Journal of Primary Care & Community Health
Volume 12: 1–8

DOI: 10.1177/21501327211025170
journals.sagepub.com/home/jpc
SAGE

Perceived Loneliness and Severe Sleep Disorders in Adult Women during the Covid-19 Quarantine: A Cross-Sectional Study in Colombia

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Abstract

Background: Quarantine is a measure to control COVID-19 spread, resulting in an increased perception of loneliness. In turn, sleep disorders (SD) may be more frequently reported in uncertain circumstances. **Objectives:** To identify the association between loneliness and severe SD, in women quarantined due to the COVID-19 pandemic. **Methods:** A cross-sectional study carried out in women, between 40 and 79 years and living in Colombia. The women were invited through social network to complete 5 digital instruments: de Jong Gierveld Loneliness Scale, Menopause Rating Scale, Fear of COVID-19 Five-item Version, Coronavirus Anxiety Scale, and Francis Religion Scale. Bivariate analysis and adjusted logistic regression between loneliness and SD were performed. **Results:** 1133 women participated, half of them under 50 years old. 43.1% had emotional loneliness, 39.9% social loneliness and 43.3% general loneliness. SD were identified in 6 out of 10 women, those with mild SD presented an OR of 1.84, 1.85, and 1.64, for emotional, social and general loneliness, respectively. Loneliness was associated twice with moderate SD, and more than twice with severe SD. Very severe SD reached OR:5.81 for emotional loneliness, OR:4.38 social loneliness and OR:4.02 general loneliness. In the presence of religiosity, fear and anxiety due to COVID-19, statistical significance was retained for associations, except intense SD with general loneliness. **Conclusions:** SD were significantly associated with loneliness in our study population. It is important to assess sleep quality and perception of loneliness in middle-aged women, especially during periods of quarantine due to a pandemic to avoid health implications.

Keywords

loneliness, sleep wake disorders, quarantine, pandemics, Colombia

Dates received: 24 March 2021; revised: 25 May 2021; accepted: 25 May 2021

Introduction

Quarantine, confinement and social isolation are measures proposed by international health organizations to manage the COVID-19 pandemic.[1-4] These are defined as the temporary and generally imposed distancing of a population, person, or group for health or safety reasons. Although these measures result in reduced spread of infectious diseases, they also result in negative public health consequences such as loneliness.[1,4-7]

The sudden and often large-scale quarantines implemented by many countries in response to the advancing pandemic, adversely impacted mental health due to interruptions in daily living, isolation, fear, and anxiety.[2,3] The link between social isolation and health is explained by the subjective experience of loneliness and the limited availability of an effective social network.[8-11] Loneliness is the discrepancy between desired and actual social relationships.[6,7] However, there is a distinction between "feeling lonely" and "being alone." The former is emotional loneliness, a feeling derived from abandonment or absence of loved ones. This refers to subjective experiences that are not determined by

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the number of social contacts. Being alone, in contrast, refers to social loneliness, lack of communication networks, objective lack of social contacts, uprooting, and marginalization. Finally, there is a type of loneliness sought by individuals, purposefully without someone or something, resulting in the simple satisfaction and fulfillment in being alone.[12,13]

Some authors[7] have found that loneliness perception increases the risk of all-cause mortality (HR = 1.22, 95%CI: 1.10-1.35). In this regard, loneliness has been associated with poor quality of life, and general morbidity including cardiovascular but most significantly coronary disease. Additionally, the perception of loneliness and social isolation may be stressors that trigger negative reactions, specifically: anxiety, fear, moodiness, depression, irritability, hostility, mistrust, suicide attempts, and low self-esteem.[9-12,14-19] These reactions are related to sleep disorders (SD), because they disrupt sleep and increase the possibility of non-restorative sleep.[9] Sleep disorders include difficulty in falling asleep, difficulty in remaining asleep through the night, and waking up early.[20] For people, the most effective sleep-wake synchronizers are light, temperature and food availability. Certain pharmacological substances and diverse social stimuli can modify sleep-wake cycle, favoring SD.[21,22] Social isolation is related to SD, due to the interruption of homeostatic regulation of sleep/wake activity while religiosity can modulate negative emotions triggered by stressful situations.[22,23] Religiosity is understood as the beliefs, practices and attitudes toward the precepts of a religion. From a holistic perspective, religion is an important variable for health.[24]

We did not identify studies that assessed the relationship between women over the age of 40, loneliness and SD during times of quarantine or confinement due to a pandemic. This association could be influenced by psychosocial conditions such as anxiety, fear and religiosity. The purpose of this study was to determine the relationship between loneliness and severe SD in women living in Colombia.

