

Trajectories of loneliness among middle-aged and older adults during and after the Covid-19 pandemic

Trajetórias da solidão em adultos de meia-idade e pessoas idosas durante e após a pandemia da Covid-19

Trayectorias de la soledad en adultos de mediana edad y adultos mayores durante y después de la pandemia de la Covid-19

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ABSTRACT

Objective: to assess the factors associated with changes in loneliness among middle-aged and older adults during and after the Covid-19 pandemic. **Method:** a prospective, longitudinal, and analytical study with a convenience sample made up of 215 individuals aged 45 years and older. The first data collection was conducted between February and December 2021, while the second took place between March and July 2023. A questionnaire that included sociodemographic variables, dependency factors, cognitive performance and social support was used, as well as the Brazilian Loneliness Scale. **Results:** most participants were female, with an average age of 63 years. There was a decrease in the prevalence of loneliness in the second assessment (9.3%) compared to the first (17.7%). Loneliness was associated with older age, higher income, dependence in instrumental activities of daily living, and weak social support ($p < 0.05$). **Conclusion:** the prevalence of loneliness decreased after the emergency phase of the Covid-19 pandemic.

Descriptors: COVID-19; Middle Aged; Aged; Aging; Loneliness.

RESUMO

Objetivo: avaliar os fatores associados às mudanças na solidão de adultos de meia idade e pessoas idosas durante e após a pandemia da Covid-19. **Método:** estudo longitudinal prospectivo e analítico, com amostra de conveniência composta por 215 indivíduos de 45 anos ou mais. A primeira coleta foi realizada entre fevereiro e dezembro de 2021, e a segunda entre março e julho de 2023, por meio de questionário com variáveis sociodemográficas, de dependência, desempenho cognitivo e apoio social, além da Escala Brasileira de Solidão. **Resultados:** a maioria dos participantes era do sexo feminino, com média de 63 anos. Houve diminuição na prevalência da solidão na segunda avaliação (9,3%) em comparação a primeira (17,7%). A solidão apresentou associação com o aumento da idade, maior renda, dependência para atividades instrumentais da vida diária e apoio social fraco ($p < 0,05$). **Conclusão:** a prevalência de solidão reduziu após o período de emergência da pandemia de Covid-19.

Descritores: COVID-19; Pessoa de Meia-Idade; Idoso; Envelhecimento; Solidão.

RESUMEN

Objetivo: evaluar los factores asociados a cambios en la soledad de adultos de mediana edad y adultos mayores durante y después de la pandemia de Covid-19. **Método:** estudio longitudinal prospectivo y analítico, con muestra por conveniencia compuesta por 215 personas de 45 años o más. La primera recolección se realizó entre febrero y diciembre de 2021, y la segunda entre marzo y julio de 2023, utilizando un cuestionario con variables sociodemográficas, de dependencia, rendimiento cognitivo y apoyo social, además de la Escala Brasileña de Soledad. **Resultados:** la mayoría de los participantes era del sexo femenino y tenía una edad media de 63 años. Hubo una disminución en la prevalencia de soledad en la segunda evaluación (9,3%) con respecto a la primera (17,7%). La soledad se asoció con el aumento de la edad, mayores ingresos, dependencia en las actividades instrumentales de la vida diaria y apoyo social escaso ($p < 0,05$). **Conclusión:** la prevalencia de soledad se redujo después del período de emergencia de la pandemia de Covid-19.

Descriptores: COVID-19; Persona de Mediana Edad; Anciano; Envejecimiento; Soledad.

INTRODUCTION

Covid-19 is caused by Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2), a virus from the Coronaviridae family that infects both animals and humans^{1,2}. This virus spread rapidly, creating a concerning situation worldwide, with over 590 million cases and 6.4 million deaths between December 2019 and August 2022³. The emergence of new strains, with multiple mutations, raised further public health concerns throughout this pandemic³.

