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Elderly in the digital age: Exploring opportunities and overcoming challenges

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Abstract
Several issues are associated with the ageing world's population, especially in emerging nations like India. Since 71% of older persons live in rural locations, healthcare is getting more complex. A potential remedy is digital literacy, which provides remote access to self-awareness and medical services. This study investigates the use of technology and digital literacy among older people. This paper identified some of the challenges faced by older people and to what extent senior citizens living in various places are digitally literate, as well as the main obstacles keeping older people from using digital technologies for self-care and accessing healthcare services. Using a mixed-method approach, the study analyses data using both qualitative and descriptive quantitative data analysis.The result reveals that only 11% of rural older people reported being proficient with digital devices, a worrying trend in their low digital literacy. Although 50% of participants own a mobile phone, the percentage of people who own a smartphone and use the internet for health-related activities is still substantially lower—less than 10% of participants use these tools. 80% % of males use the Internet, but only 20% of females use it. The study clarifies the fundamental causes of the widespread use of technology among older people, such as their lack of exposure and comfort level with digital gadgets. Further impeding older individuals' adoption of technology are obstacles, including low levels of traditional literacy and age-related physical limitations like blurred vision. The present study highlights the pressing necessity of tackling the digital divide among older people residing in rural areas, specifically focusing on healthcare access. This study will be helpful for policymakers and health professionals to enable older individuals to use digital technology for self-care and remote access to healthcare services; initiatives to advance digital literacy and offer customised training programmes are crucial. Policymakers and healthcare professionals can improve senior citizens' general well-being and quality of life living in remote locations by closing the digital literacy gap and guaranteeing fair access to healthcare services for all populations. Also, community organisations, local governments, and non-profit groups should be encouraged to promote digital inclusion among elderly populations to foster community engagement and support. Encourage collaborations between senior citizen associations, community centres, and academic institutions to host workshops, seminars, and in-person training sessions on digital literacy.

Keywords: Digital age, digital literacy, elderly, senior citizen

Introduction
In an increasingly digitized world, where technology permeates every facet of daily life, digital literacy has emerged as a critical skill for effective participation in modern society. While technological advancements offer numerous benefits and conveniences, a significant portion of the population, particularly elderly individuals, grapple with the challenges of acquiring and utilizing digital skills. This introduction delves into digital literacy challenges and opportunities for the elderly, exploring the rationale behind its importance and the significance of studying this subject in contemporary society.

Many definitions of digital literacy have evolved since Paul Gilster's pioneering study, Definitions of Digital Literacy (1997). Specific definitions of digital literacy (DL) take a skills-based approach, as exemplified by learning ICT skills (The National Curriculum Framework for All (NCF 2012), p. 9) [13], which include computer proficiency" at an adequate level for creation, communication and collaboration in aliterate society" (Son *et al.*, 2011, p. 27). These abilities necessitate using word processing software, web browsers, email writing, picture creation and editing, etc.
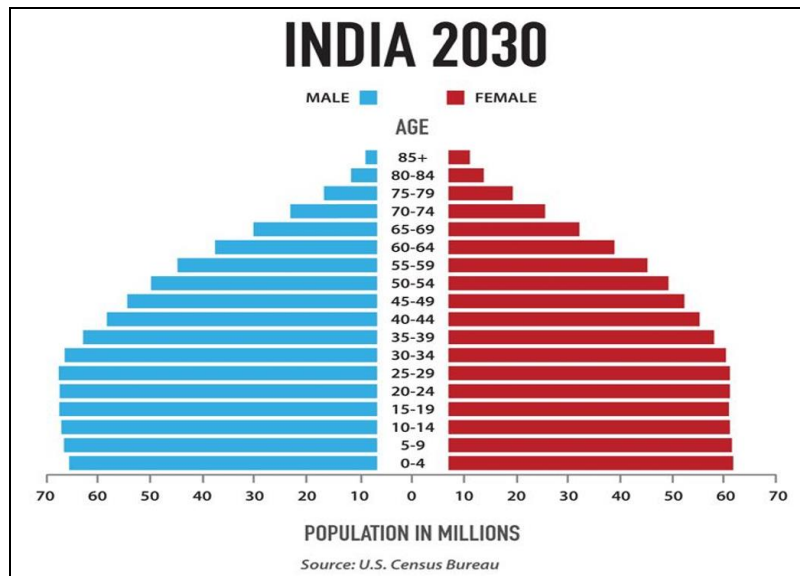
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Fig 1: Population in millions (India 2030)

