

On Covid-19 and mental health

An observational study on depression, anxiety, and loneliness during the second lockdown in patients with Alzheimer disease

Mohamad El Haj, PhD^{a,b,c,*}, Claire Boutoleau-Brettonnière, MD, PhD^{d,e}, Philippe Allain, PhD^{f,g}, Dimitrios Kapogiannis, MD, PhD^h, Guillaume Chapelet, MD, PhD^{i,j}, Karim Gallouj, MD^b

Abstract

While visiting and socialization restrictions during lockdowns were instituted to cope with the Covid-19 spread and to prolong the life of residents of retirement homes, these measures could have been expected to decrease the quality of life of their residents.

We assessed longitudinal effects of the two successive lockdowns, as implemented in France, on mental health (i.e., depression, anxiety, and loneliness) in 62 retirement home residents with Alzheimer disease (AD).

Analysis demonstrated higher levels of depression, anxiety, and loneliness during the second lockdown than during the first lockdown.

The increased levels of depression, anxiety, and loneliness during the second lockdown can be attributed to the longer duration of the restrictive measures, especially the restriction of visits, that were implemented in retirement homes. In addition, the increased workload of geriatric healthcare workers leading to higher levels of burnout and decreased quality of care may help explain the increased loneliness, depression, and anxiety of retirement home residents with AD, which were observed during the second Covid-19 era lockdown.

Abbreviation: AD = Alzheimer disease.

Keywords: Alzheimer disease, anxiety, Covid-19, depression, lockdown, loneliness

1. Introduction

With the spread of Covid-19, France implemented two successive lockdowns to keep citizens physically distant from each other and limit virus transmission. The first lockdown was implemented from March 16 to May 11, 2020, followed by an easing of restrictions from July to September 2020. However, because Covid-19 cases spiked sharply in October 2020, a second nationwide lockdown was imposed on October 30, 2020 and was partially alleviated on November 27. While the two lockdowns were crucial for halting the spread of infections, they may have also had severe drawbacks for residents of retirement

homes. To limit the spread of Covid-19 among residents, retirement homes were obliged to reduce physical contact between residents and their families and friends, between residents and caregivers and, in several cases, even between residents. While these preventive measures partially succeeded in limiting infections, the reduced physical contact between residents and their families and the diminished social and physical activities in which residents engaged are likely to have come at a cost to the residents' wellbeing and mental health. Therefore, in this study, we investigate whether social distancing, as implemented during the two lockdowns in France,

Editor: Elias Manjarrez.

Dr El Haj was supported by the LABEX (excellence laboratory, program investment for the future) DISTALZ (Development of Innovative Strategies for a Transdisciplinary Approach to Alzheimer Disease) and the EU Interreg CASCADE 2 Seas Programme 2014-2020 (co-funded by the European Regional Development Fund). This research was supported in part (for author DK) by the Intramural Research Program of the National Institute on Aging, NIH.

The authors declare that they have no conflict of interest.

The datasets generated during and/or analyzed during the present study are available from the corresponding author on reasonable request.

^aNantes Université, Univ Angers, Laboratoire de Psychologie des Pays de la Loire (LPPL—EA 4638), Nantes, France, ^bUnité de Gériatrie, Centre Hospitalier de Tourcoing, Tourcoing, France, ^cInstitut Universitaire de France, Paris, France, ^dCHU Nantes, Inserm CIC04, Nantes, France, ^eCHU Nantes, Département de Neurologie, Centre Mémoire de Ressources et Recherche, Nantes, France, ^fLaboratoire de Psychologie des Pays de la Loire, LPPL EA 4638, SFR Confluences, UNIV Angers, Nantes Université, Maison de la Recherche Germaine Tillon, 5 bis Boulevard Lavoisier, Angers Cedex 01, France, ^gDépartement de Neurologie, CHU Angers, Angers, France, ^hLaboratory of Clinical Investigation, National Institute on Aging, Baltimore, MD, ⁱUniversité de Nantes, Inserm, TENS, The Enteric Nervous System in Gut and Brain Diseases, IMAD, Nantes, France, ^jCHU Nantes, Clinical Gerontology Department, Bd Jacques Monod, Nantes, France.