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On a global scale, the Covid-19 pandemic had a serious impact on people's mental health and well-being⁴. In response, various strategies were adopted to contain the spread of the virus, leading to measures of social distancing and isolation, primarily affecting individuals who tested positive⁵. Due to the restrictions imposed during the pandemic, limited social interactions may have intensified the feeling of loneliness⁶⁻⁸.

Loneliness can be understood as an individual's interpretation of their interpersonal relationships, evaluating them as either satisfying or unsatisfying, based on both the quantity and quality of these connections. A person may be in contact with many others and still experience feelings of loneliness⁹. Studying loneliness goes beyond assessing the objective aspects of physical health; it also involves examining subjective factors, which are shaped by an individual's perception and evaluation of their social interactions. Therefore, the definition of loneliness is not universally agreed upon, as it is a subjective experience that can hold different meanings for different individuals¹⁰.

Estimates of loneliness prevalence among older adults and the elderly before the Covid-19 pandemic varied¹¹⁻¹⁴. A study conducted in the United States with adults over 50 years old found a loneliness prevalence of 18%¹¹. A transnational European study investigated the prevalence of loneliness in individuals over 60 years old. In Group 1 (Bulgaria, Hungary, Latvia, Poland, Romania, Russia, Slovakia, and Ukraine), the prevalence ranged from 19% to 34%; in Group 3 (Austria, Cyprus, Estonia, France, Portugal, Slovenia, and Spain), it ranged from 10% to 15%; and in Group 2 (Belgium, Denmark, Finland, Germany, Ireland, Netherlands, Norway, Sweden, Switzerland, and the United Kingdom), it ranged from 3% to 8%¹². Another study conducted with elderly people aged 65 or older revealed loneliness prevalence rates of 25.3% to 32.4% in Latin America, 18.3% in India, and 3.8% in China¹³. In Brazil, a pre-pandemic study found a loneliness prevalence of 33.1%¹⁴. During the Covid-19 pandemic, studies presented heterogeneous results, reporting increases^{15,16}, decreases^{14,17}, or stability in loneliness levels¹⁸.

Before the pandemic caused by the novel coronavirus, loneliness was already recognized as an epidemic health issue^{19,20}, and since the beginning of this pandemic outbreak, there has been growing concern about the psychosocial consequences of physical distancing²¹. Loneliness significantly affects older individuals, impairing their physical and mental health^{22,23}, with many experiencing this feeling more deeply due to factors such as living alone, lack of interaction with friends, loss of autonomy, widowhood, empty nest syndrome, retirement, cognitive decline^{24,25}, depression, suicidal ideation, and visual impairment²⁶. Loneliness can also be influenced by an individual's past experiences and their spirituality and/or religiosity²⁷. All of these factors can contribute to the onset of loneliness, which in turn can lead to increased morbidity and mortality²⁸⁻²⁹.

As described, loneliness is considered a health risk factor which brings negative consequences³⁰. Given this, it is crucial to develop effective strategies for screening loneliness across all levels of healthcare, particularly within Primary Health Care (PHC), by understanding its prevalence and identifying the factors associated with its onset³¹, thereby enabling the development of preventive measures and continuous monitoring. Actions taken to prevent loneliness could impact the reduction of morbidity and mortality and improve quality of life³². However, studies investigating loneliness in middle-aged and older adults in the Brazilian context are scarce and yield diverse results^{14,25,33-35}, making it necessary to conduct further research on this topic, particularly longitudinal studies.

Thus, considering the factors mentioned above and the lack of studies at the national level, this study aimed to evaluate the factors associated with changes in loneliness among middle-aged and older adults during and after the Covid-19 pandemic, in order to support interventions, prevention programs, and health promotion actions aimed at ensuring healthy aging for the population.

METHOD

This is a prospective, longitudinal, and analytical study conducted with individuals registered in nine Family Health Units (FHU) in a medium-sized municipality located in the state of Mato Grosso do Sul. The inclusion criteria were as follows: being 45 years of age or older, being registered in the FHUs of the municipality, and being able to respond to the interview questions as determined by the interviewer's assessment.

