

## Research article

# Relationship between depressive symptoms and social isolation, visual complaints and hearing loss in middle-aged and older adults

Mariana Ferreira Carrijo,<sup>1</sup> Ana Cristina Silva Augusto,<sup>1</sup> Taiene da Silva Alencar,<sup>1</sup> Aline Martins Alves,<sup>1</sup> Bruna Moretti Luchesi,<sup>1,2</sup> Tatiana Carvalho Reis Martins<sup>1,3</sup>

<sup>1</sup>Undergraduate Medical School, Três Lagoas Campus, Federal University of Mato Grosso do Sul, Três Lagoas,

<sup>2</sup>Graduate Program in Nursing, Três Lagoas Campus, Federal University of Mato Grosso do Sul, Três Lagoas,

<sup>3</sup>Federal University of Mato Grosso do Sul, Instituto Integrado de Saúde, Campo Grande Campus, Campo Grande, MS, Brazil

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### ABSTRACT

The prevalence of chronic diseases, especially depression, has been increasing worldwide. Health professionals have an important role in screening and early detection of the disorder, to prevent possible damage such as disability and dependence. With aging, sensory impairments can occur, such as visual and hearing losses, which can lead to isolation contributing to the development of depressive symptoms. The objective of this study was to analyze the relationship between depressive symptoms, social isolation, and self-perception of visual complaints and hearing loss in middle-aged and older adults. It was a cross-sectional quantitative study, in Três Lagoas, state of Mato Grosso do Sul, Brazil, with 300 participants of both sexes, aged 45 years and over, registered in the Primary Health Care network. Data were collected using a structured questionnaire with sociodemographic data and the questions “Do you consider yourself socially isolated?”, “Do you have a vision and/or a hearing problem capable of stopping you from performing a daily life activity?” and “If yes, do you use a hearing aid and/or glasses or contact lenses?”. Depressive symptoms were assessed using the Center for Epidemiological Studies - Depression (CES-D) scale with a cut-off score adapted for age. Data were analyzed with binary logistic regression, with the presence of depressive symptoms being the dependent variable. Values of  $p \leq 0.05$  were considered significant. The majority of the sample were women (65.7%), with an average age of 60.9 years, 56.7% were classified with depressive symptoms, 27.0% considered themselves socially isolated, 84.7% reported visual acuity loss (70.7% used glasses) and 17.3% reported hearing loss (2.3% used hearing aids). Social isolation (OR = 6.0), visual complaints (OR = 3.85), and hearing loss (OR = 4.67) were related to the presence of depressive symptoms. Moreover, being married (OR = 0.51) was a protective factor in these participants. The results showed the importance of early diagnosis of depressive symptoms. The correction of visual and hearing deficits is highlighted, as these may be related to symptoms of depression. Health professionals in Primary Health Care should be able to monitor depressive symptoms, visual and hearing complaints, and promote social interaction.

**KEYWORDS:** Depression, visual acuity, hearing loss, social isolation, middle-aged, elderly.

### Introduction

Population aging has brought as one of its consequences the increase in the prevalence of chronic diseases. Neurological and mental disorders stand out among these diseases, affecting approximately 20% of individu-

als aged 60 years or over, and presenting a high potential to generate disability and dependence. Depression and dementia are the most common of these disorders, affecting around 5% and 7%, respectively, of the older population in the world.<sup>1</sup> Data show that around 6.7% of adults suffer from major depression in European coun-

tries,<sup>2</sup> and the prevalence varies from 9.0% to 23.5% in the United States, depending on the geographic location.<sup>3</sup> In Brazil, it is estimated that approximately 9.7% of adults present some degree of depression, while 3.9% present higher depression levels.<sup>4</sup>

However, the symptoms of depression are often mistaken for sadness and dejection, which makes people slow to seek help. In light of this, health professionals have an important role in the early identification and monitoring of depressive symptoms, aiming to avoid inability and dependence.<sup>5</sup>

