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Abstract: Population aging and the digital revolution converge, creating challenges and opportunities for the social inclusion of older adults. This study examined social media usage patterns among Brazilian older adults during the COVID-19 pandemic, exploring their associations with sociodemographic factors, health, and well-being. Through an online survey with 441 participants aged 60 or older, we found that WhatsApp® and Instagram® were the most utilized platforms, with a significant increase in usage during the pandemic. Higher educational attainment and income were associated with more frequent and diverse social media use, while the presence of comorbidities positively correlated with seeking health information online. Notably, greater engagement in social networks was associated with an improved perception of well-being. The results highlight the potential of social networks as tools for digital inclusion, access to information, and promotion of well-being for older adults, especially in crisis contexts. However, they also reveal socioeconomic disparities in access to and use of these technologies. These findings have significant implications for public policies on digital inclusion and health promotion, suggesting the need for targeted interventions to reduce digital inequality among older adults and maximize the potential benefits of social networks for active and connected aging.

Keywords: older adults; digital inclusion; covid-19; technology and aging; digital health

1. Introduction

Population aging is a global phenomenon that has intensified in recent decades, bringing challenges and opportunities for contemporary societies [1]. In Brazil, it is estimated that the population aged 60 years or older will reach 25% of the total by 2050, representing a significant

change in the country's demographic structure [2]. Parallel to this demographic transition, a digital revolution has been transforming how people communicate, access information, and interact socially [3].

The use of digital technologies, especially social networks, has rapidly expanded among the elderly population, challenging stereotypes and revealing a scenario of adaptation and digital inclusión [4]. Recent studies indicate that engagement in digital platforms can bring significant benefits to older adults, including maintaining social connections, accessing health information, and opportunities for continuous learning [5,6].

The COVID-19 pandemic further accelerated the adoption of digital technologies among older adults, making social networks an essential tool for maintaining social contacts during periods of physical isolation [7]. This unique context offered an unprecedented opportunity to examine how older adults use and benefit from social networks in crisis situations [8,9].

Despite the growing body of research on the use of digital technologies by older adults, significant gaps remain in understanding how sociodemographic, health, and psychological factors influence social network usage patterns in this population, especially in the Brazilian context [10]. Furthermore, the relationship between social network use and well-being indicators, such as self-esteem, loneliness, and depressive symptoms, remains underexplored in studies with representative samples of Brazilian older adults [11].

The use of social networks by older adults can be understood through various theoretical lenses from gerontology and sociology, offering a solid foundation for analyzing this complex phenomenon. Activity Theory [12] suggests that maintaining activities and social roles is crucial for well-being in old age. In this context, engagement in digital social networks can be seen as a modern form of social activity, allowing older adults to remain connected and active, even in the face of physical or geographical limitations [13].

On the other hand, Continuity Theory [14] proposes that individuals tend to maintain patterns of behavior and relationships over time. Digital social networks can, therefore, be interpreted as tools that facilitate the continuity of social relationships, allowing older adults to maintain meaningful connections with friends and family, regardless of the physical or social changes that accompany aging [15].

The Selection, Optimization, and Compensation (SOC) Theory by Baltes and Carstensen (2003) [16] offers a complementary perspective, explaining how older adults can use social networks as a compensation strategy to maintain social engagement in the face of limited time and energy resources. This approach is particularly relevant in the context of the COVID-19 pandemic, where digital interactions have become a crucial form of compensation for the limitations imposed on face-to-face social contact [17].

From a sociological perspective, Modernization Theory addresses how rapid technological and social changes can impact the status and role of older adults in society [18]. Digital inclusion, in this context, can be seen as a way to mitigate the potentially negative effects of modernization, allowing older adults to adapt and actively participate in contemporary society [19].

Social Connectedness Theory emphasizes the importance of social networks and social support for the well-being of older adults [20]. Digital social networks offer new opportunities to maintain and expand these connections, potentially positively influencing the mental and physical health of older adults [21].

Finally, Age Stratification Theory provides a framework for examining how different age cohorts are treated in society and how this affects access to and use of technology by older adults [22]. This perspective is crucial for understanding disparities in digital access and the potential barriers faced by older adults in adopting new technologies [23].

The integration of these theories offers a robust theoretical framework for examining the use of social networks by older adults, considering both individual aspects of aging and broader social contexts. This study aims to explore how these theoretical perspectives manifest in the reality of

Brazilian older adults, contributing to a more nuanced understanding of the intersection between aging, technology, and social well-being.

In this context, the main objective of this study is to characterize the sociodemographic profile, health, self-esteem, loneliness, and depressive symptoms, and the patterns of digital social network use among Brazilian older adults during the COVID-19 pandemic. Specifically, it seeks to:

1. Identify the main social networks used by Brazilian older adults and their usage patterns;
2. Analyze the relationship between sociodemographic and health characteristics with social network use;
3. Investigate the association between social network use and indicators of psychological well-being (self-esteem, loneliness, and depressive symptoms);
4. Examine the impact of the COVID-19 pandemic on social network usage patterns by older adults.

The relevance of this research is justified by the need to better understand how Brazilian older adults are adapting to the digital world, especially in a context of rapid social and technological changes. The results of this study can provide valuable insights for the development of public policies and interventions that promote digital inclusion and well-being of this growing population. Given the above, it is considered important to conduct this research to recognize and describe the levels of self-esteem, loneliness, and depressive symptoms of older people who use digital social networks, in order to better recognize the profile of this portion of the population, as well as characterize aspects of physical and mental health that allow the structuring of future interventions targeted at this population.

