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Symptoms of depression, anxiety, and perceived mastery in older adults before and during the COVID-19 pandemic: Results from the Longitudinal Aging Study Amsterdam

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ABSTRACT

Objective: Governmental measures to protect older adults from COVID-19 are hypothesized to cause anxiety and depression. Previous studies are heterogeneous and showed small effects. This study aims to assess depressive and anxiety symptoms and perceived mastery just after the first wave of the COVID-19 pandemic compared to previous years in community-dwelling older adults and to identify potential risk groups according to the comprehensive geriatric assessment framework.

Methods: Data were used from 1068 Dutch older adults (aged 55–93 at baseline in 2011–2013) participating in the Longitudinal Aging Study Amsterdam, including 4 follow-ups spanning 9 years. Depressive symptoms, anxiety symptoms and feelings of mastery were assessed with the short Center for Epidemiologic Studies Depression scale (CES-D-10), the Hospital Anxiety Depression Scale - Anxiety subscale (HADS-A) and the Pearlin Mastery Scale. Linear mixed regression was used to compare outcomes in June-August 2020 to previous years and to examine predictors to identify risk groups.

Results: Slight increases in CES-D-10 (1.37, 95% Confidence interval [CI] 1.12;1.62), HADS-A (0.74, 95% CI 0.56;0.94) and mastery (1.10, 95% CI 0.88;1.31) occurred during the COVID year compared to previous years. Older adults with functional limitations or with frailty showed a smaller increase in feelings of mastery in the COVID-year.

Conclusion: Our results suggest limited mental health effects on older adults from the first COVID-19 wave. Older adults have perhaps better coping strategies than younger adults, or preventive measures did not have extensive consequences for the daily life of older adults. Further monitoring of depression, anxiety and perceived mastery is recommended.

1. Introduction

Older adults are at elevated risk for severe Corona Virus Disease 2019 (COVID-19) morbidity and mortality [1,2] and for adverse economic, social and psychological consequences related to the pandemic [3,4]. For example, public health measures that conflict with personal freedom, contradictory messages from authorities, shortages of COVID-19 tests and personal protective equipment are hypothesized to cause emotional distress and increase risk for psychiatric illness [5,6]. Furthermore, the unexpectedness of the pandemic itself and the many...

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consequences that seem uncontrollable by individuals, such as cancel-
lations of treatments and restrictions to social contacts may reduce
feelings of personal control over life (mastery), which is an essential
coping resource for maintaining good mental health [7]. In the
Netherlands, the government gave community-dwelling older adults
additional recommendations next to the public health measures for the
general population at the peaks of the pandemic from March-May 2020
and October 2020 until April 2021. The government advised older
adults against the use of public transport, not to do their own groceries
and not to receive any visitors (https://www.rijksoverheid.nl/documented-
rapporten/2020/10/14/aanvullende-corona-adivezen-aan-
zelfstandig-wonende-ouderen). Therefore, older adults were even more
restricted in their personal freedom compared to younger adults with
possible risks for their mental health.

A meta-analysis showed that effects of lockdown on depression and
anxiety were small on average but that study populations were hetero-
genous [5]. Longitudinal studies which compared anxiety and depression before and during the COVID-19 pandemic showed younger age, female sex, and previous poor mental health as risk factors during
the COVID-19 pandemic [9,10]. The younger age as risk factor for
negative psychological effects of the lockdown suggests older adults are
possibly protected instead of at risk. At the same time, in older adults,
fear for COVID-19-related morbidity and mortality could also result in
increased feelings of depression and anxiety. Unfortunately, limited
longitudinal data including pre-pandemic measurements of mental
health focusing on older adults has been published. If we would identify
older adults at risk for the development of depression, anxiety, and loss
of mastery during the COVID-19 pandemic it could guide the develop-
ment of preventive strategies for future restrictive measures during a
pandemic. Furthermore, extending previous studies focusing on affec-
tive symptoms, we additionally examined mastery as a central indicator
of control beliefs, which are strongly related to mental health and
wellbeing [11], and may change as a result of the unexpected and un-
precedented events occurring during the COVID-pandemic.