In the first assessment, a convenience sampling method was used, based on the maximum number of people who could be approached between February and December 2021, considering the sanitary restrictions imposed by the Covid-19 pandemic. Potential participants were identified using a list of names and addresses provided by the FHU teams. At the time, 215 individuals were interviewed, including 87 adults (45-59 years old) and 128 older adults (≥60 years old). All participants were contacted and invited to participate in the second assessment, which was conducted between March and July 2023. The interviews were conducted by trained evaluators, at the participants' homes.

The dependent variable, loneliness, was assessed using the Brazilian UCLA Loneliness Scale (UCLA-BR), which was validated in Brazil for individuals aged 20 to 87 years³⁶. It consists of 20 items with four Likert-type response options, ranging from 0 (never) to 3 (frequently), with a maximum score of 60 points³⁶. The UCLA-BR includes questions about the frequency with which the participant experienced social interactions and engaged in activities carried out individually³⁶. The cut-off points for interpreting the UCLA-BR were: 0 to 22 points, indicative of minimal loneliness; 23 to 35 points, indicative of mild loneliness; 36 to 47 points, indicative of moderate loneliness; and 48 to 60 points, indicative of severe loneliness³⁶. Due to the low number of participants in the mild, moderate, and severe loneliness groups, the distribution was adjusted into two groups: minimal loneliness and mild to severe loneliness.

The independent variables in this study were collected at baseline and included sociodemographic data, level of dependency, cognitive performance, and social support. The sociodemographic variables included gender (male/female), age (continuous), education level (in years of schooling), family income (in BRL – Brazilian Real), and marital status (with partner/without partner).

The level of dependency was assessed using the *Katz Index*, which evaluates Basic Activities of Daily Living (BADL). The index has a score ranging from zero (considered fully independent) to six (total dependence) and evaluates functions such as bathing, dressing, feeding, going to toilet, transferring, and continence^{37,38}. Instrumental Activities of Daily Living (IADL) were assessed using the *Lawton scale*, which covers more complex social activities such as using the phone, navigating transportation, shopping, preparing meals, performing household tasks, managing medications, and managing finances. The score ranges from seven (indicating the highest level of dependence) to 21 points (indicating complete independence). Based on the score, individuals are categorized as totally dependent (7 points), partially dependent (8-20 points), or independent (21 points)³⁹.

Cognitive performance was assessed using the Mini-Mental State Examination (MMSE), an instrument used to evaluate cognitive performance in the domains of temporal and spatial orientation, registration, attention and calculation, recall, language, and visuospatial perception. The score ranges from 0 to 30, with higher scores indicating better cognitive performance⁴⁰.

Social support was assessed through questions about the participant's living situation (living alone / living with others), the number of people they considered close (up to five / five or more people), and whether they were involved in any social groups (yes / no). Participants who met two or three criteria (living with others / having five or more close people / participating in social groups) were considered to have adequate social support. Those who met one or none of the criteria were classified as having weak social support.

All data analyses were conducted using the *Statistical Package for the Social Sciences* (SPSS®), version 25.0. A missing data rate of 4.1% was identified and handled through imputation using the Expectation-Maximization (EM) method, as they were considered *Missing Completely at Random* (Little's MCAR test: $X^2(50) = 60.75$, $p = 0.142$)⁴¹.

Initially, a descriptive analysis was conducted using absolute and relative frequencies, as well as the mean and standard deviation for all variables. Next, the prevalence of mild to severe loneliness and its respective confidence interval (CI 95%) was analyzed in the second assessment, comparing them with the first assessment. McNemar's test was used for this comparison.

Multinomial regression models were then estimated, with loneliness as the dependent variable, which was categorized into four groups: 1) minimal loneliness in both assessments (remained well); 2) mild to severe loneliness in the first assessment and minimal loneliness in the second assessment (improved); 3) minimal loneliness in the first assessment and mild to severe loneliness in the second assessment (worsened); and 4) mild to severe loneliness in both assessments (remained bad). The first group was used as the reference category in the analyses.