Seniors need to be digitally literate for several vital reasons. First, there is a significant change in the demographic landscape due to the world's population ageing at a never-before-seen pace (fig.1) (W. Bradford Wilcox and Carlos Cavalle.) As a result, many senior citizens must use digital technology to interact with others, obtain necessary services and carry out daily activities. However, many seniors have obstacles that prevent them from entirely using digital resources, including restricted access to technology, unfamiliarity with digital tools and fear of learning new skills. Second, the COVID-19 pandemic has made addressing senior citizens' digital literacy even more important. The use of digital platforms for social interaction, telehealth services, and distant work has increased due to social distancing tactics. Consequently, those lacking digital skills are at risk of social isolation, reduced access to vital services, and diminished quality of life. Understanding and addressing the challenges faced by elderly individuals in navigating the digital landscape are therefore essential for promoting their well-being and inclusion in an increasingly interconnected world. India has a much higher birth rate even though its life expectancy, at roughly 68 years, is much lower than that of nations like the USA (79 years) and Australia (83 years). Every woman gave birth to five children on average in the early 1970s. It is slowly dropping to over two children per woman (United States: 1.64).
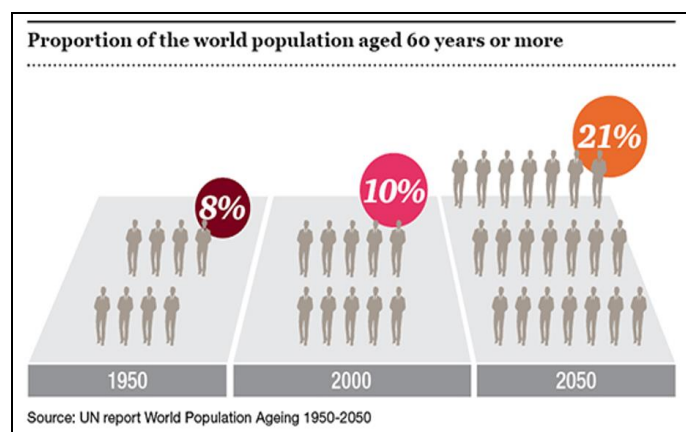

Fig 2: Population of the world population aged 60 years or more

Currently, one-third of India's population is under the age of fifteen. The average age is only twenty-six. Since 1950, the population of older people has tripled; by 2050 (fig.2), it is projected to nearly triple again. The UN Population Division claims that the ageing of our population is a phenomenon that has never occurred in human history. This results from the interaction of decreasing death rates and diminishing fertility. Ageing populations are a fact of life in almost every nation on Earth. In more developed countries, the trend is noticeably stronger.

National governments significantly influence essential matters like the labour force participation rate and the federal healthcare cost. This affects investors and businesses; the healthcare industry is one notable example. The natural deterioration in physical functions that comes with ageing causes increased demand for healthcare products and services as individuals live longer. The current instruments for assessing digital literacy in older persons differ in simplicity of use, study design, and administration style. Measures such as the Mobile Device Proficiency Questionnaire (MDPQ) are more inclusive and broadly applicable, which makes them a suitable choice when assessing older persons' digital literacy. More research is necessary to determine whether these instruments are