Trajectories of mental health in older adults before and during the
COVID-19 pandemic and risk factors for depressive and anxiety symp-
toms have been assessed in a few studies. Depressive and anxiety
symptoms increased in older adults during the pandemic in Chile, how-
ever only one measurement was performed before the pandemic,
therefore data on the trajectories of depressive and anxiety symptoms
for multiple years is limited [12]. In a population aged 50-years and
over, higher loneliness, reductions in physical activity, female gender
and being retired were risk factors for increased depressive and anxiety
symptoms during the COVID-year [13]. In older adults in Japan, internet
use for communication had a protective influence on the probability of
developing depression [14].

These studies suggest that determinants for depression, anxiety and
mastery are heterogeneous. Therefore, a comprehensive assessment
approach and systematic categorization of determinants may help to
identify risk groups. To assess older adults at risk, we used the frame-
work of the Comprehensive Geriatric Assessment (CGA). The CGA is a
multidimensional, multidisciplinary diagnostic and therapeutic process
focused on determining an older person’s medical, functional, mental,
and social capabilities and limitations with the goal of ensuring that
problems are identified, quantified, and managed appropriately [15]. In
a meta-analysis of risk factors for depressive symptoms in older adults,
bereavement, sleep disturbance, disability, prior depression, and female
gender were significant risk factors [16]. Based on the CGA-framework,
we hypothesize that having multiple comorbidities (medical domain),
cognitive impairment (mental domain), functional limitations (func-
tional domain) or living alone (social domain) are possible risk factors
in older adults living in the community for negative psychological impact
during the lockdown measures. We also hypothesize that a higher frailty
score, which summarizes limitations on the medical, mental, and func-
tional domain, is a risk factor for an increase in affective symptoms and
decrease in perceived control.

In this longitudinal observational study, we addressed the following
two research questions: 1) Is there a change in depressive or anxiety
symptoms or in perceived mastery in community dwelling older adults
in the Netherlands during the COVID-19 pandemic compared to previ-
ous years? And 2) Are older adults with multiple chronic diseases,
cognitive impairment, functional limitations, who are living alone or
with frailty at risk for a change in depressive or anxiety symptoms or
perceived mastery?

2. Materials and methods

2.1. Study sample and design

The Longitudinal Aging Study Amsterdam (LASA) is an ongoing
prospective cohort study initiated in 1992 based on a representative
sample of older adults aged 55–84 years in the Netherlands [17]. The
primary objective of LASA was to study determinants, trajectories, and
consequences of (changes in) functioning in four domains: physical,
cognitive, emotional, and social. Participants are interviewed approxi-
mately every three years and in 2002 and 2012 refresher cohorts aged
55–64 were added to the study. Interviews include a main face-to-face
interview and a subsequent medical interview with additional ques-
tionnaires and clinical tests. The LASA study was approved by the
medical ethics committee of the VU University Medical Center. Written
informed consent was obtained from all participants.

As the COVID-19 pandemic is an exceptional situation, an extra
assessment after the measurement wave of 2018–2019 was added [18].
This was a questionnaire that was sent to LASA participants in June
2020, just after the first wave of the pandemic, in a period that most
social distancing measures were eased (most governmental measures in
the Netherlands were eased as of mid-May 2020). Of the 1701 re-
pondents of the last measurement wave (Wave J, 2018–2019) 1485
were selected to participate. Respondents who were not selected had
already died (n = 61) or were purposefully not selected (n = 155)
because the questionnaire was expected to be too much of a burden [18].
These 155 people were older and more vulnerable than selected par-
ticipants, for example, 98 of them had short or proxy interviews at the
last measurement wave before the pandemic (2018–2019) because of
cognitive impairment or poor health. The questionnaire was sent on
June 8, 2020, by postal mail: participants could choose to return it by
mail or fill it out online. Participants aged 80 years and older who
initially did not respond were offered to answer the questionnaire in a
telephone interview. Data collection ended on October 8, 2020, however
99% of all data were received before the end of August 2020. Of the
1485 LASA participants approached, 1128 (76%) returned the ques-
tionnaire. On average, responders had more years of education and a
higher MMSE-score compared to non-responders. No differences in age,
sex, chronic diseases, and functional limitations were found [18]. We
restricted our sample to individuals with complete outcome measures
for the COVID wave in 2020 (n = 1068; Fig. 1) and longitudinally fol-
lowed the same individuals over 4 waves: T1: 2011–2013 (n = 1049),
T2: 2015–2016 (n = 1026), T3: 2018–2019 (n = 984), T4: 2020 (n =
1068). The N of previous waves was slightly lower because of missing
data (some participants of the COVID wave in 2020 did not complete all
measurements at previous waves).