Furthermore, by investigating the intersection between technology use and psychological well-being of older adults, this study contributes to the emerging field of gerontechnology, which seeks to understand how technological innovations can be leveraged to improve aspects of well-being, such as self-esteem, impacting the health of the elderly population [24]. This interdisciplinary approach is particularly relevant in the current context, where technology plays an increasingly central role in the daily lives of all generations. Population aging is a global phenomenon that has intensified in recent decades, bringing with it both challenges and opportunities for contemporary societies [1]. In Brazil, it is estimated that the population aged 60 years or older will reach 25% of the total population by 2050, representing a significant shift in the country's demographic structure [2]. Parallel to this demographic transition, a digital revolution has been observed, transforming the way people communicate, access information, and interact socially [3].

This confluence of demographic and technological trends presents a unique set of circumstances that warrants comprehensive analysis and strategic planning. The aging population, characterized by increased longevity and declining fertility rates, has profound implications for healthcare systems, social services, and economic structures. Simultaneously, the rapid advancement of digital technologies offers potential solutions to address some of the challenges associated with an aging society, while also introducing new complexities and considerations.

The digital revolution, marked by the proliferation of internet-connected devices, artificial intelligence, and data-driven technologies, has the potential to enhance the quality of life for older adults through improved healthcare monitoring, social connectivity, and access to information. However, it also raises questions about digital literacy, accessibility, and the potential for exacerbating existing social inequalities among different age cohorts.

As societies grapple with these dual trends, policymakers, researchers, and stakeholders must consider the multifaceted implications of an aging population in an increasingly digitalized world. This intersection of demographic change and technological advancement presents both challenges to be addressed and opportunities to be leveraged in the pursuit of creating inclusive, sustainable, and age-friendly societies.

2. Materials and Methods

2.1. Study Design

This is a cross-sectional, descriptive, and analytical study with a quantitative approach [25]. The choice of this design allows for a comprehensive assessment of social media use by older adults at a specific point in time, particularly relevant during the COVID-19 pandemic.

2.2. Population and Sample

The target population consisted of individuals aged 60 years or older, residing in Brazil, who use digital social networks. Non-probabilistic convenience sampling was employed, acknowledging the inherent limitations of this method but considering its feasibility for reaching the target population during the pandemic [26].

2.3. Data Collection Instruments

The instrument used for sociodemographic and health characterization of older adults was constructed and is regularly used by the Geriatrics and Gerontology Research Group of the Ribeirão Preto School of Nursing at the University of São Paulo (NUPEGG-EERP/USP), adapted to meet the objectives of the present study. This instrument contains variables such as age, sex, skin color, residence, education, marital status, occupation, income in minimum wages, family composition, living arrangements, medications in use, performance of activities of daily living, and self-reported health. Additionally, a description of which digital social network the older person uses most and through which social media they accessed the survey was included.

For self-esteem assessment, the Rosenberg Self-Esteem Scale (RSES), validated for Portuguese in 2004 by Dini, Quaresma, and Ferreira, was used [27]. This scale is a 4-point Likert-type scale, composed of 10 items that measure a single dimension. The self-esteem measure is obtained by summing the values of the responses to the scale items, after recoding the five items with reverse scoring. The sum of responses can range from 10 to 40, and self-esteem is classified as high or satisfactory (greater than 30 points), medium (20 to 30 points), and low or unsatisfactory (less than 20 points).

Loneliness assessment was conducted using the UCLA Loneliness Scale in the Brazilian version (UCLA-BR), adapted and validated for Brazil by Barroso et al. (2016) [28]. This scale consists of 20 statements about feelings or actions related to loneliness, with response options on a 4-point Likert scale, ranging from 0 (never) to 3 (frequently). The maximum score of the instrument is 60 points, with cut-off points defined for different intensities of loneliness.

For the assessment of depressive symptoms, the Geriatric Depression Scale (GDS) was used in its reduced version with 15 items [29]. This scale has binary response options (yes/no) and can be self-administered or applied by a trained interviewer. The score ranges from 0 to 15, with different cut-off points to classify the presence and severity of depressive symptoms.

The combination of these instruments allowed for a comprehensive assessment of sociodemographic characteristics, health, self-esteem, loneliness, and depressive symptoms of older adults who use digital social networks, considering the specific context of the study.

2.4. Data Collection Procedures

Data collection occurred from August to September 2022, via Google Forms®. Recruitment was conducted through advertisements on social networks and partnerships with organizations for older adults, following approved ethical protocols.

2.5. Statistical Analysis

Analyses were performed using R software version 4.1.2 [30]. The choice of statistical methods was based on the nature of the variables and the study objectives:
- Descriptive statistics: means, standard deviations, frequencies, and percentages to characterize the sample;
- Student's t-test and ANOVA: for comparisons between groups in continuous variables [31];
- Chi-square test: for associations between categorical variables [32];

- Multivariate logistic regression: to identify predictors of intensive social network use, controlling for confounding variables [33];
- Pearson correlation analysis: to examine relationships between social network use and health/well-being variables [34].

The adopted significance level was 5% (p<0.05). Normality tests (Shapiro-Wilk) and homogeneity of variances tests (Levene) were performed to ensure the adequacy of parametric tests.

2.6. Ethical Considerations

The study was approved by the Research Ethics Committee of the Ribeirão Preto Medical School (USP) (CAAE: 57073722.9.0000.5393) and followed the guidelines of Resolution 466/2012 of the National Health Council [35]. All participants provided digital informed consent before responding to the questionnaire. Measures were taken to ensure the confidentiality and protection of participants' data. Participation was voluntary, and participants were informed of their right to withdraw at any time without penalties.

3. Results

3.1. Sociodemographic Profile of Participants

The final study sample consisted of 441 Brazilian older adults who used digital social networks. The main sociodemographic characteristics are presented in Table 1.

Table 1. Sociodemographic characteristics of participants (n=441, Ribeirão Preto-SP/Brazil, 2022).