appropriate for use with older populations, particularly in areas like "digital content creation" and "safety," which have not yet been assessed (Roque, N. A., & Boot, W. R. (2018). Evidence-based conversations should be encouraged about how digitalization may affect how older persons are treated and how medical professionals might profit from it. (Oh, S. S., Kim, K. A., Kim, M., Oh, J., Chu, S. H., & Choi, J.) Computer and Internet users have shown a similar tendency for personal and business use. The customer sector of Internet users is expanding the quickest, and it is older folks (Hart, Chaparro, & Halcomb, 2008). By using Internet services for banking, shopping, and healthcare management, as well as engaging in recreational and communication activities for fun, they are increasing their level of independence (Vuori & Holmlund-Rytkönen,

2005). The older generation is currently divided by technology. There is a clear difference in the capacity of those with no experience or skill to utilise devices and those who can access and use them. (APA Dictionary of Psychology. https://dictionary.apa.org/cognition).

This could be because older people in today's environment were either not exposed to electronics or had limited exposure to them as children. As a result, these individuals may need more digital literacy and be more interested in learning how to use devices. (N. Ahmad). In the early 1900s, the average person's life expectancy was approximately 58 years. It was 78 years for men and 83 years for women in 2000. By 2050, the average lifespan is anticipated to have increased to more than 85 years.
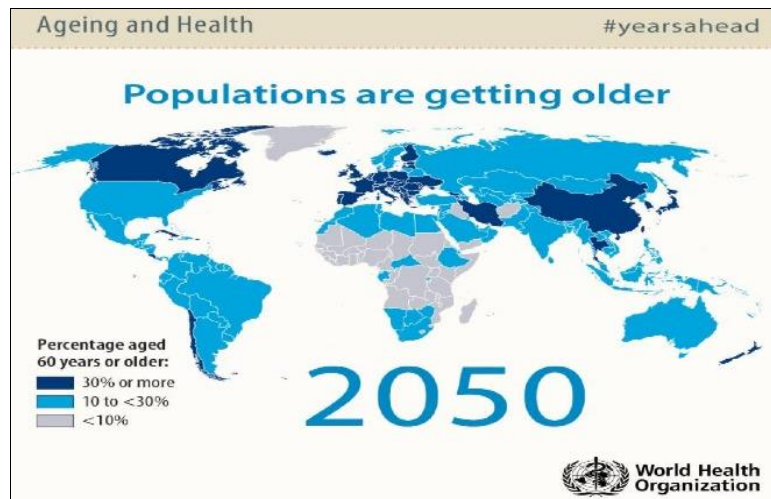

Fig 3: Percentage aged 60 years or older

By 2020, the National Digital Literacy Mission (NDLM) wants to equip every family with at least one member with the necessary digital literacy abilities. However, this plan ignores the senior population. The ageing population of India in the world population division (Table.1) compared to

2020 aged 225,428 thousand. Computerised literacy is becoming increasingly important as critical services become more computerised, especially for older people who are more vulnerable.

Table 1: Source: United Nations Department of Economic and Social Affairs | Population Division

Ageing population of India in world population division													
Population aged 65 years Or over (thousands)		Percentage aged 65 years or over		Males per 100 females aged 65 years or over		Males per 100 females aged 80 years or over		Old-age dependency ratio (65+ /20-64)		Prospective old-age dependency ratio		Economic old-age dependency ratio	
2020	2050	2020	2050	2020	2050	2020	2050	2020	2050	2020	2050	2020	2050
87,149	225,428	6.4	13.8	93.1	92.1	81.8	80.0	11.0	22.5	11.5	18.1	14.1	27.7

An Age Well Foundation survey revealed that 85.8% of participants, most older, were computer and digital illiterate (76.5% of males and 95% of women). Even still, senior citizens need access to programmes specifically focused on digital literacy. With remarkable outcomes, NGOs like HelpAge India (Fig.4) and Age Well Foundation offer computer literacy programmes for older people. The Age Well Foundation has trained approximately 35,000 senior citizens in the past four years. These programmes enable seniors to maintain social media connections with friends

and family via Facebook, WhatsApp, Skype, and other platforms. To lessen the difficulties associated with physical mobility and lengthy lines for bill payment, they also acquire valuable skills like utilising search engines, and making online reservations, completing online transactions. These programmes raise the standard of living for senior citizens by encouraging independence and closing the digital divide.