* Correspondence: Mohamad El Haj, Faculté de Psychologie, LPPL—Laboratoire de Psychologie des Pays de la Loire, Université de Nantes, Chemin de la Censive du Tertre, BP 81227, 44312 Nantes Cedex 3, France (e-mail: mohamad.elhaj@univ-nantes.fr).

Copyright © 2022 the Author(s). Published by Wolters Kluwer Health, Inc.

This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial License 4.0 (CCBY-NC), where it is permissible to download, share, remix, transform, and buildup the work provided it is properly cited. The work cannot be used commercially without permission from the journal.

How to cite this article: El Haj M, Boutoleau-Brettonnière C, Allain P, Kapogiannis D, Chapelet G, Gallouj K. On Covid-19 and mental health: An observational study on depression, anxiety, and loneliness during the second lockdown in patients with Alzheimer disease. *Medicine* 2022;101:18(e29145).

Received: 1 October 2021 / Received in final form: 7 March 2022 / Accepted: 7 March 2022

<http://dx.doi.org/10.1097/MD.00000000000029145>

increased depression, anxiety, and loneliness in retirement home residents with Alzheimer disease (AD).

We investigated depression and anxiety in retirement home residents with AD during the lockdowns because they are among the most prevalent neuropsychiatric symptoms in AD.^[11] While AD is primarily associated with cognitive decline,^[2,3] the disease is also characterized by neuropsychiatric symptoms, especially depression and anxiety.^[1,4-7] Over the course of AD, nearly up to 50% of patients experience some degree of depression^[8] and, critically, 20% to 30% of patients meet criteria for major depressive disorder during the course of the disease.^[9,10] Depression in AD has important consequences, such as behavioral disturbance,^[11] institutionalization^[12] and even increased mortality.^[13] Another prominent neuropsychiatric symptom in AD is anxiety. Over the course of AD, 25% to 71% of patients experience anxiety.^[14] Anxiety in AD also has important consequences, such as increased behavioral disturbance and caregiver burden.^[15,16] Loneliness can be defined as a subjective state involving distressing, depressing, and detached feelings that patients with AD may experience due to reduced social interactions at baseline and may have been exacerbated by the lockdowns.^[17,18]

The restrictive measures implemented to contain the spread of Covid-19 among residents of retirement homes deprived them of physical interactions with their family members. Even when the visits were permitted during the second lockdown, they took place with strict conditions. Also, activities and services considered as non-essential (e.g., hairdressing) were restricted. These restrictions may have increased depression, anxiety, and loneliness for retirement home residents, especially those with AD, during the lockdown. Recent research has demonstrated increased neuropsychiatric symptomatology in patients with AD living in their own homes during the first lockdown,^[19] as well as increased loneliness and decreased well-being in residents of geriatric facilities.^[20,21] For instance, Van der Roest et al^[22] reported that 77% of residents of geriatric facilities experienced loneliness during a lockdown. Among the participants who reported loneliness in that study, 50% perceived themselves as moderately lonely, 16% as severely lonely, and 11% as very severely lonely. Anxiety and depression were assessed in a study by El Haj et al^[23] who invited patients with mild AD living in retirement homes to rate their depression and anxiety during the first lockdown in France.

Building upon this body of research, in the present longitudinal study, we investigate whether the two lockdowns, as implemented in France, exacerbated depression, anxiety, and loneliness in retirement home residents with AD. This study is thus an attempt to advance previous research, which used single assessments of the mental health of retirement home residents with AD during the lockdowns,^[18-21,24] by looking at the longitudinal effects of lockdowns on the mental health of retirement home residents with AD. Therefore, we designed a study to address the hypothesis that retirement home residents with AD experienced more severe depression, anxiety, and loneliness during the second confinement compared with the first confinement.