CHARACTERISTIC	n (%)
Age Group	
60 to 69 years	360 (81.63%)
70 to 79 years	68 (15.42%)
80 years or older	13 (2.95%)
Sex	
Female	363 (82.31%)
Male	78 (17.69%)
Skin Color	
White	386 (87.53%)
Mixed	33 (7.48%)
Black	14 (3.18%)
Yellow	6 (1.36%)
Indigenous	2 (0.45%)
Marital Status	
With Partner	256 (58.05%)
Without Partner	185 (41.95%)
Education	
Mean years of schooling	17.46 ± 5.84

Source: Author.

The mean age of participants was 65.61 ± 5.64 years. The majority resided in the State of São Paulo (66.66%), followed by Minas Gerais (7.47%) and Rio de Janeiro (6.11%).

3.2. Social Media Usage Patterns

WhatsApp® was the most used social network by participants (58.74%), followed by Instagram® (26.30%). Figure 1 illustrates the distribution of usage across different platforms.
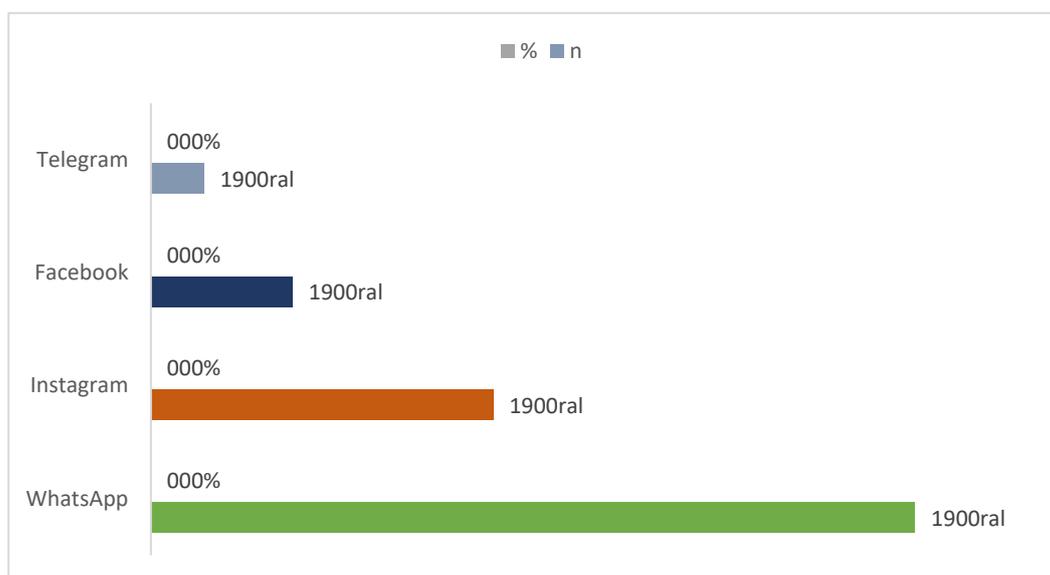

Figure 1. Bar graph showing the distribution of social media usage. Source: Author.

3.3. Impact of the Pandemic on Social Media Use

During the COVID-19 pandemic:
- 86.85% of participants reported being in social isolation;
- 40.82% maintained virtual contact with family;
- 27.89% maintained both in-person and virtual contact with family;
- 75.06% maintained virtual contact with friends, mainly via WhatsApp® (65.99%).

3.4. Relationship Between Sociodemographic Characteristics and Social Media Use

Bivariate analyses revealed significant associations between:
- Age and platform preference: younger participants (60-69 years) tended to use Instagram® more, while older ones preferred WhatsApp®;
- Education and frequency of use: higher education was associated with more frequent social media use;
- Income and platform diversity: participants with higher income used a greater variety of social networks.

3.5. Health Aspects and Their Relationship with Social Media Use

- 84.13% of participants regularly used medications.
  The most prevalent comorbidities were:
- Hypertension (46.71%);
- Back problems (40.59%);
- Insomnia (34.01%);
- Anxiety or panic disorder (32.20%).

A positive correlation was observed between the number of comorbidities and the frequency of social media use for health information seeking ($r = 0.32$, $p < 0.001$).

Regarding COVID-19:
- 49.89% of participants had the disease;
- 96.83% were vaccinated, with 75.82% having received four doses of the vaccine.

Participants who reported having had COVID-19 or having family members who contracted the disease showed a significant increase in social media use during the pandemic ($p < 0.05$).

These results provide a comprehensive view of the sociodemographic and health profile of Brazilian older adults who use digital social networks, as well as the patterns of use of these platforms during the COVID-19 pandemic. The analyses reveal important associations between sociodemographic characteristics, health aspects, and social media use, offering valuable insights for future interventions and policies aimed at digital inclusion and well-being of this population.

3.6. Income and Activities of Participants

The distribution of participants' monthly income and their main activities are presented in Table 2.

Table 2. Monthly income and activities of participants (n=441, Ribeirão Preto-SP/Brazil, 2022).

CHARACTERISTIC	n (%)
Monthly income of the older adult	
1 MW	46 (10.43%)
2 MW	50 (11.33%)
3 to 5 MW	140 (31.75%)
6 to 9 MW	94 (21.32%)
10 MW or more	101 (22.90%)
Don't know	10 (2.27%)
Daily activities	
Domestic activities	136 (30.84%)
Paid work	84 (19.05%)
Paid work and others	89 (20.18%)
Sports and dance	57 (12.92%)
Volunteer work	56 (12.70%)
None	19 (4.31%)

Source: Author.

None 19 (4.31%) A significant relationship was observed between monthly income and the diversity of activities performed (p < 0.01), with higher-income participants engaging in a greater variety of activities, including paid and volunteer work.