In the univariate analysis, each independent variable was tested individually, and those with $p < 0.20$ were further analyzed in a multiple multinomial regression model. The odds ratio (OR) was estimated along with the corresponding CI 95%. Variables with $p < 0.05$ in the multiple model, along with gender and age, which were used as control variables, were considered significant. The analyses were performed in compliance with all regression assumptions.

The research protocol was approved by the Human Research Ethics Committee of the institution that proposed the study. All interviewees were informed about the study's objectives and were asked to sign two copies of the free and informed consent form prior to the assessments. The study was conducted in accordance with the guidelines established by Resolution No. 466/2012 of the National Health Council of the Ministry of Health.

RESULTS

A total of 215 individuals participated in the study, and their characterization can be found in Table 1.

Table 1: Sociodemographic and health characteristics of the participants according to changes in loneliness (n=215). Três Lagoas, MS, Brazil, 2021 - 2023.

Variables	Categories	n(%)	Mean(sd)	Group 1 n =165 n(%)	Group 2 n =29 n(%)	Group 3 n =12 n(%)	Group 4 (=n=9 n(%)
Gender	Male	70(32.6)		52(31.5)	11(37.9)	4(33.3)	3(33.3)
	Female	145(67.4)		113(68.5)	18(62.1)	8(66.7)	6(66.7)
Age (years old)			63.3(±11.4)	63.7(11.8)	60.9(9.3)	63.3(10.4)	63.2(11.8)
Schooling (years)			6.1(±5.2)	6.2(5.3)	5.0(4.1)	6.6(5.4)	8.2(6.5)
Family income (R\$)			2416.7 (±1632.1)	2345.1 (1498.6)	1974.6 (1443.3)	3890.5 (2733.9)	3187.7 (1706.3)
Marital status	With a partner	119(55.3)		94(57.0)	14(48.3)	6(50.0)	5(55.6)
	Without a partner	96(44.7)		71(43.0)	15(51.7)	6(50.0)	4(44.4)
Dependence in BADLs			0.3(±0.6)	0.3(0.7)	0.4(0.5)	0.3(0.5)	0.3(0.5)
Dependence in IADLs			19.1(±2.8)	19.3(2.7)	18.3(3.1)	20.2(1.3)	17.2(3.9)
Cognitive performance			22.7(±4.6)	22.9(4.6)	20.7(4.7)	25.3(2.6)	22.3(3.7)
Social support	Adequate	147(68.4)		115(69.7)	19(65.5)	11(91.7)	2(22.2)
	Weak	68(28.8)		50(30.3)	10(34.5)	1(8.3)	7(77.8)

Notes: sd - standard deviation; BADLs - Basic Activities of Daily Living; IADLs - Instrumental Activities of Daily Living; Grupo 1 - minimal loneliness in both assessments; Group 2 - mild to severe loneliness in the first assessment and minimal loneliness in the second assessment; Group 3 - minimal loneliness in the first assessment and mild to severe loneliness in the second assessment; Group 4 - mild to severe loneliness in both assessments.

Most participants were female (67.4%), had a partner (55.3%), an average age of 63.3 (±11.4) years, an average monthly income of approximately BRL 2,400.00 and an average education level of 6.1 (±5.2) years. Cognitive performance had an average score of 22.7 (±4.6), and most participants had adequate social support (68.4%).

The results of the analysis focused on the variation in loneliness levels can be found in Table 2.

Table 2: Analysis of the changes in loneliness levels from 2021 to 2023 (n=215). Três Lagoas, MS, Brazil, 2021 - 2023.