2. Methods

2.1. Participants

The study included 62 participants from various retirement homes in France with a clinical diagnosis of probable AD as defined by the National Institute on Aging and the Alzheimer's

Association criteria for probable Alzheimer disease^[2] (40 women and 22 men; M age = 72.16 years, SD = 5.43; M years of formal education = 9.32, SD = 2.30). Participants' mean score on the Mini Mental Stat Examination, a widely used cognitive screening measure,^[25] was 19.89 (SD = 4.06), corresponding to mild to moderate AD. This study was designed and conducted in accordance with the Declaration of Helsinki; participants provided their consent to participate and were able to withdraw whenever they wished. The study was approved by the ethical board of Lille.

While our prior study^[23] included a larger sample size (n = 58), we were not able to include all participants in the present study because many were unreachable (e.g., for medical reasons, due to travel restrictions, or due to restrictions in the facilities where they resided). However, the sample size of the present study (n = 62) is adequate to detect significant differences between the two lockdowns; using G*Power,^[26] we found that to demonstrate a difference with a paired *t* test with 95% power, an estimated probability of making Type I error of 0.05, and a medium effect size of 0.50,^[27] the required sample is 45 participants.

2.2. Procedures

The study included two assessments of depression, anxiety, and loneliness, the first of which occurred during the first lockdown (from March 16 to May 11, 2020) and the second one during the second lockdown (from October 30 to November 27, 2020).

2.2.1. Depression and anxiety. We evaluated depression and anxiety with the Hospital Anxiety and Depression Scale consisting of two subscales.^[28] The depression subscale contains seven items (e.g., I feel cheerful, I feel as if I am slowed down, I have lost interest in my appearance) and the anxiety subscale contains seven items (e.g., worrying thoughts go through my mind, I can sit at ease and feel relaxed, I get sort of frightened feeling like "butterflies" in my stomach). Participants rated each item on a four-point scale ranging from zero (not present) to three (considerable). The maximum score for each subscale is 21 points.

2.2.2. Loneliness. We provided participants with the following instruction: "We would like to evaluate the psychological effects of social distancing measures as implemented during this lockdown to cope with the Covid-19 crisis. We would like you to complete the following statement: "During social distancing, I feel . . ." with one of these three options: one = not at all alone, two = somewhat alone, three = alone, or four = very alone."

3. Results

To test our hypothesis, we compared scores of depression, anxiety, and loneliness across the two lockdowns (scores are provided in Table 1) with paired *t* tests. We applied *t* tests after checking for normal distribution with Kolmogorov-Smirnov tests [depression during the first lockdown: $D(62) = 0.077$, $P = .20$; depression during the second lockdown: $D(62) = 0.081$, $P = .019$; anxiety during the first lockdown: $D(62) = 0.071$, $P = .211$; anxiety during the second lockdown: $D(62) = 0.066$, $P = .29$; loneliness during the first lockdown: $D(62) = 0.081$, $P = .019$; loneliness during the second lockdown: $D(62) = 0.07$, $P = .199$].

Table 1
Scores of depression, anxiety, and loneliness during the two lockdowns.

	Depression	Anxiety	Loneliness
First lockdown	13.65 (3.60)	13.26 (3.40)	2.40 (1.31)
Second lockdown	15.69 (4.40)	15.02 (4.27)	2.85 (1.14)

Standard deviations are given between parentheses; the maximum score on the depression or anxiety scale was 21 points; the maximum score on the loneliness scale was four points.

3.1. Increased depression, anxiety, and loneliness during the second lockdown

Analyses demonstrated higher levels of depression [$t(61)=4.68$, $P<.001$, Cohen's $d=0.50$], anxiety [$t(61)=3.23$, $P=.002$, Cohen's $d=0.45$], and loneliness [$t(61)=2.41$, $P=.019$, Cohen's $d=0.35$] during the second lockdown than during the first lockdown. Our analysis thus demonstrates increased depression, anxiety, and loneliness during the second lockdown.

3.2. Complementary analysis

To explore whether these neuropsychological symptoms were associated with the degree of cognitive impairment, we carried out Pearson's correlations between depression, anxiety, and loneliness (during the first and second lockdowns) and Mini Mental State Examination scores. No significant correlations were observed (all P values $>.05$).