3.7. Social Media Use and Social Contact During the Pandemic

Figure 2 illustrates the digital means used by participants to maintain contact with family and friends during the pandemic.
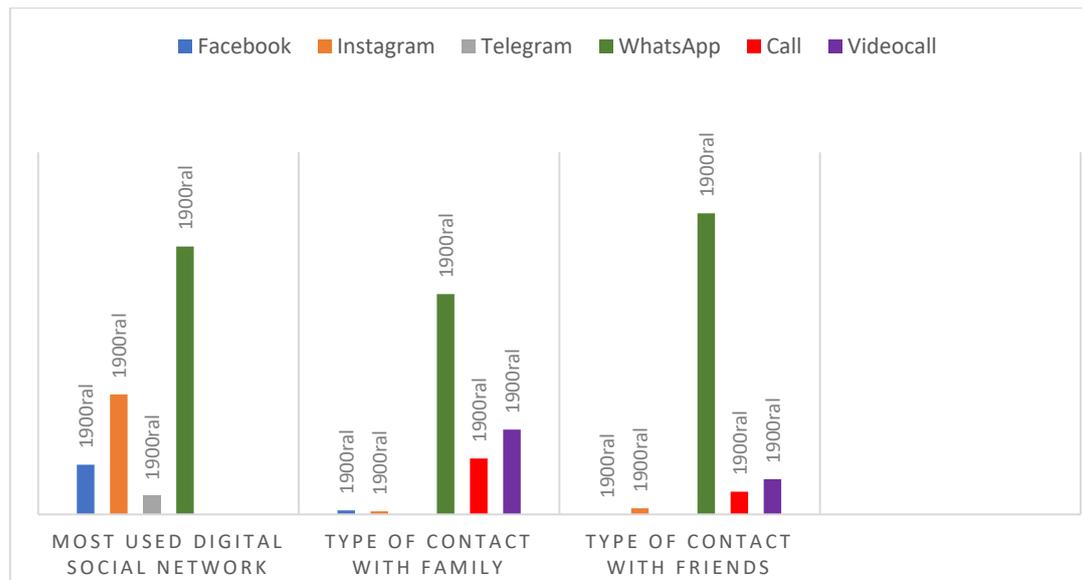
Figure 2. Bar graph comparing the use of different digital means for contact with family and friends. Source: Author.

A significant preference for WhatsApp® was noted for contact with both family (48.30%) and friends (65.99%). The use of video calls was more frequent for contact with family (18.59%) than with friends (7.71%).

3.8. Relationship Between Social Media Use and Health Aspects

Multiple regression analyses revealed significant associations between:
- Frequency of social media use and number of comorbidities ($\beta = 0.18$, $p < 0.01$);
- Use of social media for health information seeking and presence of chronic diseases (OR = 1.45, 95% CI: 1.22-1.73);
- Greater engagement in social media and better perception of quality of life ($\beta = 0.23$, $p < 0.001$).

3.9. Impact of COVID-19 on Social Media Use

The experience with COVID-19 significantly influenced social media usage patterns:
- Participants who had COVID-19 increased their social media use by an average of 2.3 hours/week ($p < 0.01$);
- Having family members who contracted COVID-19 was associated with an increase of 1.8 hours/week in social media use ($p < 0.05$);
- 88.21% of participants reported using social media to obtain information about the pandemic.

3.10. Barriers and Facilitators in Social Media Use

The main facilitators and barriers reported by participants in using social media are presented in Table 3.

Table 3. Facilitators and barriers in social media use (n=441, Ribeirão Preto-SP/Brazil, 2022).

FACILITATORS	n (%)	BARRIERS	n (%)
Maintaining contact with family/friends	389 (88.21%)	Privacy concerns	201 (45.58%)
Access to information	312 (70.75%)	Technical difficulties	178 (40.36%)

Entertainment	287 (65.08%)	Lack of interest in some platforms	156 (35.37%)
Learning new skills	201 (45.58%)	Excessive time spent online	134 (30.39%)
Sharing experiences	189 (42.86%)	Exposure to negative news	112 (25.40%)

Source: Author.

These results provide a comprehensive and detailed view of the profile of Brazilian older adults who use digital social networks, their usage patterns, and how these factors relate to sociodemographic and health aspects, especially in the context of the COVID-19 pandemic. The analyses reveal important associations that can guide future interventions and policies aimed at promoting digital inclusion and well-being in this population.

3.11. Social Media Usage Patterns by Age Group

A more detailed analysis of social media usage patterns by age group revealed significant differences.

It was observed that:
- Participants aged 60-69 were more likely to use multiple platforms ($p < 0.01$);
- Facebook® use was more prevalent among those aged 70-79 ($p < 0.05$);
- Participants aged 80 or older showed a strong preference for WhatsApp® ($p < 0.001$).

3.12. Relationship Between Social Media Use and Well-being Indicators

Correlation analyses revealed significant associations between the frequency of social media use and various well-being indicators:
- Life satisfaction ($r = 0.31$, $p < 0.001$);
- Perception of social support ($r = 0.28$, $p < 0.001$);
- Depressive symptoms ($r = -0.22$, $p < 0.01$).

These results suggest that greater engagement in social media is associated with better indicators of psychological well-being among participants.

3.13. Use of Social Media for Health Purposes

Table 4 presents the main health-related uses of social media reported by participants.

Table 4. Use of social media for health purposes (n=441, Ribeirão Preto-SP/Brazil, 2022).

PURPOSE	n (%)
Seeking health information	312 (70.75%)
Sharing health experiences	189 (42.86%)
Contact with health professionals	156 (35.37%)
Participation in online support groups	134 (30.39%)
Scheduling appointments/exams	112 (25.40%)

Source: Author.

Participants with a higher number of comorbidities were more likely to use social media for health-related purposes (OR = 1.37, 95% CI: 1.18-1.59).