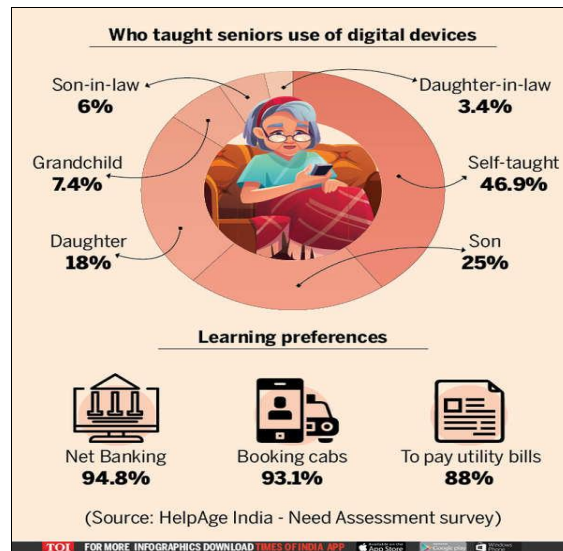(https://www.livemint.com/education/news/why-is-digital-literacy-important-for-elderly)

Fig 4: Who taught seniors use of digital devices

This study has significant implications for policymakers, healthcare professionals, educators, and caregivers addressing the digital divide among the elderly. By identifying barriers to digital literacy and effective strategies for enhancing seniors' digital skills, this research can inform targeted interventions and policies for digital inclusion. Empowering seniors with digital literacy can improve their quality of life, enhance social connectedness, and facilitate active participation in the digital age.
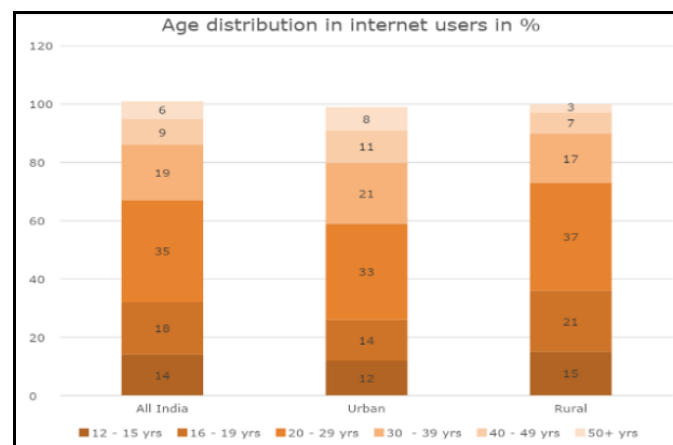

Fig 5: Age distribution in Internet users in %

Digital literacy challenges and opportunities for the elderly are critical issues with broad implications. This study aims to foster a more inclusive and equitable digital society by addressing barriers to digital inclusion and promoting digital literacy among seniors. In India, digital literacy among senior citizens was low before the COVID-19 pandemic, with varying levels of tech-savviness. Education, income, and location significantly influence seniors' digital skills. While two-thirds of figure 5. Internet & Mobile Association of India (IAMAI), Global Web Index Internet users in India are aged 12-29,(fig.5) there is potential for growth in the senior demographic, particularly in rural areas. However, Internet users aged 50+ are still deficient in rural and urban areas. Interestingly, 47% of seniors learned to use digital devices independently, while others were taught by their children, with smartphones being the most commonly used device, accounting for 60% of usage.