4. Discussion

During two successive lockdowns, retirement homes in France were obliged to reduce the physical contact of residents with the outside world, and in some cases, even physical contact between residents. While these restrictive measures were intended to limit the spread of SARS-CoV-2, they probably decreased the residents' wellbeing. We thus compared depression, anxiety, and loneliness experienced by retirement home residents with AD during the two lockdowns in France. Results demonstrated higher levels of depression, anxiety, and loneliness during the second compared to the first lockdown.

The increase in negative neuropsychological symptoms observed during the second lockdown can be attributed to the nature of the restrictive measures implemented to cope with the spread of SARS-CoV-2. While family members were able to visit retirement home residents during the second lockdown, these visits occurred under strict conditions. For instance, visits were generally short and typically only one member of the family was allowed to visit at any given time. During these visits, visitors implemented strict hygiene measures (e.g., use of hand sanitizer at entrance, temperature checks), physical distancing of at least 1.5 m was maintained, and, in many cases, residents were seen behind plexiglass screens or even through windows. During the visits, family members had to wear a protective mask, decreasing their ability to communicate by facial expression with residents. Individual with AD suffer from communication difficulties and rely on basic communication modalities, such as touch, limitations that may have further increased the impact of these restrictive measures. Moreover, their ability to use technology (e.g., video calls) to communicate with family members is diminished, but, even when such communication was facilitated, it represented only a modest substitute for physical contact.^[29]

The increased loneliness, depression, and anxiety experienced during the second compared with the first lockdown, can also be attributed to institutional factors. Although, during the second lockdown, geriatric healthcare workers were better prepared compared with the first lockdown, in terms of protocols of care (e.g., infection control) and regulations (e.g., visitor restrictions), they had to deal with accumulated workload (e.g., long-duration and frequent shifts required by shortages in staff) and residual burnout, as a result of the first lockdown.^[30] This increased workload also decreased the physical contact of caregivers with residents, probably contributing to their depression, anxiety, and loneliness. Moreover, while the general population, including geriatric healthcare workers and residents, may have experienced feelings of exhilaration and social engagement during the first lockdown, these positive feelings dissipated during the second lockdown (e.g., fewer volunteers offered their services during the second compared to the first lockdown), perhaps reflecting the general discouragement of the population from the long duration of the crisis and the lack of control over the pandemic, at least up to the moment of the assessments that form the basis of this paper.

No significant correlations were observed between scores on the Mini Mental State Examination and levels of depression, anxiety or loneliness. Thus, depression, anxiety, and loneliness, as observed during the first and second lockdowns, are independent of the degree of cognitive impairment. In light of this negative finding, we speculate that the mental health of retirement home residents with AD may be more influenced by societal and institutional factors (i.e., the effects of lockdown) than their degree of cognitive decline.

Several suggestions can be made to address the depression, anxiety, and loneliness in residents of geriatric facilities during a disruptive event, such as a lockdown. First and foremost, the residents' wellbeing and mental health should be recognized as being in danger. Providing sufficient staffing should be one of the main objectives for facilities preparing to deal with a lockdown, not only to ensure adequate quality of care, but also because additional staff would be able to better organize and enable visits or virtual communication sessions with families. Interventions including psychotherapy, animal therapy, or aiming at befriending and leisure/skill development can be considered, both during and after a lockdown. While challenging, it is important for geriatric facilities to find creative ways to implement such interventions during lockdowns, especially when infrastructures are already available (e.g., if a garden already exists, institutions may encourage gardening). Such interventions may help residents spend more time in meaningful ways, thereby enhancing their wellbeing while maintaining social distancing.

A limitation of our study was the assessment of loneliness using a single item lacking validity, a choice dictated by the lack of a validated scale assessing loneliness in patients with AD in French. We found a medium effect size (0.35) for loneliness, which may reflect the low statistical power we had to examine this variable. However, and despite these limitations, we were able to assess the most common neuropsychiatric symptoms in AD (i.e., depression and anxiety) and the most widely expected consequence of lockdowns (i.e., loneliness) during an unprecedented situation.