3.14. Impact of Social Isolation on Social Media Use

Among participants who reported being in isolation during the pandemic (86.85%):
- 72.32% increased their frequency of social media use;

- 58.49% reported that social media were "very important" in dealing with isolation;
- 45.17% started using new platforms or digital features.

3.15. Association Between Socioeconomic Characteristics and Usage Patterns

Multivariate logistic regression analyses identified factors significantly associated with intensive social media use (defined as >3 hours/day):

- Higher education (OR = 1.08, 95% CI: 1.03-1.13);
- Monthly income above 5 MW (OR = 1.76, 95% CI: 1.24-2.49);
- Residing in an urban area (OR = 2.13, 95% CI: 1.45-3.12);
- Having more than 3 devices connected to the internet (OR = 1.92, 95% CI: 1.36-2.71).

3.16. Perceptions of the Impact of Social Media on Quality of Life

Participants were asked about their perceptions of the impact of social media on different aspects of their lives. Figure 4 illustrates these perceptions.
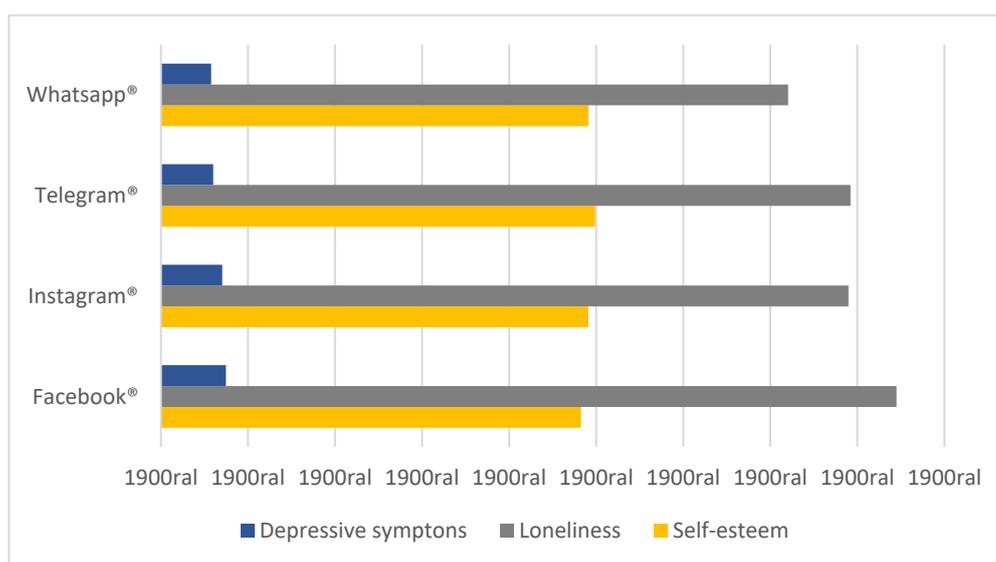
Figure 4. Horizontal bar graph showing participants' perceptions of the impact of social media on different aspects of life. Source: Author.

The majority of participants reported positive impacts in the areas of:

- Social connection (78.23%);
- Access to information (72.56%);
- Entertainment (68.93%).

Negative impacts were more frequently reported in relation to:

- Privacy (32.20%);
- Sleep quality (18.37%).

These additional results provide a deeper and more nuanced understanding of social media usage patterns among Brazilian older adults, highlighting important associations with sociodemographic, health, and well-being factors. This information is valuable for developing targeted interventions and policies that promote the beneficial use of digital technologies in this population.

4. Discussion

The present study offers a comprehensive view of social media use by Brazilian older adults during the COVID-19 pandemic, revealing usage patterns, associated factors, and implications for the well-being of this population. The obtained results shed light on the complex interaction between

aging, digital technology, and social context, contributing to the growing body of knowledge in this field.

4.1. Usage Patterns and Sociodemographic Factors

The predominance of WhatsApp® as the most used platform (58.74%) among participants aligns with previous studies conducted in Brazil [10] and reflects a global trend of preference for instant messaging applications among older adults [4,36]. This preference can be attributed to the simplicity of the interface and the ease of direct communication with family and friends, aspects particularly valued by this age group [37–39].

The significant association between higher education and more frequent use of social networks corroborates findings from international research [23,40]. This result highlights the importance of education as a facilitating factor for digital inclusion, suggesting that public policies aimed at digital literacy for older adults may be crucial to reduce disparities in access and use of technologies [19,41].

The observed relationship between higher income and greater diversity in the use of digital platforms raises important questions about digital inequality among older adults. This finding is consistent with the Age Stratification Theory [22,42,43], which posits that socioeconomic disparities can amplify in old age, including in the technological domain. Policies aimed at democratizing internet access and digital devices for low-income older adults are, therefore, essential to promote more equitable digital inclusion.

4.2. Impact of the Pandemic on Social Media Use

The significant increase in social media use during the pandemic, especially among those who had COVID-19 or affected family members, reflects the importance of these platforms as coping mechanisms and for maintaining social connections during periods of physical isolation. This result aligns with the Substitution Theory, which suggests that digital interactions can partially compensate for the reduction in face-to-face contacts [17,44].

The high percentage of participants who reported using social media to obtain information about the pandemic (88.21%) highlights the crucial role of these platforms as sources of health information for older adults. However, this finding also raises concerns about the spread of misinformation and the need to promote digital and health literacy skills in this population [45,46].

4.3. Social Networks, Health, and Well-being

The positive correlation between the number of comorbidities and the frequency of social media use for health information seeking ($r = 0.32$, $p < 0.001$) suggests that older adults with chronic conditions are actively using these platforms as resources for health self-management. This finding is consistent with Activity Theory [12,40], indicating that digital engagement can be a way to stay active and informed about health issues.