Methods

Study Design

This was a cross-sectional correlational study with psychometric instruments.

Participants and Setting

Convenience sampling through social networks (Facebook, Instagram, and WhatsApp) and e-mail was used to invite participants for the study. Colombian women between the ages 40 to 79 years, not pregnant, and residents were eligible to complete the digital survey instrument between June 1 and 5, 2020. At the time, Colombia was subject to mandatory quarantine, decreed by the national government, and a curfew in major cities as a result of COVID-19. Infection and death rates were rising daily, with no overflow in health care capacity.

Sample size calculation was performed taking into account data from the Colombian population census of 2005 that established a projection for 2020 of 25 772 783 women. Of these 9 031 917 were aged 40 to 79 years. A sample size of 385 women was calculated in EPIDAT with a 95% confidence level, 50% expected proportion, 5% significance, and 5% absolute precision. We established that if the calculated sample size was not reached within 5 days, the social network invitations would be repeated and the platform would remain available for another 5 days.

Data Collection

Instruments

The survey instrument was delivered electronically with a link for Google Forms. The instrument was accessible by participants with the link from their computers, tablets, or smart phones. The instrument included a demographic section followed by 5 instruments: de Jong Gierveld Loneliness Scale - Short Version, Menopause Rating Scale, Fear of COVID-19 Five-item Scale Version, Coronavirus Anxiety Scale, and Francis-5 Religiosity Scale. The demographic items included age, number of children and grandchildren, ethnicity, and menopausal status. Menopausal status was classified according to menstrual bleeding: pre-menopause (regular, irregular or amenorrhea lasting less than 1 year) and post menopause (amenorrhea lasting more than 1 year). The participants were asked to provide their responses to each item based on the month prior to their participation.

de Jong Gierveld Loneliness Scale - Short Version (DJGLS): The following response options were provided for the 11 items: *No, More or less*, or *Yes*. Items 2, 3, 5, 6, 9, and 10 which measure emotional loneliness, were assigned one point for answers *More or less* or *Yes*. No points were given for a *No* answer. Items 1, 4, 7, 8, and 11 which establish social loneliness, were assigned one point for answers *More or less* or *No*, and no points were given if the answer was *Yes*. The sum of the scores for all items defines general loneliness. Therefore, DJGLS can be evaluated both two-dimensionally (social and emotional loneliness) and one-dimensionally (general loneliness). The total score ranges from zero (no loneliness) to 11 (extreme loneliness). This is a widely used scale to measure loneliness and has validations in several languages, the validation of the scale done in Valencia, Spain was used.[25,26] In the present study, emotional loneliness, social loneliness and general loneliness were considered to be above average, since no cut-off point has been reported. In these sample of women, a Kuder-Richardson coefficient of 0.86 was estimated for the one-dimensional DJGLS assessment, 0.79 for emotional loneliness and 0.79 for social loneliness.[27]

Menopause Rating Scale (MRS): To identify SD in this study, we used the third question of the MRS which ask about difficulty in falling asleep, difficulty in remaining asleep through the night and waking up early. SD severity can be classified as mild, moderate, severe, or very severe. For this study, the last 2 items were also analyzed together, so the new category was called intense SD. MRS explores menopause-related symptoms through 11 questions with Likert type response options. It has been translated and validated in several languages, including Spanish.[20,28] In a group of Colombian women, Monterrosa et al[28,29] found a reliability of 0.86 through Cronbach's α. In determining internal consistency for the included women in this study, a Cronbach's α was found to be 0.80 for the Menopause Rating Scale.[27]