The government of India's 'Digital India Initiative' aimed to transform India into a digital India, which included digital literacy among senior citizens. In addition to all of this, some NGOs and private organizations are also lending a helping hand to this cause. The Senior Citizens Bureau of India has launched programs to train seniors on using smartphones and the Internet. Despite these efforts, digital literacy in India has remained a cause for concern. The COVID-19 pandemic has helped highlight this issue further and develop solutions. The shift of government services and healthcare facilities to online digital mode has served as the solution to digital literacy, forcing seniors to adapt positively to technological changes.

Objectives
1. To find out the levels of digital literacy among the elderly in different demographic variables.
2. To find out the health-related issues, living arrangements and sources of income among the Elderly.
3. To determine how much the elderly adopt technology, including mobile phones and internet access, to access information and services.
4. To determine the barriers that impede elderly individuals from effectively utilizing digital technologies for and accessing self-care services.

Research Design: A survey was done using convenience and snowball sampling of the elderly to collect data on their digital literacy and challenges when they use digital devices and have internet access. The survey includes open-ended questions to assess the level of digital literacy.

Research Approach: The research utilized a mixed-method approach (qualitative and quantitative) to explore the level of digital literacy among the elderly effectively. Individual interviews were conducted to gather insights into participants' knowledge, experiences, perceptions, and issues with internet access. For data collection, both convenience sampling and snowball sampling methods were employed. Surveys were distributed to willing elderly participants, who were then asked to share the survey with other seniors. A Google Form questionnaire was distributed via Facebook or WhatsApp, while interviews were conducted using online video conferencing or in-person, based on participant preferences. Open-ended questions allowed for detailed feedback, while the semi-structured format provided flexibility for an in-depth study of participant's viewpoints.

Data Analysis: The thematic and quantitative analysis evaluates qualitative data from interviews, identifying and analysing the data patterns, themes, and categories.

Finding and discussion: To reach the objectives, the data collected through the survey needs to be presented, analysed, and discussed. The study reveals a significant disparity in digital literacy between rural and urban elderly populations (table.1), with only 11% of rural elderly individuals possessing digital literacy compared to 46% in urban areas.

Table 2: percentage level of digital literacy in rural and urban elderly

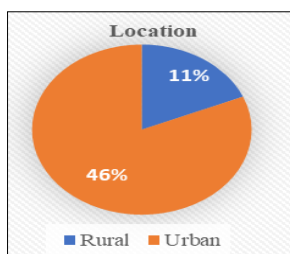| Location	N	%
Rural	14	11%
Urban	61	46%

Fig 6: percentage level of digital literacy in rural and urban elderly

There is a notable gender gap in digital literacy (table. 3), with 80% of males and only 20% of females having digital literacy skills. This highlights the importance of addressing gender-specific barriers to digital inclusion and empowering women with digital skills.

Table 3: Showing a percentage level of digital literacy in male and female elderly

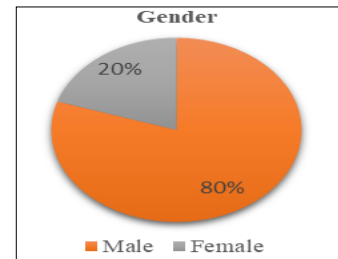| Gender	N	%
Male	60	80%
Female	15	20%

Fig 7: Showing a percentage level of digital literacy in male and female elderly

The study indicates variations in digital literacy levels across different age groups. (table. 4) While 50 to 70-year-olds have the highest digital literacy rate at 67%, the percentage decreases significantly among older age groups, with only 20% of individuals aged 70 to 80 and 13% of those aged 80 and above possessing digital literacy skills

Table 4: Showing a percentage level of digital literacy According to Age of the elderly

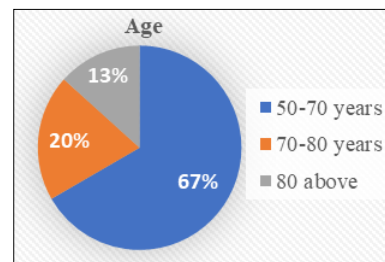| Age	N	%
50-70 years	50	67%
70-80 years	15	20%
80 above	10	13%

