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| RESEARCH ARTICLE

Social Isolation and Loneliness among Older Adults with the Rise of Technology: Bangladesh Perspective

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| ABSTRACT

The increase in cases of social isolation and loneliness among the elderly is a topic of concern and often occurs worldwide and in Bangladesh itself, as this trend is affected by such demographic changes as the variety of social bonds within a family unit. The paper is a qualitative piece of research that investigates the relationships between the ageing phenomenon, technology, and social network connectivity through interviews among older adults in rural and urban territories. By analysing the data thematically and decomposing visual data, the study determines the most important issues that lead to people feeling lonely, and assesses the perception and uptake of digital interventions by older people. The results show that though most of the elderly people are willing to interact with technology, physiological concerns and technological barriers curtail effectiveness. Nonetheless, technology has the potential to become a very useful resource in improving well-being and overcoming isolation through focused training, community acceptance, and design. This research paper ends with policy, design, and social framework recommendations that can narrow the digital divide gap and enhance the living standards of senior adults in Bangladesh.

| KEYWORDS

Social Isolation, Loneliness, Older Adults, Technology Adoption, Bangladesh.

| ARTICLE INFORMATION

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1. Introduction

The 21st century has experienced a revolution in the aspects of the demographic setup, social organisation, and technological environment within the global societies. Of these changes, population ageing has become one of the most characteristic global trends (Rahman et al., 2024). A steep rise in the number of the elderly can be observed in countries that were traditionally known to have high levels of young people, such as Bangladesh. The United Nations Department of Economic and Social Affairs estimates that the population of people aged 60 and above will increase from about 15 million people in the year 2020 to over 40 million people in 2050 in Bangladesh. Although the shift is a sign of improvement in health and life expectancy, it also creates important social and psychological issues: old age, social isolation and exclusion, loneliness, and so on (Mistry et al., 2022).

Within extended family households in the typical old society of Bangladesh, the old used to occupy distinctive positions. Their wisdom was followed, they were backed by their children, and they became part of the day-to-day life of a family. But these long-held cultural codes have been shattered by the processes of modernisation, urbanisation, and globalisation. The following factors increase the likelihood of loneliness: advanced age, women, widows or widowers, lower educational attainment, lack of paid employment, lower economic position, living alone,

and bad health (Rahman et al. 2024). Nuclearisation of families, rural to urban migration, labour migration across the globe, and the emerging relations with intergenerations have robbed many aged citizens, particularly in the countryside the closest family unit or the emotional bond with their family members. The holding up of support systems that are traditionally in place has exposed the older generations more to isolation, abandonment, and even depression (Mistry, Ali, Yadav, Huda, et al., 2022).

The objective absence of social contact (social isolation) and the subjective perception of being alone (loneliness) have become known as highly impactful public health problems. According to studies, loneliness and social isolation can lead to heart disease, depression, loss of cognitive function, and even mortality in the elderly. These conditions are even more prevalent in Bangladesh, where social nets are loose and mental health facilities are still in the beginning stages of their development.

Concurrently, the digital economy evolved at an unexpected rate since the evolution of digital technology revolutionarized personal communication, interaction, and access to common services. Social communications between individuals of various ages have been changed as a result of innovations in mobile communication, social networks, video callings, e-medical services, and messengers' fields (Mistry, Ali, Yadav, Huda, et al., 2022). Technology brings real-time connectivity, efficiency, and convenience to young and middle-aged generations. Technology remains an obstacle and an inaccessible territory to most older college graduates, especially those with lower educations or low incomes. Interestingly, the technology divide between Bangladesh's young and old has widened, with the latter suffering (Sayem et al., 2024). Nevertheless, a greater acceptance is now being brought about that, with the right utilisation, technology can be employed as a potential instrument in the fight against the social isolation of older individuals. Across the globe, there are programs that have been developed that enable the older adult populations to explore the digital world by making it accessible by using alluring applications, community spaces over the internet, and whether applications, as well as digital literacy (Rahman et al., 2024). Elderly people in countries where social media and video calling have become popular took these platforms as a means of communication with relatives who live far away, entertain them, and even learn new things or engage in religious practices online (Sen et al., 2022).