2021 Assessment	2023 Assessment	
	Minimal loneliness	Mild to severe loneliness
Frequency (1%)		
Minimal loneliness	165 (76.7%)	12 (5.6%)
Mild to severe loneliness	29 (13.5%)	9 (4.2%)

Notes: Percentages relative to the total sample; p-value=0.004

In the first assessment, during the pandemic, the prevalence of mild to severe loneliness was 17.7% (95% CI: 13.2 – 23.3). In the second assessment, this prevalence decreased to 9.8% (95% CI: 6.5 – 14.5). The changes in loneliness categories were statistically significant (p=0.004). It was observed that 5.6% of participants who reported minimal loneliness in the first assessment experienced mild to severe loneliness in the second assessment, while 13.5% of those who reported mild to severe loneliness in 2021 experienced minimal loneliness in the 2023 assessment.

Table 3 presents the regression analyses examining the factors associated with changes in loneliness categories.

Table 3: Unadjusted and adjusted analyses examining factors associated with changes in loneliness categories among participants (n=215). Três Lagoas, MS, Brazil, 2021 - 2023.

Variables	Group 2		Group 3		Group 4	
	Gross OR (CI 95%)	Adjusted OR (CI 95%)	Gross OR (CI 95%)	Adjusted OR (CI 95%)	Gross OR (CI 95%)	Adjusted OR (CI 95%)
Gender						
Male	1.33 (0.59-3.01)	1.97 (0.79-4.91)	1.09 (0.31-3.77)	0.48 (0.10-2.21)	1.09 (0.26-4.51)	0.62 (0.12-3.12)
Female	Ref.	Ref.	Ref.		Ref.	Ref.
Age (years old)	0.98 (0.94-1.01)	0.94 (0.90-0.98)*	0.99 (0.95-1.05)	1.05 (0.97-1.14)	0.99 (0.94-1.06)	0.94 (0.87-1.03)
Schooling (years)	0.95 (0.87-1.04)		1.02 (0.91-1.13)		1.06 (0.95-1.19)	
Family income (R\$)	1.00 (0.99-1.00)	1.00 (0.99-1.00)	1.00 (1.00-1.01)*	1.00 (1.00-1.01)*	1.00 (1.00-1.01)	1.00 (1.00-1.01)*
Marital status						
With a partner	0.71 (0.32-1.55)		0.76 (0.23-2.44)		0.94 (0.25-3.64)	
Without a partner	Ref.		Ref.		Ref.	
Dependence in BADLs	1.08 (0.60-1.94)		0.97 (0.37-2.52)		0.97 (0.32-2.90)	
Dependence in IADLs	0.90 (0.79-1.02)	0.86 (0.72-1.01)	1.20 (0.86-1.67)	1.14 (0.74-1.74)	0.82 (0.69-0.99)*	0.69 (0.52-0.93)*
Cognitive performance	0.91 (0.84-0.98)*	0.92 (0.83-1.01)	1.19 (0.99-1.42)	1.18 (0.94-1.48)	0.97 (0.84-1.13)	0.96 (0.78-1.16)
Social support						
Adequate	Ref.	Ref.	Ref.		Ref.	Ref.
Weak	1.21 (0.53-2.79)	1.06 (0.43-2.64)	0.21 (0.03-1.66)	0.21 (0.03-1.75)	8.05 (1.62-40.2)*	11.18 (1.87-66.70)*

Notes: OR - Odds Ratio; CI - Confidence Interval; Ref - Reference category for the independent variables; BADLs - Basic Activities of Daily Living; IADLs - Instrumental Activities of Daily Living; *p≤0.05; Model adjustment - X² (18) = 48.282; p <0.001; R² Nagelkerke = 0.256; Group 1 - minimal loneliness in both assessments (reference category for the regression model); Group 2 - mild to severe loneliness in the first assessment and minimal loneliness in the second assessment; Group 3 - minimal loneliness in the first assessment and mild to severe loneliness in the second assessment; Group 4 - mild to severe loneliness in both assessments.