The sensory impairment common in old age, such as visual acuity and hearing loss, also presents a great potential of causing disability.<sup>6</sup> These losses increase with advancing age and can go undetected, especially in the presence of other conditions.<sup>6-8</sup> They limit the communication capacity of older people, restricting their participation in daily life activities. Furthermore, they may lead to isolation and embarrassment and also harm family and social interactions, reducing the individual's quality of life and participation in society.<sup>9</sup>

Impaired visual acuity compromises several activities of daily life, causing higher dependency, impaired social life, and a higher risk of depression. Loss of peripheral vision causes insecurity during locomotion, which may increase the number of falls and mortality. All these factors affect the individual's health, causing a vicious cycle of inabilities and contributing to the overall decline of the aging person.<sup>10</sup>

The aging process is also associated with losses related to social life, such as the loss of family members and friends due to advanced age and the loss of social ties from the work environment that comes after retirement.<sup>1</sup> Social isolation, defined as the absence of interpersonal relations with family and friends, has been widely studied in older people due to its potential to negatively affect the quality of life.<sup>11</sup>

The literature shows a high prevalence of depressive symptoms in the population.<sup>2-4</sup> However, few studies have evaluated the relationship between depressive symptoms and vision and hearing losses in older individuals, especially in middle-aged adults living in Latin American countries, such as Brazil. Therefore, an early understanding of this relationship is important to avoid the worsening of depressive symptoms and even reduce the risk of suicide.

Our study aimed to analyze the relationship between depressive symptoms, social isolation, and self-perception of visual complaints and hearing loss in middle-aged and older adults in the community.

## Material and Method

This is a cross-sectional quantitative study carried out in the city of Três Lagoas, state of Mato Grosso do Sul, Brazil. According to the 2010 census, the city had 101,791 inhabitants, 16.1% being between 45 and 59 years old, and 9.9% elderly people ( $\geq 60$  years old).

### Participants and procedure

The population consisted of all users over 45 years old who registered as regular users of the Primary Health Care (PHC) network. The inclusion criteria were: to be 45 years old or older, to be registered at the city's PHC network, and to be able to answer the interview questions (evaluated by the interviewer's perception).

According to the sample size calculation, with a type I error of 5% ( $\alpha=0.05$ ), a sampling error at 5% ( $d=0.05$ ), and an estimate of 50% ( $p=0.50$ ), a sample of  $n=132$  subjects was obtained in each group; that is, at least 132 adults and 132 older adults.

Interviews were performed in the participants' homes or at the PHC unit, according to availability, from November 2018 to June 2019. The interviews were individual and conducted by examiners trained in the use of the instruments. The interviewers visited 369 persons; one person had moved to another address, nine were not found at home after two attempts, and 59 refused to participate in the study. The final sample was composed of  $n=300$  participants (answer rate 81.3%), 147 adults, and 153 older adults.

### Measures

The data collection instrument consisted of:

- Sociodemographic data: gender (male/ female), age, marital status (single, widowed, divorced/ married, or stable relationship), schooling (in years).
- Hearing loss and hearing aid: evaluated by the questions "Do you have a hearing problem capable of stopping you from performing a daily life activity?" and "If yes, do you use a hearing aid?"
- Visual complaints and glasses/contact lenses: evaluated by the questions "Do you have a vision problem capable of stopping you from performing a daily life activity?" and "If yes, do you wear glasses or contact lenses?"
- Social isolation: evaluated by the question "Do you consider yourself socially isolated?"

The dependent variable was the presence of depressive symptoms, evaluated through the Center for Epidemiological Studies-Depression (CES-D). This instrument evaluates the frequency of depressive symptoms experienced in the previous week through 20 items

with response options ranging from 0 to 3 for each item (0=rarely or none of the time, 1=some or little of the time, 2=moderately or much of the time, 3=most or almost all the time) including questions about mood, somatic symptoms, interactions with others and motor functioning. The final score varies from zero to 60 points. For adults, the cutoff score for the presence of depressive symptoms is  $\geq 16$ , and for older adults,  $\geq 12$ .<sup>12,13</sup>

The Federal University of Mato Grosso do Sul Ethics Committee approved the study and all the participants gave their written informed consent.