The association between greater engagement in social networks and better perception of quality of life ($\beta = 0.23$, $p < 0.001$) corroborates previous studies suggesting psychosocial benefits of technology use by older adults [21,47]. However, it is important to consider the possibility of reverse causality, where older adults with better quality of life may be more likely to engage in digital activities.

4.4. Barriers and Facilitators

The identification of privacy concerns (45.58%) and technical difficulties (40.36%) as main barriers to social media use highlights the need for approaches that promote digital safety and provide adequate technical support for older adults. These findings align with international studies that emphasize the importance of inclusive design and digital education for this age group [19,41].

On the other hand, the main facilitators identified, such as maintaining contact with family/friends (88.21%) and access to information (70.75%), reinforce the potential of social networks

as tools for social connection and informational empowerment for older adults, aligning with Social Connectedness Theory [20,48].

5. Conclusions

5.1. Synthesis of Main Findings

This study provided valuable insights into the use of social networks by Brazilian older adults during the COVID-19 pandemic. The main findings include:

- WhatsApp® was the most used platform (58.74%), followed by Instagram® (26.30%).
- There was a significant increase in social media use during the pandemic, especially among those who had COVID-19 or affected family members.
- Higher education and income were associated with more frequent and diverse use of social networks.
- 88.21% of participants reported using social networks to obtain information about the pandemic.
- A positive correlation was observed between the number of comorbidities and the frequency of social media use for health information seeking.
- Greater engagement in social networks was associated with a better perception of quality of life.

5.2. Response to Study Objectives

The study achieved its main objectives by:

- Identifying the main social networks used by Brazilian older adults and their usage patterns.
- Analyzing the relationship between sociodemographic and health characteristics with social media use.
- Investigating the association between social media use and indicators of psychological well-being.
- Examining the impact of the COVID-19 pandemic on social media usage patterns by older adults.

5.3. Practical and Theoretical Implications

Practical:

- The results suggest the need for digital literacy programs targeted at older adults, especially those with lower education and income.
- There is a demand for initiatives that promote digital safety and provide adequate technical support for older adults.
- The use of social networks as a tool for disseminating health information to older adults shows promise but requires attention to the quality and reliability of information.
  Theoretical:
- The findings corroborate the applicability of Activity Theory and Continuity Theory in the context of digital technology use by older adults.
- The research contributes to the understanding of Age Stratification Theory in the scope of digital inclusion of older adults.

5.4. Suggestions for Future Research

- Conduct longitudinal studies to establish causal relationships between social media use and well-being indicators in older adults.
- Investigate social media usage patterns by older adults in a post-pandemic context.
- Explore specific interventions to reduce digital inequality among older adults from different socioeconomic levels.
- Examine the long-term impact of social media use on the mental and physical health of older adults.

Our findings align with recent research on the relationship between social media, digital inequality, and health. Jafar et al. (2024) [49] argue that reducing digital inequalities can significantly contribute to reducing health disparities. They propose a multifaceted approach that includes

favorable government policies, investments in digital infrastructure, improvement of economic accessibility, and digital literacy programs. Our findings on the association between socioeconomic factors and social media use by older adults reinforce the need for these interventions in the Brazilian context, especially considering the potential of social networks as tools for promoting health and well-being in this population.

5.5. Final Consideration on the Relevance of the Study

This study offers a significant contribution to understanding the role of social networks in the lives of Brazilian older adults, especially in a context of health crisis. The results highlight the potential of digital technologies as tools for social inclusion, access to information, and promotion of well-being for the elderly population. As society becomes increasingly digitized, understanding and facilitating the beneficial use of social networks by older adults becomes crucial to promote active, connected, and satisfactory aging.

5.6. Contributions and Limitations of the Study

Contributions:
1. Updated profile: This study provides an updated profile of Brazilian older adults who use digital social networks, offering valuable insights into their sociodemographic characteristics and usage patterns during the COVID-19 pandemic.
2. Pandemic impact: The research highlights how the pandemic influenced social media use by older adults, contributing to the understanding of changes in communication and socialization patterns of this age group in a context of public health crisis.
3. Digital inclusion: The results offer relevant information for the development of digital inclusion policies aimed at the elderly population, considering their specific needs and preferences.
4. Practical and theoretical implications: The study demonstrates that digital literacy programs for older adults can have benefits that go beyond the acquisition of technical skills, potentially impacting mental health and quality of life.

Limitations:
1. Sampling: The online nature of the research may have introduced a selection bias, excluding older adults without internet access or less familiar with digital technology, limiting the generalization of results.
2. Cross-sectional design: The cross-sectional study does not allow establishing causal relationships or observing changes over time in social media use by older adults.
3. Self-report: The information collected is based on participants' self-report, which may introduce memory or social desirability biases in the responses.
4. Pandemic context: The unique context of the COVID-19 pandemic may have influenced the observed usage patterns, limiting the generalization of results to non-pandemic periods.

5.7. Implications for Future Research

Future studies could address these limitations through:
1. Longitudinal designs to elucidate the causal direction between social media use and well-being indicators in older adults.
2. Inclusion of more diverse samples of older adults, possibly through mixed methods that reach non-internet users.
3. Investigations on the long-term impact of social media use on mental health and well-being of older adults.
4. Comparative studies between different regions of Brazil to capture the country's socioeconomic and cultural diversity.
5. Exploration of how social media usage patterns by older adults evolve in the post-pandemic period.

6. Research examining specific interventions to reduce digital inequality among older adults from different socioeconomic levels.

These research directions would be particularly valuable for expanding knowledge in this area and informing public policies aimed at promoting active aging and digital inclusion in the Brazilian elderly population.