In this digital age, old people are usually overlooked. Not every single one of them possesses the technological knowledge, ability, or devices to utilize digital media. Other people are not able to use the devices because of physical accessibility impairments, such as arthritis, deafness, or impaired eyesight. There are cultural differences to be recognized because older people think that technology is something of the younger generation and is useless, or even dangerous, for them (Bhut & Nileshkumar, 2024).

The purpose of this essay is to examine the complex interplay between social relationships, technology, and aging in Bangladesh. It explores in detail how older urban and rural populations think about and exploit digital technology, in what way it affects their sense of inclusion or exclusion, and what resistance and reluctance exist to increased technology take-up (Sen et al., 2022). It also attempts to consider ways in which technology, by being inclusive and available, may maximize social welfare and minimize the damaging effect of loneliness on mental health (Bhut & Nileshkumar, 2024).

Since the majority of the study is based on thematic analysis and interviews to determine older persons' views and lived realities, the research design is qualitative. It offers a rich humanistic perspective that transcends numbers and statistics to discover social and emotional significance in today's accelerated digitalizing era (Aroonsrimorakot et al., 2019). This is because the research adds to the existing South Asian literature on digital inclusion, active aging, and mental well-being by examining the interlinkages between technology and the health of older people.

1.1 Research Objectives

The main aim of this research is to analyze the social loneliness and isolation that older people in Bangladesh face, along with how digital technology can be made to help alleviate these problems. The research has a specific objective to fulfill the following aims:

- To determine the main social, cultural, and economic predictors of the extent of loneliness and social isolation among the older population in Bangladesh.
- To investigate the degree to which older people are able to use, access, and perceive the advantages of today's technologies, such as cellphones, internet-based platforms, and video-conferencing technologies.
- To investigate the main obstacles that prevent older adults from being able to successfully use digital technology, including those of a cognitive, physical, psychological, and infrastructure nature.
- To investigate means of incorporating digital technology into the lives of older citizens on a daily basis that enable emotional well-being and social connectedness.

1.2 Research Questions

A series of research questions prepares the direction of the present study with the objective of gaining insight into the multifaceted connection of ageing, technology, and social well-being entrenched in the Bangladesh socio-cultural landscape. All the questions attempt to ascertain the reason behind the social isolation, the possibility of digital tools to reduce loneliness, and the technology adaptation barriers among the old adults.

The following are the questions of the research:

- What are the leading social, cultural, and economic causes of social isolation and loneliness among older adults in Bangladesh?
- How do older adults in Bangladesh gain access, use, and benefits of modern technology, including smartphones, internet-based platforms, and video conferencing tools?
- What are the major obstacles, physical, cognitive, psychological, and infrastructural, that hinder the use of technologies amongst the aged?
- What are the most effective ways of integrating digital technologies into the lives of older people, to increase their social connection as well as their emotional well-being?

2. Literature Review

The correlation between age, social disconnection, and technological progress has become an increasingly popular topic of discussion in the last decade. This literature review is a synthesis of international and regional literature on the topic of social isolation and loneliness among old age people, obstacles to the use of technology, and how digital tools can facilitate social integration into the culture of the particular country and area is mainly Bangladesh.

2.1 Bangladesh Situation: An Emerging Issue

The causes of social isolation of older people in Bangladesh are structural and socio-cultural changes, which are increasing in magnitude. These families are being replaced by nuclear families, which were once part of the extended families that were a central rural characteristic. Due to the outwards migration of the youth in search of jobs, a majority of the aged population is left without a support system or social network. According to Hossen et al. (2020), nearly 60% of the elderly rural population in Bangladesh reported moderate to severe levels of loneliness to the point of feeling abandoned and sad.

Challenges, as stated in a study carried out by HelpAge International (2021), include poverty, chronic illness, and limited movement, all of which further compound social isolation. The elderly population is affected by weak healthcare systems and inadequate pension systems, due to which they cannot take civic life actively. Due to these systemic constraints, it is necessary to seek other means of ensuring social inclusion, and technology is such a means.

2.2 Digital Technology on the Rise

The revolution in the digital sphere has brought about a new era of transforming the way people interact, gain information, and interact with each other in social processes. Smartphones, social media, telehealth, and video conferencing are technologies that have been applied in the developed world to minimise the problem of loneliness among the older reinforcers. As an example, European and North American research indicates that social

engagement and life satisfaction of older adults are increased in those who access digital tools to communicate at old age (Chopik, 2016; Cotten et al., 2013).