### Statistical analysis

The data were analyzed in the Statistical Package for the Social Science (SPSS) version 25.0. We conducted a descriptive analysis and used a binary logistic regression to investigate the associations between the independent variables and the dependent variable. The presence of depressive symptoms was the dependent variable. The independent variables were social isolation, visual complaints, and hearing loss. The final model was controlled by gender, age, schooling, marital status, use of glasses, and use of hearing aids. Values of  $p \leq 0.05$  were considered significant.

### Results

Table 1 shows the characterization of the participants. They were mostly women (65.7%), with an average age of 60.9 years, 56.7% presented depressive symptoms, 27.0% considered themselves socially isolated, 84.7% reported a loss of visual acuity (70.7% used glasses) and 17.3% reported hearing loss (2.3% used hearing aids).

Table 2 shows the results of the final binomial logistic regression model for the presence of depressive symptoms in middle-aged and older adults.

Among the participants, the ones that considered themselves socially isolated (OR=6.0) and had visual (OR=3.85) and hearing impairments (OR=4.67) presented higher chances of having depressive symptoms. On the other hand, having a partner (married or stable union) was inversely associated with depressive symptoms (OR=0.51). The associations remained even after controlling for use of glasses and hearing aid.

### Discussion

Social isolation, visual complaints, and hearing loss were related to depressive symptoms in middle-aged and older adults, and having a partner (married/stable relationship) was a protective factor.

The association between social isolation/loneliness and depressive symptoms has been observed in previous studies.<sup>14,15</sup> The perception of being excluded from social

**Table 1.** Characterization of the middle-aged adults and older adults. Três Lagoas, MS, Brazil, 2018/2019 (n=300).

Variable	% or Mean±SD (median)
Gender	
Female	65.7%
Male	34.3%
Age (years)	60.9±10.1 (60.0)
Schooling (years)	5.8±4.0 (5.0)
Marital Status	
Single/Widower/Divorced	44.0%
Married/Stable relationship	56.0%
Presence of depressive symptoms (yes)	56.7%
Social isolation (yes)	27.0%
Visual impairment (yes)	84.7%
Glasses (yes)	70.7%
Hearing impairment (yes)	17.3%
Hearing aids (yes)	2.3%

Note: SD= Standard Deviation

groups makes individuals feel vulnerable, leading to a series of cognitive, behavioral, and physiological responses. Thus, lonely individuals tend to be less confident, more anxious, and more pessimist, which may explain the association found between these two variables.<sup>16</sup>

In Brazil, participation in activities that provide interactions with other people and with religious groups as well as leisure physical activity have proved protective factors against depressive symptoms.<sup>17</sup> International investigations, in turn, identified factors possibly related to social isolation such as low family support, being single or divorced, lack of social engagement and interaction with neighbors, and dissatisfaction with family relationships to be associated with depressive symptoms in adults and older adults.<sup>18-20</sup>

The association between the presence of depressive symptoms and hearing loss in older adults has been demonstrated in several studies.<sup>21-24</sup> This relation results from behavioral mechanisms, because older people may remove themselves from situations in which they have difficulty communicating, contributing to social isolation and loneliness and ultimately leading to depression. It is also known that chronic hearing impairment leads to reduced activation of central auditory pathways and results in pathological compensatory activation. These mechanisms decrease cognitive performance and increase the risk of depression, culminating in executive dysfunction and difficulties in normative emotion regulation.<sup>23</sup>

It is also observed that withdrawal from social and family relationships due to hearing disorders partially or totally prevents effective communication between

**Table 2.** Final logistic regression model for the presence of depressive symptoms in middle-aged adults and older adults. Três Lagoas, MS, Brazil, 2018/2019 (n=300).