Fig 8: Showing a percentage level of digital literacy According to the age of the elderly

The study highlights the correlation between educational attainment and digital literacy. A majority of elderly individuals with digital literacy skills have higher levels of education (Table 5), with 53% holding a PhD, 27% having a postgraduate degree, 13% possessing a graduate degree, and only 7% having completed school education. This suggests that educational interventions and lifelong learning opportunities can significantly impact digital literacy levels among the elderly.

Table 5: Showing a percentage level of digital literacy in education Level in elderly

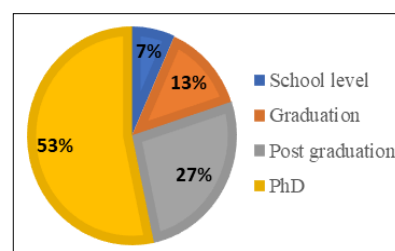| Education level	N	%
School level	5	7%
Graduation	10	13%
Post graduation	20	27%
PhD	40	53%

Fig 9: Showing a percentage level of education in elderly

The study findings reveal that 60% of elderly individuals (Table 6) live with their families, while 40% live independently. Understanding the living arrangements of elderly individuals is crucial for designing digital literacy initiatives that accommodate their unique living situations and support networks.

Table 6: Showing a percentage level of living arrangement in elderly

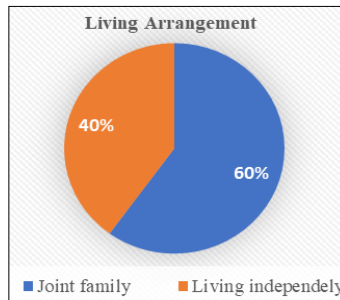| Living arrangement	N	%
Joint family	45	60
Living independently	30	40

Fig 10: Showing a percentage level of living arrangements in elderly

The study reveals that 36% of elderly individuals (table.7) have internet access, with varying levels of data availability. Among them, 15% have unlimited data, while 5% have limited data, and 5% have no data access at all. Limited internet access poses a significant barrier to digital inclusion among the elderly.

Table 7: Showing a percentage level of Internet access in elderly

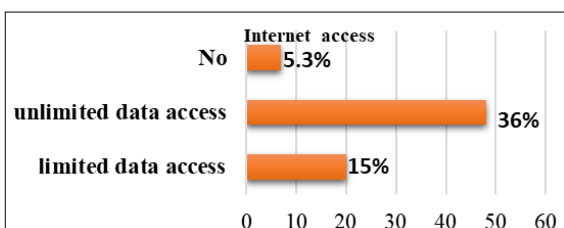| Internet Access	N	%
limited data access	20	15%
unlimited data access	48	36%
No	7	5%

Fig 11: Showing a percentage level of internet access in elderly

Half of the elderly (50%) own digital devices (table .8), while 7% have no access to any devices. Access to personal devices is crucial for engaging in digital activities and online services.

Table 8: Showing a percentage of elderly having their own devices

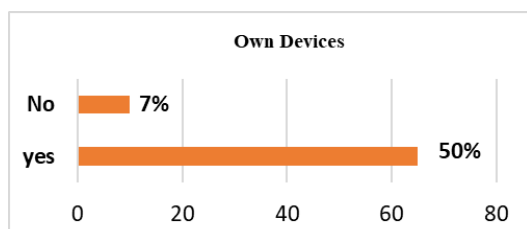| Own devices	N	%
Yes	66	50%
No	9	7%

Fig 12: Showing a percentage of elderly having their own devices

A considerable proportion of elderly individuals (table.9) report various health issues that may impact their digital literacy and technology usage. 35% have poor eyesight, 6% experience hearing issues, 3% suffer from back or neck pain, and 6% face forgetfulness. These health issues may contribute to challenges in using digital devices effectively.