Fear of COVID-19 Five-item Scale Version: This short scale with 5 items and dichotomous responses (yes/no), was used to identify fear of COVID-19. It is validated in the Colombian population and in Spanish, were a Kuder-Richardson coefficient of 0.67 and McDonald's omega of 0.68 was found.[30] This version derived from the original scale published by Ahorsu et al.[31] The above-average score indicated significant fear of COVID-19, since no cut-off point has been established. The Kuder-Richardson coefficient found in this study was 0.78.[27]

Coronavirus Anxiety Scale: Was used to assess anxiety respect to the coronavirus through 5 questions with Likert type response options. A score of 9 or more indicated dysfunctional levels of anxiety in terms of COVID-19, with a sensitivity of 90% and specificity of 85%.[32] There is no validation in Spanish neither adaptation in the Colombian cultural context. Two out of 10 steps indicated by the guidelines of the Task Force for Translation and Cultural Adaptation were performed, forward and reverse translation, then a face validity was achieved.[33] For the population included in this study, the reliability was 0.87 with Cronbach's α.[27]

Francis-5 Religiosity Scale: Used to explore the relationship with God, Jesus and prayer. The scale has 5 questions with Likert type response options. A Cronbach's α of 0.74 has been reported in Colombian adolescents.[34] In determining the internal consistency of this group of middle-aged women, we found a Cronbach's α of 0.95.[27] For this study, an above-average score was considered to indicate high religiosity. No cut-off point has been indicated for this scale either.

Data Analysis

The database that is automatically generated in Microsoft Excel was downloaded from the Google platform. To preserve participant anonymity, e-mail information was deleted from the database by one of the researchers prior to analysis. The forms that were not filled out in their entirety were not considered for the analysis. The statistical analysis was performed using Stata/MP 14.0. Continuous data are expressed in means and standard deviation, and categorical data in absolute values, percentages, and 95% CI. Unadjusted logistic regression models were performed to establish the association between emotional, social, and general loneliness (dependent variables), with SD presence and severity (independent variable). An adjusted logistic regression model was also created, which included fear of COVID-19, anxiety due to COVID-19, and religiosity as covariates, to identify how much the results of the bivariate analysis were modified. The internal consistency of the 5 scales included in the study was estimated. A $P < .05$ was considered statistically significant.

Ethical Considerations

The participants were informed about the anonymous and voluntary nature of their participation, about the objective of the study and the tools to be used. They did not receive incentives of any kind. The recommendations of the Declaration of Helsinki and resolution 8430 of the Republic of Colombia, which establishes scientific and administrative guidelines for human research, were carefully followed. The research project was institutionally approved.

Results

In the first 5 days of June 2020, 1185 forms were received, of which 52 (4.3%) had incomplete data. A total of 1133 Colombian women were included in the analysis, 3 times the calculated sample size. The average age was 49.8 ± 8.2 years, 44.5% of whom were over 50 years old. 85.7% recognized themselves as Mestizos and 12.7% as being of Afro-descendant. While 61.1% were highly religious, 56.9% were significantly fearful of COVID-19 and 7.2% had dysfunctional anxiety levels (Table 1).

Emotional loneliness was identified in 489 (43.1%) [CI95%:40.3-46.0], social loneliness in 452 (39.9%) [CI95%: 37.0-42.7] and general loneliness in 491 (43.3%) [CI95%: 40.4-46.2]. Four hundred and four (35.7%) women did not present SD, while 729 (64.3%) [95%CI: 61.5-67.0] had SD. Of those women who had SD, 365 (32.2%) [95%CI: 29.5-34.9] were mild, 244 (21.5%) [95CI: 19.2-24.0] moderate, 81 (7.1%) [95%CI: 5.7-8.8] severe, 39 (3.5%) [954%CI: 2.5-4.6] very severe, and 120 (11.6%) [95%CI: 8.9-12.5] were intense (severe and very severe SD together).