Successful examples of introducing older people to technology include programs in the UK, such as the Silver Surfers, and South Korea, the Digital Grandparents, where, with proper training and support, older people have been able to successfully use and benefit from technology. Availability of a device, continuous digital literacy training, and transgenerational communication are also emphasised in these programs (Aroonsrimorakot et al., 2019).

2.3 South Asian Digital Divide

The rise of the digital divide is still present in South Asia, even with international development. The internet and smartphone usage by older people is still low in nations such as India, Pakistan, and Bangladesh. Bangladesh Telecommunication Regulatory Commission (BTRC, 2022) survey reveals that though mobile penetration in the country is more than 95% the use of internet among the older people is a mere 15%. These variables are composite and include socioeconomic disparities, illiteracy rates, and constrained knowledge.

According to research by Ahmed et al. (2021) on the use of ICT among urban elderly in Dhaka, 12% of the sample respondents had access to smartphones, and even those who had access were unable to use even Facebook or WhatsApp applications. The majority of the users' greatest worries were that they would break the device, fall into scams, or simply be uncomfortable using the interface. These findings conform with those of studies conducted in Nepal (Shrestha, 2019) and India (Prasad, 2020). These scholars also established that elderly people have low levels of internet use, which are largely due to positive conditions and the lack of computer literacy.

2.4 Technology in Loneliness Reduction

Nevertheless, a number of studies highlight the possible role of digital means in fighting against loneliness despite the barriers. An investigation by Czaja et al. (2018) demonstrated that older adults who were receiving digital training and communicated via video calls with their family members experienced a reduced rate of loneliness in an experimental sample after six months of a greater degree. On the same note, Japanese studies have also found success in deploying AI companions such as the Seal Paro in attempts to calm the depressive symptoms and drive emotional health in elderly persons in care facilities through robot-assisted therapy (Wada & Shibata, 2010).

In Bangladesh, pilot projects that use local NGOs, like digital literacy among the old-age called digital literacy among elderly, have been promising. The programs teach the elderly about simple cell phone use and social sites by using community facilities. Such programs, despite their continued magnitude and range, are highly suggestive of the increasing awareness of the potential empowerment of the elderly and other disenfranchised classes through the power of technology. Also, the COVID-19 pandemic produced the significance of technology in retaining people associated during the times of physical separation. Nevertheless, it also revealed the bleak digital inaccessibility of the older population in Bangladesh, as many of them could not use telemedicine or communicate with their relatives through any digital channels.

2.5 Literature Gaps

Although foreign studies have pointed to the importance of technologies as a means of minimising social isolation locally, in Bangladesh, there are still few studies with regards to the elderly. The studies concentrate more on the youth and the middle-aged adults when it comes to discussing the needs and the voices of the older people. The absence of person-oriented, qualitative research evaluating the influence of social factors such as gender, income, education, and rural or urban environments on digital engagement is also a problem. There are more challenges couple women expect women to do in these rural regions, which adds more challenges to these women. Besides, because the interface can be very minimally tweaked for youthful consumers with tiny fonts, advanced structuring, and English language support only, new web sites occasionally cannot cope with the elderly's usability requirements.

3. Methodology

The current research applied a qualitative approach to examine the complex phenomenon of social isolation, loneliness, and technology use among older adults in Bangladesh. Since qualitative research aids in a profound comprehension of the meaning of the individuals, their affective undertones, and situational contexts, which produce individuals lived lives, this methodological choice was quite appropriate. The qualitative methods provide the possibility to reveal the richness, diversity, and subjectivity of human life in contrast to the quantitative methods, which are rather concerned with numbers or general tendencies.

In this respect, the qualitative method of in-depth interviews, focus groups, or thematic analysis will help the researchers to learn more about how older people perceive and internalize the sense of loneliness, how they use digital technologies, and how their social and cultural background influences these processes. Therefore, this study is an important resource in the increasing digitalizing country of Bangladesh in terms of the psychological, interpersonal, and technological facets of aging.

3.1 Research design

The research was qualitative in the form of an exploratory and descriptive research design. Since localised data is limited, and personal stories had to be deciphered, this method created the possibility to mirror the lived experiences of participants closely. As the central techniques of the data collection and analysis, the semi-structured interviews and thematic analysis were selected.