In group 2, older age was associated with a lower likelihood of ceasing to experience mild to severe loneliness (OR: 0.94; CI95%: 0.90-0.98). In groups 3 and 4, higher income was associated with a greater likelihood of becoming lonely or maintaining feelings of loneliness (OR: 1.00; CI95%: 1.00-1.01). In group 4, lower dependence in IADLs was associated with a reduced likelihood of remaining lonely (OR: 0.69; CI95%: 0.52-0.93), and participants with weak social support are more likely to continue experiencing feelings of loneliness (OR: 11.18; CI95%: 1.87-66.70).

DISCUSSION

The present study investigated the prevalence of loneliness in middle-aged and older adults during and after the pandemic, observing a reduction in prevalence from 17.7% in 2021 to 9.8% in 2023.

Studies conducted in other countries during the pandemic found higher prevalences of loneliness^{15,43-45}. A study in China (with participants over 50 years old) reported loneliness in 37.9% of participants⁴³. In the United States, data from the Covid-19 *Coping Study* revealed that 29.5% of adults aged 55 or older experienced high levels of loneliness⁴⁴. Another study found that 42.5% of older adults reported experiencing loneliness¹⁵. A review study indicated that most longitudinal studies comparing loneliness levels before and during the pandemic reported an increase in loneliness during the pandemic⁴⁵.

However, the Brazilian Longitudinal Study of Aging (ELSI-Brasil) revealed divergent results. A publication using data from 5,108 participants aged 50 or older showed that the prevalence of loneliness in the pre-pandemic period (August 2019 to March 2020) was 33.1%. It also evidenced that, over time, this prevalence decreased to 23.6% between May and June 2020, 20.5% between July and August 2020, and 20.6% between September and October of the same year¹⁴. In contrast, an analysis of data from 4,431 participants also conducted by ELSI-Brasil found a prevalence of 23.9% during the pandemic and 32.8% prior to the Covid-19 pandemic¹⁷.

Although the data from ELSI-Brasil indicated a higher prevalence of loneliness during the pandemic compared to the findings of the present study, it is important to note that ELSI-Brasil assessed loneliness using a simple question

(*How often do you feel lonely?*), whereas the present study used a validated instrument, which may explain the differences observed. Additionally, in this study, pandemic data were collected in 2021, when the pandemic had already been ongoing for some time, whereas ELSI collected data during the early stages of the pandemic. We also observed a reduction in the prevalence of loneliness after the pandemic; however, we have not identified other studies reporting similar findings for comparison.

In the present study, the factors associated with changes in loneliness during the longitudinal assessment were: age, income, independence in IADLs, and social support.

In the longitudinal assessment, older age was associated with a reduced likelihood of improvement in loneliness. Consistently, other studies also report a link between older age and higher levels of loneliness⁴⁶⁻⁴⁸. Aging is accompanied by various psychosocial changes, including a heightened susceptibility to loneliness. Older adults often go through a challenging period characterized by a sense of diminished purpose or meaning in life, increased feelings of isolation and separation, a lack of intimacy, and a greater prevalence of grief in their relationships⁴⁹. Given the impact of loneliness on physical and mental health, quality of life, and longevity, the World Health Organization (WHO) published a document titled “Social isolation and loneliness among older adults”, highlighting the political and public health concerns surrounding these issues, which became even more evident due to the COVID-19 pandemic⁴.

Regarding family income, individuals with higher incomes were more likely to experience an increase in loneliness and to continue feeling lonely after the pandemic. International studies conducted before^{22,32} and during the pandemic^{50,51} found contrasting results, suggesting that low income is a risk factor for loneliness.

In Brazil, due to the government's inadequate response to the health crisis, the economic impact of the pandemic was devastating. This crisis led to a significant increase in informal labor, affecting 48% of the population by mid-2020⁵². The Covid-19 pandemic led to negative macroeconomic and financial consequences, creating widespread financial hardships across society⁵³. The economic fallout of the pandemic in Brazil may have contributed to the rise in feelings of loneliness among individuals with higher family incomes.