Variables	Depressive symptoms	OR (CI 95%)
Gender		
Female	62.4%	1.00
Male	45.6%	0.74 (0.41–1.31)
Age (years)	–	0.99 (0.96–1.02)
Schooling (years)	–	0.96 (0.91–1.03)
Marital status		
Single/Widower/ Divorced	65.9%	1.00
Married/Stable Union	49.4%	0.51 (0.39–0.90)*
Social isolation		
No	45.7%	1.00
Yes	86.4%	6.00 (2.94–12.29)*
Visual impairment		
No	39.1%	1.00
Yes	59.8%	3.85 (1.40–10.64)*
Glasses		
No	54.5%	1.00
Yes	57.5%	0.62 (0.28–1.40)
Hearing impairment		
No	51.6%	1.00
Yes	80.8%	4.67 (1.91–11.39)*
Hearing aids		
No	56.3%	1.00
Yes	71.4%	0.46 (0.07–3.14)

Note: \*refers to significant data ( $p \leq 0.05$ ). OR=Odds Ratio. CI=Confidence Interval

individuals and negatively affects social relationships. This is because the older person presents a comprehension deficit and the interlocutors are usually unprepared in making themselves understood. In this sense, a psychological adaptation to hearing loss happens, varying from individual to individual. This adaptation occurs through social and psychic processes, culminating in mild or more severe depressive symptoms.<sup>24</sup> However, it is known that severe hearing impairment causes important levels of isolation, which, in turn, is associated with more pronounced depressive symptoms.<sup>24</sup>

It is observed that hearing impairment increases with age, and age-related hearing loss has been associated with late depression. Thus, possible interventions that aim to treat these cases might be an efficient prevention strategy against depressive symptoms.<sup>21</sup> In addition, improved and continuous detection of depressive symptoms in older people with possible hearing loss can improve the quality of life of this population.<sup>22</sup>

As in the present study, there is evidence in the literature that loss of visual acuity can entail the development of disorders related to anxiety and depression.<sup>25</sup> This is important because although depression due to aging is generalized, it is misreported and misdiagnosed. Lack of training on the part of health professionals to recognize mental disorders and also the reluctance of older individuals to discuss their emotional difficulties contribute to this fact and may result in complications of physical diseases due to mental disorders.<sup>26</sup> Furthermore, the sensory loss is associated with mental health impairment, which can be mediated by social functioning.<sup>27</sup>

An investigation showed that the occurrence of depression was approximately 13.5% in older adults with vision loss, while it was 7.4% in those with no vision problems.<sup>28</sup> The Tromsø Study, a six-year population-based longitudinal study carried out in Norway, reported a relationship between vision problems and depression. The authors also discussed that the decrease in daily life activities, especially the fact of no longer driving, can be a mechanism through which visual acuity loss influences depression, further aggravated in people that live alone.<sup>29</sup> Lower light exposure due to vision problems that lead to a decrease in melatonin synthesis was also reported, compromising the circadian cycle, sleep, and social rhythms, ultimately leading to mood disorders and depression.<sup>30</sup>

According to the World Health Organization (WHO),<sup>31</sup> at least 2.2 billion people worldwide have vision impairments and the prevalence is estimated to be four times higher in low- and middle-income countries. Among the people that presented moderate vision loss, 65% and 84% were estimated to correspond to people over 50 years old in 2010 and 2019, respectively.<sup>32</sup> In the case of most of them, the vision loss could have been prevented or was not being treated.<sup>31</sup> The main causes of these problems are uncorrected refractive errors, cataracts, age-related macular degeneration, glaucoma, diabetic retinopathy, cornea opacity, and trachoma.<sup>31</sup>

Depressed people often do not seek ophthalmologic treatment for their visual problems. Sometimes, they are not aware of their impairment, until they are questioned.<sup>33</sup> And in people diagnosed with bad visual conditions, depression can lead to low adherence to ophthalmologic treatment, which, in turn, can lead to accelerated vision loss.<sup>33</sup>

A study that evaluated depressive symptoms in people with visual impairment found that the emotional consequences of the visual problem (embarrassment, frustration, boredom, loneliness, isolation, sadness, and depression, among others) contribute more significantly to depressive symptoms than the degree and time living with the impairment.<sup>34</sup>

The prevalence of depression in people with visual acuity loss, especially in older people, suggests that ophthalmologists and PHC professionals should be aware of the higher depression risk in people with visual acuity loss. Individuals with visual loss present a higher propensity to chronic comorbidities, disability, lack of social interaction, worse general health, and reduced access to health services than those without visual problems.<sup>35</sup>