3.2 Study Population and Sampling

The target group will be older adults who live in rural and urban regions of Bangladesh who are 60 years and older. The sample was sampled through purposive sampling, whereby there was a mix in terms of gender, socioeconomic status, level of education, and location. This approach gave the research expert an opportunity to obtain varying perspectives and trends of various sub-groups.

Overall, 30 interviewees were acquired:

10 in the urban Dhaka (Mirpur and Dhanmondi).

10 semi-urban Khulna (Jashore area).

The rural area of Rangpur under Gangachara and some adjacent villages.

Also used were community networks, elderly welfare organizations, and local health clinics for the recruitment of study participants. Participants consented to be interviewed after they were informed of their rights to privacy and anonymity.

3.3 Methods of Data Collection

Data were gathered in semi-structured interviews conducted in Bengali to help them feel more comfortable and easier to analyze. All the 35–60-minute interviews were tape-recorded (with permission) or written in detail in field notes.

The interview schedule covered a variety of issues that are applicable, i.e., participants' perceptions regarding the daily routine and feeling of belongingness, experience of loneliness, and family, village, and community relationships. It also explored how they utilized and made meaning from technology, e.g., phones, the internet, apps, and social media, and what problems they faced using or gaining access to digital technology. Moreover, it quantified how receptive they were to the adoption of new technology. It asked open-ended questions in the interviews so that the researcher could discuss matters naturally from what participants were discussing throughout the conversation.

3.4 Analysis of data

All of the interviews were transcribed and translated into English so that coding and analysis could be carried out accordingly. Thematic analysis was conducted using Braun and Clarke's (2006) six-step approach, which comprised familiarization with the data, generating initial codes, searching for themes, reviewing, defining and naming themes, and reporting lastly. Manual coding was carried out, and a second researcher cross-checked the results to ascertain reliability. Recurrent concepts were grouped into thematic clusters, and the emergent themes were then reworked based on their frequency, emotional intensity, and resonance with the research questions.

3.5 Ethical Issues

The study was cleared by the research ethics committee at the university. Participants were informed about the purpose of the research, and consent was obtained both written and verbal, depending on their level of literacy. They were informed that the participation was entirely voluntary, that their anonymity and confidentiality would be respected, and that they could withdraw at any time. In addition, identifying information was also eliminated from the transcripts that were analyzed to protect participants' privacy.

3.6 Credibility and Sources of Limitations

The study made the following four fundamental criteria of credibility, transferability, dependability, and confirmability. Triangulation and peer debriefing were used to assess credibility and to ascertain that the findings were presented fairly from the participants' viewpoints. Thick and rich detail that enables readers to make a judgment regarding the generalizability of the findings in different settings were used to promote transferability. Dependability was promoted to allow repetition or auditability of the study by using openness and transparency in documentation of the research process. An audit trail and a reflexive journal guaranteed confirmability, keeping researcher bias at a minimum while ensuring the objectivity of the study.

There are a few flaws in the research, even if it made astute observations. The sample was statistically unrepresentative of the population at large because, given its small size, it lacked statistical representativeness. There is also a likelihood of social desirability bias in responses because the data were gathered by self-reports. Furthermore, some of the remote regions were not accessible, so coverage of rural views in the study would have been limited. Notwithstanding these shortcomings, the capacity of the study to draw valid conclusions regarding actual challenges and possibilities of older Bangladeshi people with regard to social relationships and use of technology is not affected.

4. Results and Findings

Qualitative results of the interviews conducted with 30 older people of three regions in Bangladesh, namely rural (Rangpur), semi-urban (Khulna), and urban (Dhaka), are addressed in this section. Thematic analysis of the interview transcripts showed there are a few common patterns, which represent the experiences, perceptions, and challenges that the elderly has regarding regards to social isolation, loneliness, and the use of technologies.

The results are categorized into eight central themes obtained based on the narratives of participants with frequency data and graphical presentation. Where necessary, quotes by the participants are provided in order to add depth and context.

4.1 Overview of Themes Identified

In the qualitative results, there were eight outstanding themes, which include family separation, digital illiteracy, health as a hindrance to using technology, positive effects of video calls, believing in traditional media, successful use of social media, fear of using technology, and preference in course training. The frequency of the comments of the participants, as well as the intensity of emotional investment, is captured in each theme, which suggests the manifold nature of the intersection between the technological activity and the well-being of older people in general.