This study found that greater independence in IADLs was associated with a lower likelihood of experiencing loneliness and a reduced chance of persisting in loneliness over time. Data from the Danish Longitudinal Study of Aging showed that lonely individuals are at an increased risk of experiencing physical limitations⁵⁴. Maintaining independence in IADLs is closely linked to the ability to live autonomously in the community⁵⁵. Individuals who experience a decline in these activities face greater challenges in daily life, which can hinder their social participation, increase the risk of depression, and erode their self-confidence⁵⁶.

Regarding social support, participants with weak social support were more likely to continue experiencing mild to severe loneliness. A study conducted in China with 1,067 older adults found that social support had a strong effect in reducing loneliness during the pandemic. Interventions that strengthen social support networks, such as fostering increased community engagement, can help mitigate feelings of loneliness, particularly in the post-Covid-19 public health landscape. These strategies may also play a vital role in addressing loneliness during potential future pandemics⁵⁷.

Additionally, it is essential to highlight that social support serves as a crucial protective factor against loneliness, helping individuals adapt to the various challenges and losses that come with aging. Social support plays an essential role by providing both emotional and practical assistance, contributing to a better adaptation to the changes inherent in the aging process^{32,58}. An online study conducted in 2020 with a sample of U.S. adults aged 50 or older, all of whom had at least one chronic condition, found that higher levels of emotional support were associated with lower levels of loneliness⁵⁹.

This study is seen as contributing to the nursing practice by highlighting the need for healthcare professionals to become better equipped to address loneliness in their patients. To achieve this, it is crucial to provide training that enables these professionals to identify the factors that may contribute to the development of loneliness in individuals.

Study limitations

Regarding the limitations of the study, it is important to highlight that a small, convenience sample from a single municipality in Brazil was used, which limits the generalizability of the results. However, these findings may serve as a basis for guiding future research on the topic. Despite the precautions taken during data collection, the use of convenience sampling may have introduced selection bias.

CONCLUSION

The prevalence of loneliness among middle-aged and older adults decreased when comparing the period during the Covid-19 pandemic's public health emergency to the post-pandemic period. Changes in loneliness during the assessed period were associated with several factors: older age, which was linked to a lower likelihood of improvement in loneliness; higher income, which was associated with an increased likelihood of experiencing worsening loneliness or maintaining the same level of loneliness; independence in IADLs, which was linked to a decreased likelihood of remaining lonely; and weak social support, which was associated with a greater likelihood of continuing to experience loneliness.

Therefore, it is crucial to promote healthy aging by prioritizing the preservation of autonomy and functional capacity in individuals. Additionally, promoting the active participation of older adults in social groups is a valuable strategy for reducing feelings of loneliness. These groups can even be created and monitored by primary healthcare teams, incorporating activities such as laughter therapy, horticulture, physical exercise, and other initiatives into their regular programs.

It is also expected that the healthcare network will implement strategies such as training healthcare professionals and developing or strengthening specialized services to ensure adequate and compassionate care, promoting healthy and active aging. Additionally, it is recommended that future studies utilize representative samples of middle-aged and older adults to further investigate the issue of loneliness in this population in the coming years.

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Conceptualization, L.K.C. and T.C.R.M.; methodology, L.K.C., F.G.M.K. and T.C.R.M.; software, T.C.R.M. and B.M.L.; validation, L.K.C.; formal analysis, I.N.S. and M.K.; investigation, L.K.C. and F.G.M.K.; resources, T.C.R.M. and B.M.L.; data curation, L.K.C.; manuscript writing, M.K., I.N.S. and L.K.C.; writing – review and editing, L.K.C., F.G.M.K., I.N.S., B.M.L. and T.C.R.M.; visualization, T.C.R.M.; supervision, T.C.R.M.; project administration, L.K.C.; acquisition of financing, T.C.R.M. e B.M.L. All authors read and agreed with the published version of the manuscript.