The results of the present study showed that having a partner (married or stable union) was inversely associated with the presence of depressive symptoms in middle-aged and older adults, agreeing with several studies.<sup>36–38</sup> Being married is associated with lower depressive symptoms and can be considered a protective factor against depression.<sup>36–38</sup> The protective effect of this marital status can be a result of several factors. Marriage can provide a feeling of security and protection associated with less isolation and higher stimuli for social interactions and the widening of social ties. Moreover, a spouse can provide emotional support in adverse situations and greater financial stability, since economic resources tend to be higher. All of these aspects contribute to enhancing well-being and quality of life, which in turn are inversely related to depression.<sup>36,38,39</sup>

However, the data presented above should be seen with caution, since the protective effect of marriage against depression can vary according to the characteristics of the relationship. Qualitatively positive relationships can prevent depressive symptoms, but conflicting marriages can be triggers of depressive symptoms. This is true in other social spheres, in which qualitatively positive relationships are related to a higher quality of life and fewer feelings of loneliness and depression, differently from qualitatively negative relationships.<sup>38,40</sup> Being married, divorced, widowed, or living alone is considered a risk factor for depression, according to Bae,<sup>36</sup> Faisca et al,<sup>41</sup> and Güzel and Kara,<sup>42</sup> besides being associated with loneliness.<sup>43</sup> It is known that loneliness is an important risk factor for several comorbidities, including a sedentary lifestyle, cardiovascular diseases, cognitive decline, dementia, suicidal ideas, and depression, among others.<sup>39,43</sup>

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Among the limitations of this study, the cross-sectional design prevents establishing a cause-effect relationship. Moreover, the sample was not probabilistic. We highlight the importance that future studies investigate the visual and hearing loss diagnosis instead of self-reporting of these conditions and quantifying these impairments when identified in the participants. Also, future analyses should be controlled by the use of antidepressants, which was not possible in our study.

Our data confirm the fact that social isolation makes middle-aged and older adults more likely to have depressive symptoms. Thus, it is necessary to prevent isolation, offer leisure opportunities, and establish a social support network to reduce depressive symptoms in this population.

The identified association between hearing loss and these symptoms can be related to difficulties in communication, causing loneliness and, consequently, depressive symptoms. Visual acuity loss can also cause disorders associated with anxiety and depression, since there is a reduction in daily life activities, compromising the circadian cycle, lower search for specialized care, and lower adherence to treatment. Early identification and preventive actions are necessary to avoid the aggravation of both impairments and depressive symptoms since these conditions are interconnected and tend to become worse with aging.

This study is important to define priorities and set goals that allow for an improvement in the health conditions of PHC users. Healthcare professionals should act to promote and protect the health of the population by monitoring depressive symptoms, visual and hearing complaints, and promoting social interaction.

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## Ερευνητική εργασία

# Σχέση μεταξύ καταθλιπτικής συμπτωματολογίας, κοινωνικής απομόνωσης και προβλημάτων όρασης και ακοής σε μεσηλικούς και ηλικιωμένους

Mariana Ferreira Carrijo,<sup>1</sup> Ana Cristina Silva Augusto,<sup>1</sup> Taiene da Silva Alencar,<sup>1</sup> Aline Martins Alves,<sup>1</sup> Bruna Moretti Luchesi,<sup>1,2</sup> Tatiana Carvalho Reis Martins<sup>1,3</sup>

<sup>1</sup>Undergraduate Medical School, Três Lagoas Campus, Federal University of Mato Grosso do Sul, Três Lagoas,

<sup>2</sup>Graduate Program in Nursing, Três Lagoas Campus, Federal University of Mato Grosso do Sul, Três Lagoas,

<sup>3</sup>Federal University of Mato Grosso do Sul, Instituto Integrado de Saúde, Campo Grande Campus, Campo Grande, MS, Brazil