Table 9: Showing a percentage level of health-related issues in the elderly

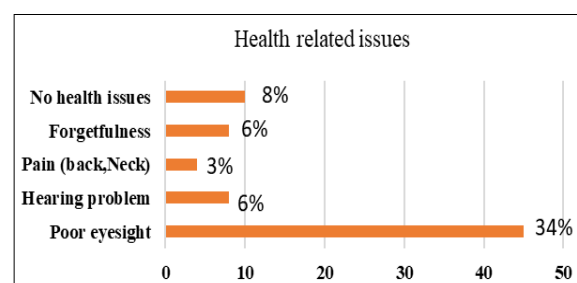| Health-related issues	N	%
Poor eyesight	45	34%
Hearing problem	8	6%
Pain (back, Neck)	4	3%
Forgetfulness	8	6%
No health issues	10	8%

Fig 13: Showing a percentage level of health-related issues in the elderly

Among those who do not use (table .10) digital devices, 19% cite need for more knowledge about the device as the primary reason, followed by 8% who express no interest in using devices. Additionally, 30% find digital devices difficult to use, highlighting the importance of user-friendly technology solutions.

Table 10: Shows the percentage level of reasons for no use of devices by the elderly

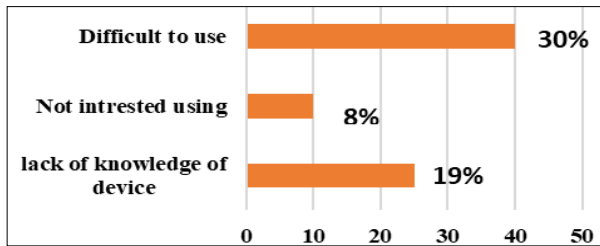| Do not use digital devices because	N	%
Lack of knowledge of the device	25	19%
Not interested in using	10	8%
Difficult to use	40	30%

Fig 14: percentage level of reason for no use of devices by elderly

A small percentage of elderly individuals actively use digital (table .11) services for various purposes. 8% utilize social media platforms such as Facebook or WhatsApp, while 15% connect with family and friends online. Only 4% use digital services for entertainment, 3% for online shopping, 6% for digital payments, and 9% for other services such as alarms or reminders.

Table 11: Showing the percentage level of services used by the elderly

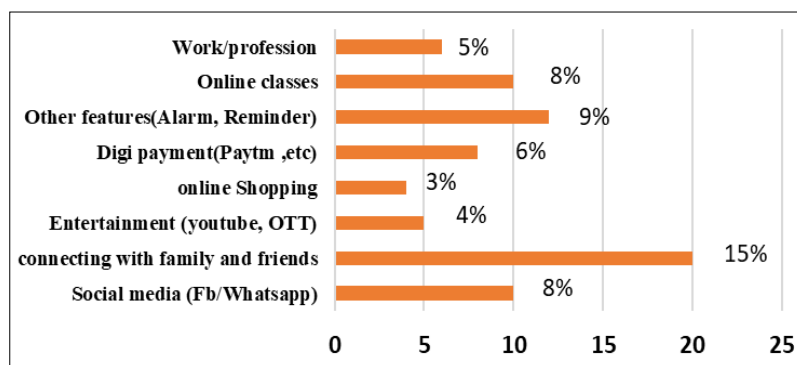| Services use	N	%
Social media (Fb/Whatsapp)	10	8%
connecting with family and friends	20	15%
Entertainment (youtube, OTT)	5	4%
online Shopping	4	3%
Digi payment(Paytm ,etc)	8	6%
Other features(Alarm, Reminder)	12	9%
Online classes	10	8%
Work/profession	6	5%

Fig 15: Showing the percentage level of services used by the elderly

A significant portion of elderly individuals (38%) rely on pension (table 12), work, or profession for income, while 12% depend on their savings. Only 8% are financially dependent on their families for support.