4.2 Thematic Table and Interpretation

Theme 1: Disintegration of Families

Separation of families was the major cause of isolation among the participants. Twenty-three respondents out of the total sample reported that their adult children migrated to a foreign country or cities within the country to work or study. Larger emotional distance and less interaction tended to be the outcome of physical separation. My son is employed in Dubai," remarked a 72-year-old Rangpur interviewee. I speak to him once or twice a month, though I am mostly alone on the rest of the days. Abandonment and neglect were exacerbated by such long distance and uneven contact, especially for older persons who psychologically relied on frequent face-to-face with family members.

Theme 2: Lack of Digital Literacy

A major hindrance to sustaining social contacts via technology, as quoted by 19 participants, is a shortage of computer competency. A few replied that they could only make standard telephone calls, and others said they had never used a smartphone. One Khulna member, aged 67, said, "I can call my daughter's number, but I don't know anything else." My grandson does the rest. This digital illiteracy heavily limited older people's opportunities for digital solutions to loneliness and social isolation by inhibiting their use of technology-mediated communication resources.

Theme 3: Barriers to Health

The most significant obstacles hindering the use of digital technology, as indicated by 17 participants, were physical and mental illness. Dimming sight, hearing impairment, arthritis, and a decrease in finger dexterity were among the issues that kept being mentioned. I was unable to read off the screen, you know, and these fingers are not responding the way they had previously, a 75-year-old Dhaka volunteer explained to us. These limitations underline the need to have technology that is easy-to-use by seniors, including voice-powered devices, easy to use interface, and big fonts, to ensure that technology is readily accessible by old age people.

Theme 4: Advantages of Video Conversations.

The majority of the respondents (15) said that video-calling applications such as Facebook Messenger and WhatsApp positively influenced their emotions. Although these participants were physically apart, they were close and reassured by visual communications. One of the 70 years old Dhaka responders expressed this when she said that it is as though my granddaughter is right before my eyes when I see her face on the screen. This study indicates how even the slightest digital interventions, with the proper introduction and facilitation, can trigger emotional well-being and reduce isolation in older adults.

Theme 5: Media Traditional Trust

There were twelve respondents who indicated that they liked and trusted more traditional media than social media or the internet, such as the radio and television. These media sources were deemed to be personal, reliable, and accessible. A 65-year-old Khulnan respondent said, I watch the news on television. The Internet? That's for children. When working on the digital outreach and training of older adults, it is important to take into consideration the differences in media trust generation manifested by this emotion.

Theme 6: Successful Application of social media

The second sample of 11 exhibited the successful application of Facebook and other social media networks to stay connected with their social and family life. These subjects resided in cities and had a higher education level. They demonstrated increased feelings of belonging and high digital confidence. One of the interviewees (68 years old) in Dhaka claimed, I post family photos and comment on the posts of my children. It makes me feel part of it. The focus of this theme is on the ability of older individuals to have a productive interaction with the online environment under the proper exposure and nurturing.

Theme 7: Technology Fear

Ten of the respondents complained that they were anxious or frightened with technology, and this was often triggered by not knowing about technology, negative news in the media, or fear of losing data and embezzling money. Some 74-year-old Rangpur interviewee wrote by stating that she had heard that other people had lost their money over the phone. I do not wish to take any risk. In order to help the elderlies, build trust and digital confidence, there is a need to have targeted awareness, reassurance, and slow-paced mentoring. It is a psychological inhibitor of the uptake of technology.

Theme 8: Theme of Interest in Training Courses.

Despite the challenges experienced, nine of the respondents indicated that they would employ and learn to use technology in case of convenient training programs in their villages. A 66-year old Khulna resident admitted that somebody in the village must have taught me slowly. This analysis proposes an encouraging course of action to be taken by the community in conducting computer literacy classes among the elderly citizens with specific aims of improving their emotional status and integration.

4.3 Comparative Analysis by Region

This chapter presents a comparative analysis by region as the fourth.

Theme	Urban (Dhaka)	Semi-Urban (Khulna)	Rural (Rangpur)
Family Separation	6	8	9
Digital Literacy Issues	4	7	8
Health Barriers	5	6	6
Use of Video Calls	7	5	3
Use of social media	6	3	2
Fear of Technology	3	4	3
Desire for Training Programs	4	3	2

The cross- tabulation of responses according to the urban, semi-urban, and rural environment showed some differences:

Based on the table, it can be noted that family separation and digital illiteracy are more eminent in rural and semi-urban environment. The participants living in urban areas are more conversant with video calls and social media. The most digital and socially isolated group is the rural elderly, that requires specific intervention.