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### ΠΕΡΙΛΗΨΗ

Ο επιπολασμός χρόνιων νόσων και ιδιαίτερα της κατάθλιψης έχει αυξηθεί παγκοσμίως. Οι επαγγελματίες υγείας διαδραματίζουν σημαντικό ρόλο στον έλεγχο και την έγκαιρη ανίχνευση της διαταραχής, για την πρόληψη πιθανών βλαβών όπως η αναπηρία και η εξάρτηση. Με τη γήρανση, μπορεί να εμφανιστούν αισθητηριακές βλάβες, όπως απώλεια όρασης και ακοής, που μπορεί να οδηγήσουν σε απομόνωση συμβάλλοντας στην ανάπτυξη καταθλιπτικών συμπτωμάτων. Ο στόχος αυτής της μελέτης ήταν να αναλύσει τη σχέση μεταξύ των καταθλιπτικών συμπτωμάτων, της κοινωνικής απομόνωσης και της αυτοαντίληψης των οπτικών παραπόνων και της απώλειας ακοής σε μεσηλικούς και ηλικιωμένους ενήλικους. Πρόκειται για μια συγχρονική ποσοτική μελέτη, στο Três Lagoas, στην πολιτεία Mato Grosso do Sul της Βραζιλίας, με 300 συμμετέχοντες και των δύο φύλων, ηλικίας 45 ετών και άνω, εγγεγραμμένους στο δίκτυο Πρωτοβάθμιας Φροντίδας Υγείας. Τα δεδομένα συλλέχθηκαν χρησιμοποιώντας ένα δομημένο ερωτηματολόγιο με κοινωνικοδημογραφικά δεδομένα και τις ερωτήσεις «Θεωρείτε τον εαυτό σας κοινωνικά απομονωμένο;», «Έχετε πρόβλημα όρασης ή/και ακοής ικανό να σας εμποδίσει να εκτελέσετε μια καθημερινή δραστηριότητα;» και «Εάν ναι, χρησιμοποιείτε ακουστικό βαρηκοΐας ή/και γυαλιά ή φακούς επαφής;». Τα συμπτώματα της κατάθλιψης αξιολογήθηκαν με τη χρήση της κλίμακας Κέντρου Επιδημιολογικών Μελετών – Κατάθλιψη (CES-D) με όριο βαθμολογίας προσαρμοσμένο στην ηλικία. Τα δεδομένα αναλύθηκαν με διωνυμική λογιστική παλινδρόμηση, με την παρουσία καταθλιπτικών συμπτωμάτων ως εξαρτημένη μεταβλητή. Οι τιμές  $p \leq 0,05$  θεωρήθηκαν σημαντικές. Η πλειοψηφία του δείγματος ήταν γυναίκες (65,7%), με μέση ηλικία τα 60,9 έτη, το 56,7% ταξινομήθηκε με συμπτώματα κατάθλιψης, το 27,0% θεωρούσε τον εαυτό του κοινωνικά απομονωμένο, το 84,7% ανέφερε απώλεια οπτικής οξύτητας (70,7% χρησιμοποιούσε γυαλιά) και το 17,3% ανέφερε απώλεια ακοής (2,3% χρησιμοποιούσε ακουστικά βαρηκοΐας). Η κοινωνική απομόνωση (OR = 6,0), τα προβλήματα όρασης (OR=3,85) και η απώλεια ακοής (OR=4,67) σχετίζονταν με την παρουσία καταθλιπτικών συμπτωμάτων. Επίσης το να είναι κανείς παντρεμένος (OR=0,51) ήταν προστατευτικός παράγοντας στους συμμετέχοντες. Τα αποτελέσματα έδειξαν τη σημασία της έγκαιρης διάγνωσης των καταθλιπτικών συμπτωμάτων. Επισημαίνεται η ανάγκη για διόρθωση των ελλειμμάτων όρασης και ακοής, καθώς αυτά μπορεί να σχετίζονται με συμπτώματα κατάθλιψης. Οι επαγγελματίες υγείας στην Πρωτοβάθμια Φροντίδα Υγείας θα πρέπει να έχουν τη δυνατότητα να παρατηρούν τα καταθλιπτικά συμπτώματα, τα προβλήματα όρασης και ακοής και να προωθούν την κοινωνική αλληλεπίδραση.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Κατάθλιψη, οπτική οξύτητα, απώλεια ακοής, κοινωνική απομόνωση, μεσήλικοι, ηλικιωμένοι.