Mild SD were associated 1.84, 1.85, and 1.64 times, with higher emotional, social, and general loneliness, respectively. All types of loneliness were associated twice with moderate SD and more than twice with severe SD. In turn,

Table 1. Sociodemographic Characteristics, Frequency of Loneliness, and Sleep Disorders (n = 1133).

Age, years old, $X \pm SD$	49.8 ± 8.2
Years in post menopause,[a] $X \pm SD$	7.1 ± 5.3
Age at last menstrual period,[a] $X \pm SD$	48.8 ± 3.8
Age range, years old, n (%) [IC95]	
40-49	581 (51.3) [48.3-54.1]
50-59	403 (35.5) [32.8-38.4]
60-69	135 (11.9) [10.1-13.9]
70-79	14 (1.3) [0.7-2.0]
Age over 50 years, n (%) [95 CI]	505 (44.5) [41.7-47.4]
Older adults (60-79 years), n (%) [95 CI]	149 (13.2) [11.3-15.2]
Premenopausal, n (%) [95 CI]	566 (49.9) [47.0-52.8]
Posmenopausal, n (%) [95 CI]	567 (50.1) [47.1-52.9]
Living in urban areas, n (%) [95 CI]	885 (78.1) [75.6-80.4]
Afro-descendants, n (%) [95 CI]	144 (12.7) [10.9-14.7]
Indigenous, n (%) [95 CI]	18 (1.6) [1.01-2.50]
Hispanics, n (%) [95 CI]	971 (85.7) [83.5-87.6]
With children, n (%) [95 CI]	975 (86.0) [83.9-87.9]
With grandchildren, n (%) [95 CI]	251 (22.1) [19.8-24.6]
High fear to COVID-19, n (%) [95 CI]	645 (56.9) [54.0-59.7]
Dysfunctional levels of anxiety with COVID-19, n (%) [95 CI]	82 (7.2) [5.8-8.9]
High religiosity, n (%) [95 CI]	693 (61.1) [58.2-63.9]
Without loneliness, n (%) [95 CI]	136 (12.0) [10.2-14.0]
Extreme loneliness, n (%) [95 CI]	82 (7.2) [5.8-8.9]

Data are presented as mean (X) and standard deviation (SD), frequencies n (%) and corresponding CIs.
[a]Postmenopausal women. n = 567.