We applied STROBE (STrengthening the Reporting of OBservational
studies in Epidemiology) guidelines for reporting observational studies
in epidemiology (Electronic Supplementary Material 1).

2.2. Mental health outcomes

To assess depressive symptoms, we used the Center for Epidemi-
ologic Studies Depression scale (CES-D) short version (10-item scale)
[19]. The CES-D-10 is a self-report questionnaire designed to measure
depressive symptoms in the general population and has good psycho-
metric properties and validity in elderly samples [20]. For the 10-item

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Using the CGA framework, risk factors were chosen from four domains. For the medical domain, we assessed multiple chronic conditions by seven groups which were explicitly asked about: Chronic non-specific lung disease, cardiac disease, peripheral artery disease, stroke, diabetes mellitus, arthritis, and malignancies. This count variable could therefore range from 0 to 7.

For the mental domain, we assessed cognition by the Mini-Mental State Examination (MMSE) [25]. The MMSE is a brief primary screening test for cognitive functioning, which is strongly influenced by age and education. The MMSE consists of 23 items and the score ranges from 0 to 30, higher scores indicating better cognitive functioning.

For the functional domain, we described functional limitations in seven common daily activities: Can you walk up and down a staircase of 15 steps without resting? Can you dress and undress yourself? Can you sit down and stand up from a chair? Can you cut your own toenails? Can you walk outside during five minutes without stopping? Can you use your own public transportation? Can you take a shower or bath? A score of 0–7 was calculated by dividing the sum of the health deficit score by the total number of healthy deficits measured, resulting in a score between 0 and 1. A cut-off of 0.25 is used to indicate frailty [28,29].

The risk factors and FI were measured at T3 (2018–2019), because the COVID-questionnaire did not include all necessary items.

2.4. Covariates

We adjusted for baseline age (years, continuous), gender (male/female) and educational level (years, continuous). These were selected as potential confounders because they do not lie on the causal pathway between risk factors and the outcomes.

2.5. Statistical analyses

Baseline characteristics were described with mean values for continuous variables and with percentages for categorical variables. Prevalence estimates (with interquartile ranges) for each outcome were calculated in repeated cross-sectional analysis using all responses of the COVID and previous waves. A sensitivity analysis for baseline characteristics between participants who had complete and incomplete outcome variables was performed.

We conducted a linear mixed model to assess change in outcomes over time, using time in days as predictor; additionally, we added a dummy for the year 2020 to test differences between the COVID-wave and pre-COVID waves and adjusted model for age (continuous), gender (dichotomous) and educational level (continuous in years of education). Predicted residuals were plotted to evaluate model assumptions.

Additional analyses to assess if the change was associated with the selected predictors chronic diseases (continuous per 1 increment), MMSE (continuous per 1 increment), functional limitations (continuous per 1 increment), living with someone (dichotomous, living alone or with someone) or frailty (dichotomous yes/no, with cut-off at 0.25) were done by fitting interaction terms between the dummy variable for the year 2020 and the predictors. Predictors were time-fixed variables.
from T3 (2018–2019). Analysis was conducted with Stata version 15 (StataCorp. 2017. *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LLC).