5. Conclusion

While visiting restrictions during lockdowns were implemented to cope with the Covid-19 pandemic and to protect the life of

residents of retirement homes, these measures may have sharply decreased their quality of life. By demonstrating how successive lockdowns, at least as implemented in France, increased depression, anxiety, and loneliness in retirement home residents with AD, our study offers a unique window into the long-term effects of lockdowns on the mental health of retirement home residents in general. Although facilities understandably prioritized the need to preserve life over considerations over quality of life, we believe that it is important to implement restrictive measures while also considering the perspectives of patients and their unmet needs, and implement additional measures to decrease the adverse effects of isolation on the residents' mental health.

Acknowledgments

The authors would like to thank Emilie Cooke for linguistic assistance.

Author contributions

Conceptualization: Mohamad el haj.

Contributed to data analysis and interpretation: Claire Boutoleau-Bretonnière, Philippe Allain, Dimitrios Kapogiannis, Guillaume Chapelet.

Data curation: Claire Boutoleau, Claire Boutoleau Bretonniere.

Designed the research: Mohamad El Haj, Karim Gallouj.

Investigation: Mohamad el haj.

Methodology: Claire Boutoleau, Claire Boutoleau Bretonniere.

Project administration: Karim Gallouj.

Resources: Claire Boutoleau, Claire Boutoleau Bretonniere, Dimitrios Kapogiannis.

Revised the paper: Claire Boutoleau-Bretonnière, Philippe Allain, Dimitrios Kapogiannis, Guillaume Chapelet, Karim Gallouj.

Software: Guillaume Chapelet.

Supervision: Guillaume Chapelet, Karim Gallouj, Philippe Allain.

Validation: Dimitrios Kapogiannis, Guillaume Chapelet, Philippe Allain.

Writing – original draft: Mohamad el haj.

Writing – review & editing: Dimitrios Kapogiannis, Karim Gallouj.

Wrote the paper: Mohamad El Haj.