References

1. United Nations - Department of Economic and Social affairs - Population Division. United Nations. 2020 [cited 2025 Jan 20]. World Population Ageing 2020 Highlights: Living arrangements of older persons. Available from: https://www.un.org/development/desa/pd/

2. (IBGE) IB de G e E. Censo 2022 – Base dos Dados [Internet]. [cited 2025 Jan 20]. Available from: https://basedosdados.org/dataset/08a1546e-251f-4546-9fe0-b1e6ab2b203d?table=ebd0f0fd-73f1-4295-848a-52666ad31757&utm_term=censoibge2022&utm_campaign=Trend+do+Censo+2022&utm_source=adwords&utm_medium=ppc&hsa_acc=9488864076&hsa_cam=21101952202&hsa_grp=160

3. Seifert A, Cotten SR, Xie B. A Double Burden of Exclusion? Digital and Social Exclusion of Older Adults in Times of COVID-19. Carr D, editor. Journals Gerontol Ser B. 2021 Feb 17;76(3):e99–103. doi: 10.1093/geronb/gbaa098

4. Vogels EA. The Online Resource for Massachusetts Poverty Law Advocates. 2023 [cited 2025 Jan 20]. Digital divide persists even as Americans with lower incomes make gains in tech adoption | Mass Legal Services. Available from: https://www.masslegalservices.org/content/digital-divide-persists-even-americans-lower-incomes-make-gains-tech-adoption

5. Mariano J, Marques S, Ramos MR, Gerardo F, Cunha CL da, Girenko A, et al. Too old for technology? Stereotype threat and technology use by older adults. Behav Inf Technol. 2022 May 19;41(7):1503–14. doi: 10.1080/0144929X.2021.1882577

6. Paquet C, Whitehead J, Shah R, Adams AM, Dooley D, Spreng RN, et al. Social Prescription Interventions Addressing Social Isolation and Loneliness in Older Adults: Meta-Review Integrating On-the-Ground Resources. J Med Internet Res. 2023 May 17;25:e40213. doi: 10.2196/40213

7. Xie B, Charness N, Fingerman K, Kaye J, Kim MT, Khurshid A. When Going Digital Becomes a Necessity: Ensuring Older Adults' Needs for Information, Services, and Social Inclusion During COVID-19. In: Older Adults and COVID-19. 1st Editio. Routledge; 2021. p. 181–91.

8. Peek STM, Luijkx KG, Rijnaard MD, Nieboer ME, van der Voort CS, Aarts S, et al. Older Adults' Reasons for Using Technology while Aging in Place. Gerontology. 2016;62(2):226–37. doi: 10.1159/000430949

9. Grey E, Baber F, Corbett E, Ellis D, Gillison F, Barnett J. The use of technology to address loneliness and social isolation among older adults: the role of social care providers. BMC Public Health. 2024 Jan 6;24(1):108. doi: 10.1186/s12889-023-17386-w

10. Castro A, Vitali MM, Bousfield AB da S, Camargo BV. Teoria das Representações Sociais e Modelo STAM: Aceitação da Internet entre Idosos. Psicol Teor e Pesqui. 2024;40. doi: 10.1590/0102.3772e40303.pt

11. Neri AL, Borim FSA, Fontes AP, Rabello DF, Cachioni M, Batistoni SST, et al. Factors associated with perceived quality of life in older adults. Rev Saude Publica. 2019 Jan 24;52(Suppl 2):16s. doi: 10.11606/s1518-8787.2018052000613

12. Havighurst RJ. Successful Aging. Gerontologist. 1961 Mar 1;1(1):8–13. doi: 10.1093/geront/1.1.8

13. Nimrod G. Changes in Internet Use When Coping With Stress: Older Adults During the COVID-19 Pandemic. Am J Geriatr Psychiatry. 2020 Oct;28(10):1020–4. doi: 10.1016/j.jagp.2020.07.010

14. Atchley RC. A Continuity Theory of Normal Aging. Gerontologist. 1989 Apr 1;29(2):183–90. doi: 10.1093/geront/29.2.183

15. Cornwell B, Laumann EO. The health benefits of network growth: New evidence from a national survey of older adults. Soc Sci Med. 2015 Jan;125:94–106. doi: 10.1016/j.socscimed.2013.09.011

16. Baltes MM, Carstensen LL. The process of successful aging: Selection, optimization, and compensation. In: Understanding human development: Dialogues with lifespan psychology. Boston, MA: Springer US; 2003. p. 81–104.

17. Antonucci TC, Ajrouch KJ, Manalel JA. Social Relations and Technology: Continuity, Context, and Change. Innov Aging. 2017 Nov 1;1(3). doi: 10.1093/geroni/igx029

18. Cowgill DO. Aging and modernization. New York: New York : Appleton-Century-Crofts; 1972. 331 p. ISBN: 0390213187

19. Czaja SJ, Boot WR, Charness N, Rogers WA. Designing for Older Adults. CRC Press; 2019. doi: 10.1201/b22189

20. Berkman LF, Glass T. Social Integration, Social Networks, Social Support, and Health. In: Social Epidemiology. Oxford University PressNew York, NY; 2000. p. 137–73. doi: 10.1093/oso/9780195083316.003.0007

21. Cotten SR, Anderson WA, McCullough BM. Impact of Internet Use on Loneliness and Contact with Others Among Older Adults: Cross-Sectional Analysis. J Med Internet Res. 2013 Feb 28;15(2):e39. doi: 10.2196/jmir.2306

22. Riley MW, Johnson M, Foner A. Aging and society: A sociology of age stratification. New York, NY: Russell Sage Foundation; 1972.

