban included being highly educated and with good health. In the case of email use, generally, older adults in this category were likely males, with good health and computer literacy. For the urban older adults, this included being young; while rural included being young and with higher education. However, in all three locations, this study has shown that being computer literate is the strongest predictor of an older adult's awareness and use of email; thus, showing a need to give more attention to the inequalities in the use of ICT among older adults and not just sufficient to discuss issues of the digital divide based on younger and older adults alone. Also, the study has contributed to literature on older adults that have continued to show that older adults are not a homogeneous group with similarity in their online behaviours. Moreover, the findings have shown areas for intervention so that older adults can be more active in online activities as their use of different ICT tools for online activities can ease some of the problems associated with age-related limitations of engaging in outdoor activities. Specifically, approaches and interventions aimed at involving a greater number of older adults in the use of ICT should be based on an understanding of their age, gender, health status, and computer skills.

The study is limited to older adults in just three towns in a state in Nigeria; hence, the findings may not be generalised to all older adults in Nigeria. Future studies could be extended to other regions or states in Nigeria.

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