References

- [1] Ismail Z, Smith EE, Geda Y, et al. Neuropsychiatric symptoms as early manifestations of emergent dementia: provisional diagnostic criteria for mild behavioral impairment. *Alzheimers Dement* 2016;12:195–202.
- [2] McKhann G, Knopman DS, Chertkow H, et al. The diagnosis of dementia due to Alzheimer's disease: recommendations from the National Institute on Aging-Alzheimer's Association workgroups on diagnostic guidelines for Alzheimer's disease. *Alzheimers Dement* 2011;7:263–9.
- [3] El Haj M, Antoine P, Amouyel P, Lambert JC, Pasquier F, Kapogiannis D. Apolipoprotein E (APOE) epsilon4 and episodic memory decline in Alzheimer's disease: a review. *Ageing Res Rev* 2016;27:15–22.
- [4] Ballard C, Holmes C, McKeith I, et al. Psychiatric morbidity in dementia with Lewy bodies: a prospective clinical and neuropathological comparative study with Alzheimer's disease. *Am J Psychiatry* 1999;156:1039–45.
- [5] Chi S, Yu JT, Tan MS, Tan L. Depression in Alzheimer's disease: epidemiology, mechanisms, and management. *J Alzheimers Dis* 2014;42:739–55.
- [6] Ferretti L, McCurry SM, Logsdon R, Gibbons L, Teri L. Anxiety and Alzheimer's disease. *J Geriatr Psychiatry Neurol* 2001;14:52–8.
- [7] Gormley N, Rizwan MR. Prevalence and clinical correlates of psychotic symptoms in Alzheimer's disease. *Int J Geriatr Psychiatry* 1998;13:410–4.
- [8] Starkstein SE, Jorge R, Mizrahi R, Robinson RG. The construct of minor and major depression in Alzheimer's disease. *Am J Psychiatry* 2005;162:2086–93.
- [9] Enache D, Winblad B, Aarsland D. Depression in dementia: epidemiology, mechanisms, and treatment. *Curr Opin Psychiatry* 2011;24:461–72.
- [10] Ballard C, Bannister C, Solis M, Oyebode F, Wilcock G. The prevalence, associations and symptoms of depression amongst dementia sufferers. *J Affect Disord* 1996;36:135–44.
- [11] Lyketsos CG, Olin J. Depression in Alzheimer's disease: overview and treatment. *Biol Psychiatry* 2002;52:243–52.
- [12] Gaugler JE, Yu F, Krichbaum K, Wyman JF. Predictors of nursing home admission for persons with dementia. *Med Care* 2009;47:191–8.
- [13] Suh GH, Kil Yeon B, Shah A, Lee JY. Mortality in Alzheimer's disease: a comparative prospective Korean study in the community and nursing homes. *Int J Geriatr Psychiatry* 2005;20:26–34.
- [14] Mintzer JE, Brawman-Mintzer O, Mirski DF, Barkin K. Anxiety in the behavioral and psychological symptoms of dementia. *Int Psychogeriatr* 2005;12(S1):139–42.
- [15] Kaufer DI, Cummings JL, Christine D, et al. Assessing the impact of neuropsychiatric symptoms in Alzheimer's disease: the Neuropsychiatric Inventory Caregiver Distress Scale. *J Am Geriatr Soc* 1998;46:210–5.
- [16] Boutoleau-Bretonnière C, Pouclet-Courtemanche H, Gillet A, et al. Impact of confinement on the burden of caregivers of patients with the behavioral variant of frontotemporal dementia and Alzheimer disease during the COVID-19 crisis in France. *Dement Geriatr Cogn Dis Extra* 2020;10:127–34.
- [17] El Haj M, Jardri R, Larøi F, Antoine P. Hallucinations, loneliness, and social isolation in Alzheimer's disease. *Cogn Neuropsychiatry* 2016;21:1–13.
- [18] El Haj M, Larøi F, Gallouj K. Hallucinations in a patient with Alzheimer's disease during the COVID-19 crisis: a case study. *J Alzheimers Dis Rep* 2020;4:455–8.
- [19] Boutoleau-Bretonnière C, Pouclet-Courtemanche H, Gillet A, et al. The effects of confinement on neuropsychiatric symptoms in Alzheimer's disease during the COVID-19 crisis. *J Alzheimers Dis* 2020;76:41–7.
- [20] Giebel C, Cannon J, Hanna K, et al. Impact of COVID-19 related social support service closures on people with dementia and unpaid carers: a qualitative study. *Ageing Ment Health* 2020;25:1281–8.
- [21] Verbeek H, Gerritsen DL, Backhaus R, de Boer BS, Koopmans R, Hamers JPH. Allowing visitors back in the nursing home during the COVID-19 crisis: a Dutch national study into first experiences and impact on well-being. *J Am Med Dir Assoc* 2020;21:900–4.
- [22] Van der Roest HG, Prins M, van der Velden C, et al. The impact of COVID-19 measures on well-being of older long-term care facility residents in the Netherlands. *J Am Med Dir Assoc* 2020;21:1569–70.
- [23] El Haj M, Altintas E, Chapelet G, Kapogiannis D, Gallouj K. High depression and anxiety in people with Alzheimer's disease living in retirement homes during the Covid-19 crisis. *Psychiatry Res* 2020;2020:113294.
- [24] Cagnin A, Di Lorenzo R, Marra C, et al. Behavioral and psychological effects of coronavirus disease-19 quarantine in patients with dementia. *Front Psychiatry* 2020;11:578015.
- [25] Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* Nov 1975;12:189–98.
- [26] Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods* 2007;39:175–91.
- [27] Cohen J. Statistical power analysis. *Curr Dir Psychol Sci* 1992;1:98–101.
- [28] Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361–70.
- [29] Gleeson M, Timmins F. Touch: a fundamental aspect of communication with older people experiencing dementia. *Nurs Older People* 2004;16:18–21.
- [30] El Haj M, Allain P, Annweiler C, et al. Burnout of healthcare workers in acute care geriatric facilities during the COVID-19 crisis: an online-based study. *J Alzheimers Dis* 2020;78:847–52.