Table 12: Showing the percentage level of source of income for the elderly

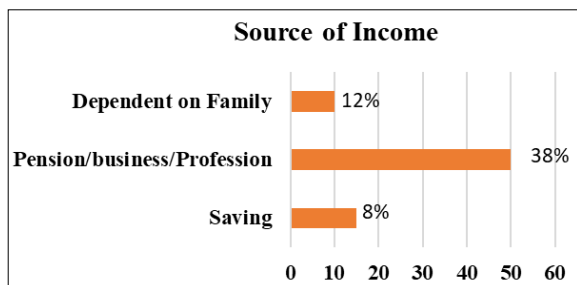| Source of income	N	%
Saving	15	12%
Pension/Business/Profession	50	38%
Dependent on Family	10	8%

Fig 16: Showing the percentage level of services used by the elderly

While 15% of elderly individuals find it easy to use digital devices (Table.13), a larger proportion (39%) require occasional assistance, and 3% always need help. User-friendly technology solutions and support systems are essential for enhancing digital literacy among older adults.

Table 13: Shows the percentage level of comfortably used devices by the elderly.

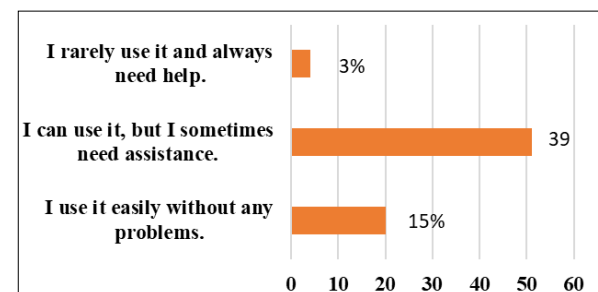| Comfortably use of devices	N	%
I use it efficiently without any problems.	20	15%
I can use it, but I sometimes need assistance.	51	39%
I rarely use it and always need help.	4	3%

Fig 17: Shows the percentage level of comfortably used devices by the elderly

A notable percentage of elderly individuals (table.14) face age-related barriers (23%), fear and anxiety (8%), cost issues (8%), limited access to technology (12%), and lack of relevance (8%), hindering their engagement with digital devices and services.

Table 14: Shows the percentage level of barriers in using devices by the elderly.

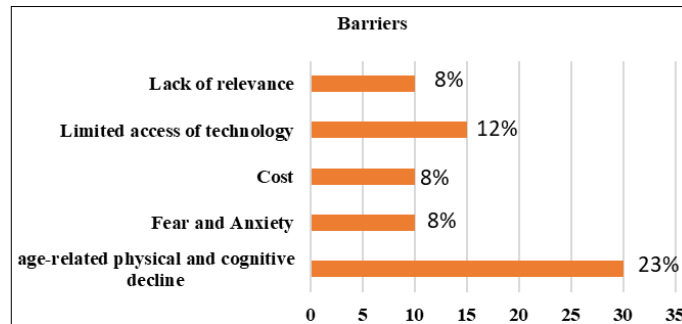| Barriers	N	%
Age-related physical and cognitive decline	30	23%
Fear and Anxiety	10	8%
Cost	10	8%
Limited access of technology	15	12%
Lack of relevance	10	8%

Fig 18: Shows the percentage level of devices used comfortably by the elderly.

Conclusion
In conclusion, our study illuminates the significant digital literacy disparities among elderly populations, emphasizing the urgent need for tailored interventions to address these gaps. Despite the challenges faced, a notable proportion of elderly individuals have access to digital resources, highlighting the potential for digital inclusion. However, barriers such as health issues and device usability hinder widespread digital engagement. Moving forward, policymakers, stakeholders, and community organizations must prioritize initiatives to enhance digital literacy and accessibility for elderly individuals. By fostering a more inclusive digital landscape, we can empower elderly populations to fully participate in the benefits of technology and improve their overall quality of life.

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