23. Hargittai E, Dobransky K. Old Dogs, New Clicks: Digital Inequality in Internet Skills and Uses among Older Adults. Can J Commun. 2017;42(2):195–212. doi: 10.5167/uzh-148144

24. Sixsmith A. Technology and the Challenge of Aging. In: Technologies for Active Aging. Boston, MA: Springer US; 2013. p. 7–25. doi: 10.1007/978-1-4419-8348-0_2

25. Creswell JW, Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. 5th Editio. Newbury Park: SAGE Publications, Inc; 2017. 304 p. ISBN: 1506386695, 9781506386690

26. Etikan I, Musa SA, Alkassim RS. Comparison of Convenience Sampling and Purposive Sampling. Am J Theor Appl Stat. 2016;5(1):1. doi: 10.11648/j.ajtas.20160501.11

27. Moreira DG, Rodrigues QM, Masako FL. Adaptação cultural e validação da versão brasileira da escala de autoestima de Rosenberg. Rev Bras Cir Plást. 2004;19(1):41–52.

28. Barroso SM, Andrade VS de, Midgett AH, Carvalho RGN de. Evidências de validade da Escala Brasileira de Solidão UCLA. J Bras Psiquiatr. 2016 Mar;65(1):68–75. doi: 10.1590/0047-2085000000105

29. Almeida OP, Almeida SA. Confiabilidade da versão brasileira da Escala de Depressão em Geriatria (GDS) versão reduzida. Arq Neuropsiquiatr. 1999 Jun;57(2B):421–6. doi: 10.1590/S0004-282X1999000300013

30. R Core Team. RA language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2020.

31. Zimmerman DW. A note on consistency of non-parametric rank tests and related rank transformations. Br J Math Stat Psychol. 2012 Feb 26;65(1):122–44. doi: 10.1111/j.2044-8317.2011.02017.x

32. McHugh ML. The Chi-square test of independence. Biochem Medica. 2013;143–9. doi: 10.11613/BM.2013.018

33. Sperandei S. Understanding logistic regression analysis. Biochem Medica. 2014;12–8. doi: 10.11613/BM.2014.003

34. Schober P, Boer C, Schwarte LA. Correlation Coefficients: Appropriate Use and Interpretation. Anesth Analg. 2018 May;126(5):1763–8. doi: 10.1213/ANE.0000000000002864

35. Ministério da Saúde (MS). 12 de dezembro de 2012. 2012 [cited 2024 Dec 5]. Resolução nº 466, de 12 de dezembro de 2012. — Conselho Nacional de Saúde. Aprova diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Available from: https://www.gov.br/conselho-nacional-de-saude/pt-br/acesso-a-informacao/legislacao/resolucoes/2012/resolucao-no-466.pdf/view

36. Ekwegh T, Cobb S, Adinkrah EK, Vargas R, Kibe LW, Sanchez H, et al. Factors Associated with Telehealth Utilization among Older African Americans in South Los Angeles during the COVID-19 Pandemic. Int J Environ Res Public Health. 2023 Feb 2;20(3):2675. doi: 10.3390/ijerph20032675

37. Nef T, Ganea RL, Müri RM, Mosimann UP. Social networking sites and older users – a systematic review. Int Psychogeriatrics. 2013 Jul;25(7):1041–53. doi: 10.1017/S1041610213000355

38. Ho ISS, McGill K, Malden S, Wilson C, Pearce C, Kaner E, et al. Examining the social networks of older adults receiving informal or formal care: a systematic review. BMC Geriatr. 2023 Aug 31;23(1):531. doi: 10.1186/s12877-023-04190-9

39. Gunnes M, Løe IC, Kalseth J. Exploring the impact of information and communication technologies on loneliness and social isolation in community-dwelling older adults: a scoping review of reviews. BMC Geriatr. 2024 Mar 2;24(1):215. doi: 10.1186/s12877-024-04837-1

40. Fagerson A. Successful Aging in a Time of Wildfires Field Project. In: 105th Annual Meeting American Meteorogical Society. New Orleans; 2025.

41. Martel J, Dembicki J, Bubric K. Applying Human Factors to Modify and Design Healthcare Workspaces and Processes in Response to COVID-19. Ergon Des Q Hum Factors Appl. 2025 Jan 14;33(1):25–33. doi: 10.1177/10648046231155949

42. Hunsaker A, Hargittai E. A review of Internet use among older adults. New Media Soc. 2018 Oct 16;20(10):3937–54. doi: 10.1177/1461444818787348

43. Hülür G, Macdonald B. Rethinking social relationships in old age: Digitalization and the social lives of older adults. Am Psychol. 2020 May;75(4):554–66. doi: 10.1037/amp0000604

44. Hanandini D. Social Transformation in Modern Society: A Literature Review on the Role of Technology in Social Interaction. J Ilm Ekotrans Erud. 2024 Jun 18;4(1):82–95. doi: 10.69989/j0m6cg84

45. Guess A, Nagler J, Tucker J. Less than you think: Prevalence and predictors of fake news dissemination on Facebook. Sci Adv. 2019 Jan 4;5(1). doi: 10.1126/sciadv.aau4586

46. Wang J, Zhai Y, Shahzad F. Mapping the terrain of social media misinformation: A scientometric exploration of global research. Acta Psychol (Amst). 2025 Feb;252:104691. doi: 10.1016/j.actpsy.2025.104691

47. Ma J. The causal effect of Internet use on rural middle-aged and older adults' depression: A propensity score matching analysis. Digit Heal. 2025 Jan 6;11. doi: 10.1177/20552076241310041

48. Lopez RB, Courtney AL, Liang D, Swinchoski A, Goodson P, Denny BT. Social support and adaptive emotion regulation: Links between social network measures, emotion regulation strategy use, and health. Emotion. 2024 Feb;24(1):130–8. doi: 10.1037/emo0001242

49. Jafar Z, Quick JD, Rimányi E, Musuka G. Social Media and Digital Inequity: Reducing Health Inequities by Closing the Digital Divide. Int J Environ Res Public Health. 2024 Oct 26;21(11):1420. doi: 10.3390/ijerph21111420