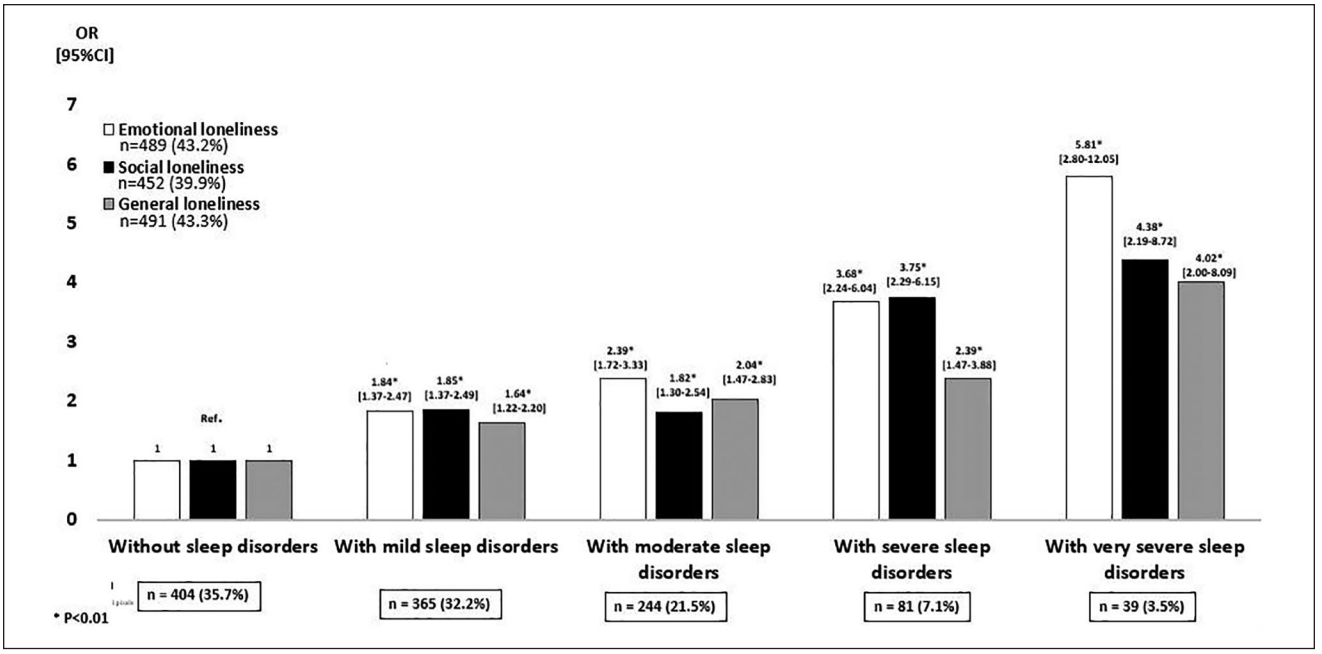

Figure 1. Perception of loneliness and severity of sleep disorders (n = 1133).

very severe SD were associated 5 times with emotional loneliness and 4 times with social or general loneliness (Figure 1).

Presenting SD or intense SD (severe and very severe), were associated twice with emotional, social or general loneliness ($P < .01$). In an adjusted model, with religiosity,

fear of COVID-19, and dysfunctional levels of anxiety due to COVID-19, statistical significance was observed for all established associations, except for intense SD with general loneliness (Table 2).

Discussion

SD are associated with poor health due to high levels of fatigue, reduced quality of life, increased risk of cardiovascular disease and psychiatric disorders.[6-8,35] Prior to the COVID-19 pandemic, Monterrosa-Castro et al[36] reported almost half of the Colombian women (n = 1215) surveyed with the Menopause Rating Scale experiences SD including 1.2% severe and 16.7% mild. This is less than the number and severity of SD reported in the current study.

Conceptually, healthy and restful sleep requires an adequate environment which is safe and conducive to sleep.[37] Several authors[13,14,16,19] have reported loneliness can cause feelings of being under threat and vulnerable that induces nocturnal micro-waking and other conditions reducing sleep effectiveness. The SD identified in this study are coherent with the pandemic disrupting stable health, social, and economic conditions in most countries across the world. Furthermore, the social isolation, whether real or perceived, seems to be associated with poor quality sleep, sleep inefficacies, and other dysfunctions during the day.[18,38] In this regard, social isolation is associated with sleep alterations resulting from interruptions in the homeostatic regulation of the sleep/wake cycle.[22]

In the studied population, averaging fifty years of age and severe SD were associated with objective and subjective loneliness. The presence of anxiety or fear due to COVID-19 and religiosity, did not significantly modify the association between sleep disorders and emotional and social loneliness. Similar results were reported from Israel in an older population as the COVID-19 quarantine related loneliness was significantly associated more sleep disorders using the same DJGLS instrument. They also observed the association between loneliness and sleep disorders was especially strong among people more concerned about COVID-19 and less resilient people.[39] Specific to older adults, Shankar[40] reported loneliness was relevant in the context of the pandemic due to the negative impact on sleep quality. The current study supports this finding in the context of middle-aged women as nearly half the women experienced loneliness. No similar studies were identified with Colombian women outside the context of the pandemic. In a Swiss study of elderly adults (n=1,990), researchers reported more loneliness followed requirements for social distancing during the COVID-19 pandemic and slightly diminished once the requirements were relaxed. Importantly, elderly women with lower incomes, no children, and dissatisfied with their neighbors were significantly more likely to report loneliness.[41]

When government officials consider quarantine measures to reduce the expansion of an epidemic, they need to evaluate the likely consequential outcomes including poor mental health and reduced well-being.[1,6,7] In this regard, academic institutions and scientific associations should collaborate to study the psychosocial impact of quarantines including the implications for current nosological classifications. Furthermore, public and private health services institutions need to promote community social networks for the health lifestyles of women during periods of forced social isolation due to a pandemic. Finally, the impact of quarantines on women living in rural and urban areas may be different due to the social determinants of health. This requires researchers to consider tailored interventions for different populations.