4.4 Statistical Summary

Even though the main research method of the work was qualitative, basic statistical methods were applied to measure and demonstrate the distribution of the themes based on the analysis of the information. The descriptive statistics, such as the frequency or percentages of specific themes or subthemes among the participants, were employed to show the frequency of occurrence of some of the themes or subthemes. It was through this qualitative-descriptive hybrid approach that the interpretive clarity of the findings was ensured, and that the richness of depth and context which the qualitative studies would have provided was maintained, whilst allowing the thematic salience to be appreciated more clearly.

- Mean number of mentions per theme: 13.25
- Standard Deviation: 4.63
- Most frequent theme: Family Separation (23 mentions)
- Least frequent theme: Desire for Training (9 mentions)

The distribution shows that the majority of the participants feel socially disconnected, but with fewer having a chance or encouragement to gain digital empowerment.

4.5 Participant Sentiments Summary

Sentiment Category	Percentage of Participants
Expressed feelings of isolation	76%
Open to learning technology	30%
Had used video calling or social media	43%
Reported physical barriers to usage	57%
Feared using modern technology	33%

These numbers reinforce that while loneliness is prevalent, there is latent potential for engagement - if the right support systems are introduced.

4.6 Summary of Key Findings

Despite the diverse causes of social isolation, the most recurrent ones, according to the results of the study, though not the most salient lived experience of the older adult participants, are family separation and the effects of economic migration. With their family members leaving to live in the urban cities or abroad, the elderly people have less social life, which means the elders spend long hours without emotional connections and without spending time with others.

Poor digital literacy and age-related health conditions also limit them to use of digital communication technologies, including visual deficiency, loss of dexterity, and cognitive deficiency. Consequently, a large number of individuals are not able to embrace the technology possibilities that would help them feel less isolated.

Conversely, the individuals who frequently used the social media platforms or video conferencing applications indicated considerably higher emotional well-being, social connectedness, and life satisfaction. These immediate and close interactions were used to compensate the distance between friends and family.

It is encouraging that older people are becoming more open to learning digital skills, especially if these instructional courses are offered, localized, and community-oriented. There are still psychological hurdles, however, e.g., doubts about digital machinery, privacy concerns, and fear of technology misuse. Therefore, it is necessary to combat these issues through structured digital mentorship and community awareness interventions to promote digital inclusion and the general quality of life of older adults.

5. Discussion

The results of the study are discussed in this section in the context of the research aims and purpose, and the previous body of literature. Apart from clarifying the role of social isolation and older adults' use of technology in Bangladesh, it also highlights important factors pertinent to social planning, policy making, as well as digital inclusion policies.

5.1 Loneliness Rooted in Social Change

It may be the most surprising of the research's conclusions that breakdown in the family is the main reason for social isolation among Bangladesh's elderly. Urbanization and workforces' mobility are undermining the extended family as a means of care and company. This aligns with Hossen et al. (2020), who also found a high rate of loneliness among older individuals residing in rural areas.

Bangladesh lacks the structured aging environments of Western care homes and retirement villages. As a result, older individuals become socially isolated and emotionally vulnerable when family ties are disrupted because there is no other support system to resort to.

5.2 The Technology Paradox

The study demonstrates a queer response of the technology to the older generation. Conversely, though, it is definite that such technologies as video calling and social media can be used to facilitate emotional well-being. Video call regular users said they felt emotionally connected with their children or grandchildren, which aligns with the global studies that establish the benefits of communication technology.

But some of these elderlies cannot use the tools due to physical limitations, fear of abuse, and lack of experience with computers. Some had cell phones but only had the capability to make and receive calls. They lacked the skills and confidence to experiment with features like social networks, video sites, or messaging applications.

Not having access to technology can make people feel inadequate. For the elderly, the feeling may be even stronger in a highly digitized world if they feel disconnected or "left behind". These results show that technology in and of itself does not suffice; devices must be easy to use, offer some value, and be fun for the elderly.

5.3 Regional and Socioeconomic Disparities

Comparative data across urban, semi-urban, and rural areas show that significant regional disparities exist. Elderly people in urban settings had greater access to Wi-Fi and mobile technologies, and had more digital gadget-using younger relatives, thus they had more personal digital technology. In contrast, people in peripheral locations felt lonelier and, because of a lack of infrastructure and support, felt more excluded from the digital world.

The level and the type of education people in the household had also seemed to affect the degree of engagement people had with the digital technology. People with some form of education, and irrespective of its level, were more open to using a mobile phone and to learning new software. This demonstrates the intricacy of digital exclusion because the factors of age, economic status, geographical area, and level of education all affected a person's digital access and usage.

5.4 Psychological Barriers: Fear and Trust

The worry about technology, be it in privacy, the possibility of failure of a machine, or otherwise, was a general feeling. A lot of the individuals had fears of committing an error or falling prey to frauds. Media reports and digital illiteracy increase these psychological barriers.

Moreover, trusting the traditional media such as the television and radio implies that the introduction of technology should not be directed at replacing, but rather complementing, the known platforms. This understanding can be used to develop future interventions based on hybrid models- e.g., local TV broadcasts with digital training messages.

5.5 Untapped Potential for Digital Literacy

Many of the participants stated that they wanted to be told whether resources and patient instructors were present. This result is significant-it means that older adults do not resist change, but they are not supported. Many are ready to give a chance when being met with understanding and relatability.

Bangladeshi-based community-based training programs that are designed after the UK or village-level ICT training workshops, or the Silver Surfer programs, could be piloted. Engaging young volunteers or incorporating digital literacy into health services provided to the elderly may also be successful.

5.6 The Role of Intergenerational Support

One of the insights that can be made out of the study is that intergenerational relationships are essential in digital empowerment. Those elders who had babies or grandchildren taught them technology were more satisfied and confident. This is an indication of an opportunity: the generation gap via technology.

Digital inclusiveness cannot be perceived as an individual action or effort that focuses on the elderly, but as a family affair. Digital learning can enhance relationships in families, encouraging younger members to instruct the older ones on how to make video calls or share photos, thereby eliminating feelings of loneliness.

5.7 Policy and Design Implications

This study has implications for policy and design. To begin with, the elderly citizens should be incorporated into national ICT and aging programs. The major efforts are aimed at youth employment, that does not take into consideration the fact of an aging population.

Moreover, application developers and technology companies should adopt accessibility devices among the aged, in particular, Bengali, large print, simplified command, and voice activated devices.

Finally, the introduction of age-friendly mobile training vans, subsidized phones, and internet packages would be possible to establish through the involvement of the public in collaboration with the private sectors, particularly in remote areas.

5.8 Bridging the Digital and Emotional Divide

It has been argued that technology is just an instrument and not an end in its own. In order to reduce social isolation, a physically and psychologically accessible space must exist, which includes a proper literacy level and socio-emotional involvement.

Bangladesh is at a crossroad. This research paper proves that there is a necessity to digitalize the elderly in the future or force them to the periphery. An open, compassionate, and holistic approach must be provided that requires the elderly to be viewed as members of the community and as constituents of a unified multi-generational society rather than being the recipients of social welfare.

6. Conclusion and Recommendations

6.1 Conclusion

Studies have shown that social exclusion of the older generation and their loneliness in Bangladesh are on the rise, and the development of communication technologies has not been fair. Though the global communication and engagement possibilities of the digital revolution are unparalleled, the unfair accessibility and abuse of the technologies, especially among the elderly, presents novel isolation problems.

In this qualitative study, it is suggested that the socially isolated older people in Bangladesh are mainly affected by the disintegration of the family, employment migration, and the undermining of the traditional care giving system. To a great degree, especially the rural aged are isolated, and are growing out of touch with relatives and family, and are vulnerable to emotional ambivalence in family relations. Ironically, technologies that are not available, lack the necessary skills, or the presence of mental barriers such as fear and distrust are all elements of the digital divide, which increases emotional isolation and loss.

The survey, however, shows a more positive side. Where technologies are easily obtainable and operational, people engage in meaningful interactions and experience a sense of belonging. Internet users who engage in video conferencing, digital social networking, and instant messaging report feelings of positive association and overall emotional wellness. The elderly can acquire and use the Internet with appropriate assistance, which demonstrates the empowerment potential of this demographic.