Limitations: The study also has the limitations of cross-sectional designs. The results are statistical associations and it is not possible to infer causality. No questions were asked about the perception of loneliness and SD, prior to the establishment of the pandemic. Nervous temperament, number of cohabitants, having a sexual partner, going out to work, not complying with quarantine measures, feeling emotionally affected by the news about COVID-19, suffering from co-morbidities, using drugs or sleeping infusions were not explored, and all of these can lead to confusing biases. Measurement bias is possible, when using scales without a set cut-off point, as is the determination of SD obtained by self-report, meaning that such identification is subjective. It was not possible to use objective methods, such as polysomnography. Other measurement bias may be present due to the lack of validation of the DJGLS scale in the Colombian population, the validated version in Valencia, Spain was used, which is recognized as a limitation because of the differences in language and culture. Additionally, for the Coronavirus Anxiety Scale, we didn't complete all the steps established by the guidelines of the Task Force for Translation and Cultural Adaptation. There is selection bias since only women with connectivity and ability to handle electronic devices can participate and although more participants than the sample size were included, this could be considered convenience sampling. Finally, the conclusions could be extrapolated to women under similar environmental conditions and cultural patterns.

Conclusion

In middle-aged women living in Colombia during the COVID-19 pandemic, SD were significantly associated with loneliness. The more severe the SD, the stronger the association with loneliness. The findings indicate health care professionals need to ask women about their sleep quality and perceptions of loneliness especially during periods of social isolation due to a quarantine. With the evidence prior to the pandemic, health care providers should

Table 2. Perception of Loneliness and Sleep Disorders Logistic Regression (n = 1133).

Emotional loneliness					Social loneliness				General loneliness			
	Yes[a]	No[a]	OR [95% CI] *P* value		Yes[a]	No[a]	OR [95% CI] *P* value		Yes[a]	No[a]	OR [95% CI] *P* value	
	489 (43.2)	644 (56.8)	Non adjusted	Adjusted[b]	452 (39.9)	681 (60.1)	Non adjusted	Adjusted[b]	491 (43.3)	642 (56.7)	Non adjusted	Adjusted[b]
Without sleep disorders	123 (25.1)	281 (43.6)	2.30 [1.78-2.97] <.01	1.86 [1.42-2.44] <.01	117 (25.9)	287 (42.1)	2.08 [1.60-2.70] <.01	1.76 [1.34-2.31] <.01	134 (27.3)	270 (42.1)	1.93 [1.50-2.49] <.01	1.56 [1.19-2.03] <.01
With sleep disorders	366 (74.9)	363 (56.4)			335 (74.1)	394 (57.9)			357 (72.7)	372 (57.9)		
Without intense[c] sleep disorders	411 (84.1)	602 (93.5)	2.72 [1.83-4.03] <.01	2.02 [1.33-3.07] <.01	378 (83.6)	635 (93.2)	2.70 [1.83-3.98] <.01	2.20 [1.46-3.31] <.01	421 (85.7)	592 (92.2)	1.96 [1.34-2.88] <.01	1.48 [0.98-2.23] .05
With intense[c] sleep disorders	78 (15.9)	42 (6.5)			74 (16.4)	46 (6.8)			70 (14.3)	50 (7.8)		

[a]Data are presented as frequencies n (%).
[b]Variables included in the adjusted model: Fear to COVID-19, dysfunctional levels of anxiety with COVID-19 and religiosity.
[c]Intense sleep disorders: severe + very severe.

become more familiar with health implications of loneliness on sleep to better care for middle-aged women. Additional research is necessary in different locations and social contexts during critical conditions such as a pandemic to understand the relationship between biological, biochemical, and behavioral aspects in the context of perceived loneliness and sleep disorders.

Acknowledgments

To the Universidad de Cartagena, Colombia, which institutionally supports the Women's Health Research Group and the CAVIMEC+COVID STUDY (*Calidad de Vida en la Menopausia y Etnias Colombianas bajo condición de Pandemia*).

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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