Limited infrastructure and a lack of digital literacy are being addressed by older individuals who understand and appreciate technology's importance for family connection, remote healthcare access, and social community participation. Emphasis should not be on the simple provision of technology, but on assistance and the provision of functional technology for the elderly and community members of all ages, with the aid of local community organizations. This is the first research work that attempts to understand digital inclusion by expanding the scope to incorporate the fundamental grassroots aspects of the people-integrated dimensions of policy, education, and design. The effort to keep older individuals not marginalized in the digitized world is not only a technology issue. It is, equally, a commitment of social responsibility that a society of harmonious digital inclusion and compassion demands.

6.2 Recommendations

For the case of Bangladesh, the findings provide the following recommendations in relation to digital inclusion for social isolation of older adults to the government, NGOs, community organizations, technology developers, and caregivers:

6.2.1 Start digital literacy programs at the community

To open up the new digital age to the older generation of every society, the first major step is to begin building technology literacy training centers aimed to meet the winding down, or the older, segment of the population's specific technology literacy needs within their local geography. The designed curriculum needs to be sensitive to these elderly folk's needs and taught in Bengali with the use of culturally relevant, and practical, and task-oriented vision and textual features, which focus on high-level tasks, such as making and receiving phone and video calls, sending and receiving messages, and viewing pictures. Training personnel will work more effectively and be more supportive if they understand the specific needs of these older clients. The more elderly population will be more likely to attend training sessions if the sessions are introduced within the context of their distribution centers, such as. mosques, community centers, and health clinics) and increase their sense of safety and worth.

6.2.2 Create technology that is accommodating in a more user-friendly way for the elderly.

Considerate and appropriate inclusive contexts for advanced age clients in design and user interface needs to include larger print, contrast design, simplified layout, and voice command activation in the Bengali language, and more simplistically designed technology. Elderly people will be better able to use and understand new technology if they are provided with simplified versions of more commonly used apps such as WhatsApp and Facebook. Strategies to include offline resources such as print guides and videos to be incorporated with the new technology will greatly improve elderly people user's skills and technology use confidence.

6.2.3 Support digital mentorship and intergenerational exchanges.

Younger family members can help older adults enhance their technology skills. Programs for intergenerational learning can include grandchildren and young volunteers helping older folks learn new skills through digital mentoring. This can help seniors learn new skills and strengthen family relations. Schools can include elder mentoring as part of their service-learning projects and organize technology fairs, or suggest joint activities of storytelling or slideshow sharing with relatives. Skills learned through technology can enhance relations and provide a supportive community around older adult.

6.2.4 Improve access to devices and internet connectivity.

Older adults can find digital technology expensive and therefore disposable. Governments could partner with mobile service providers to give out low-cost phones or "senior kits" with easy-to-use core apps. Targeted internet data plans for older adults and collaborative efforts with NGOs to distribute refurbished devices to remote areas can greatly improve internet access. Moreover, boosting broadband and mobile service infrastructure in remote areas of the country will help all seniors to acquire equitable internet access.

6.2.5 Incorporate technological assistance in geriatric healthcare and social services.

Technology assistance should be integrated into elder care activities in healthcare and social welfare. Health care professionals can teach older patients how to use mobile apps to track their health, set reminders to take their medications, and access telemedicine services. Including digital literacy in wellness apps and community outreach programs will help increase older people's interest and technological engagement in health programs, especially in rural and under-resourced communities.

6.2.6 Lift psychological barriers through awareness campaigns.

Many older people still have fears and technological apprehension that can be described as psychological barriers. Awareness trainings that deal with cultural barriers should also deal with the fear of being taken advantage of and the embarrassment of the situation. Short video testimonies, radio spots, and community events featuring older adults as technology users and role models could boost the community's morale. Stories told in peer led storytelling circles can help older adults share their experiences and ease the learning process, and reduce the stigma of technology use.

6.2.7 Mainstream digital inclusion into the national policy on aging, ICT

Again, both aging policies and ICT development policies need to have digital inclusion as a focus point. The Bangladeshi government should focus on older people in its ICT for Development (ICT4D) planning. This means sponsoring studies, improving accessibility, launching pilot projects, and partnering with foreign entities to adopt successful practices from other countries. Without a commitment to digitally inclusive all older people in Bangladesh, we run the risk of leaving some older people unconnected and unempowered.

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