### 3. Results

The 1068 participants had a mean age of 73.8 years and 47.2% were male. Regarding the potential risk factors, 14.2% of the participants had three or more chronic conditions, 18.9% had three or more functional limitations, 71.8% of participants were living together with someone and 20.0% of participants had a LASA-FI of 0.25 or above and were considered frail (Table 1). Last, the median MMSE score of participants was 29 (interquartile range [IQR] 28;30). Regarding COVID-19 infections, 2.6% of participants reported a COVID-infection in themselves and 3.5% reported a COVID infection in a close relative (partner, parent, child). Sensitivity analysis in which participants of the LASA COVID study with complete \( n = 1068 \) and incomplete \( n = 60 \) data on outcome measures were compared showed that the participants with complete outcomes were younger, had a higher MMSE score and less functional limitations (Electronic supplementary material 2).

The mean follow-up time was 7.8 years with a standard deviation of 0.54 years. Mean and median scores of outcome variables for all waves are described in Fig. 2 and in the appendix (Electronic supplementary material 3). Median CES-D-10 score showed a gradual increase over time (Fig. 2A). Median HADS-A score was stable for the three pre-COVID time points and increased during the pandemic (Fig. 2B). Mean values of CES-D-10 and HADS-A did not reach cut off values at any time point. Also, median scores of the mastery outcome were stable for the three pre-COVID time points and increased during the pandemic (Fig. 2C).

Mixed linear regression showed that CES-D-10 (\( \beta = 1.37, 95\% \text{ Confidence interval [CI]} \, 1.12;1.62 \)), HADS-A (\( \beta = 0.74, 95\% \text{CI} \, 0.56;0.94 \)) and mastery (\( \beta = 1.10, 95\% \text{CI} \, 0.88;1.31 \)) increased in the COVID year compared to pre-COVID waves (Table 2).

Each additional functional limitation was associated with a 0.11 smaller increase in mastery in the COVID year compared to previous years (95%CI -0.20; –0.02). Being frail was associated with a 0.43 smaller increase in mastery score in the COVID year compared to previous years (95%CI -0.84; –0.02, Table 2). Having more chronic conditions, a higher MMSE-score or living with someone were not associated with change in CES-D-10 or HADS-A in the COVID year.

### Table 1

Characteristics of the cohort members (aged 63–102 years) of the Longitudinal Aging Study Amsterdam (2011–2020).

| Characteristic                           | Total |
|-----------------------------------------|-------|
| N                                       | 1068  |
| Age, mean ± SD                         | 73.8 (7.5) |
| Male, (%)                               | 47.2  |
| Educational level, (%)                  |       |
| Primary/lower vocation                  | 29.1  |
| Junior/senior high school               | 40.5  |
| Higher vocational/university            | 30.4  |
| Medical domain: Number of chronic diseases from 7 majors, (%) |       |
| 0                                       | 23.2  |
| 1                                       | 37.4  |
| 2                                       | 25.2  |
| 3 or more                               | 14.2  |
| Mental domain: MMSE (0–30), median (IQR) | 29 (28;30) |
| Functional domain: Functional limitations (of 7 items), (%) |       |
| 0                                       | 44.9  |
| 1                                       | 24.2  |
| 2                                       | 11.9  |
| 3 or more                               | 18.9  |
| Social domain: household, (%)           |       |
| Living alone                            | 28.3  |
| Living with someone                     | 71.6  |
| LASA frailty index 32 items, (%)        |       |
| Not frail                               | 80.0  |
| Frail (cut off 0.25)                     | 20.0  |

Note: MMSE = Mini-Mental State Examination Score.

- Number of participants with complete information on symptoms of depressions, symptoms of anxiety and mastery at the COVID-questionnaire.
- Measured at T4(2020).
- Measured at T5(2018–2019), excluding missing data.
negative psychological effects. A second explanation for the mild in
ery et al. [34] hypothesize that life expertise may protect older adults from
adaptive use of personal memory and a focus on generativity [34]. Lind
the first months
possible negative effect of the pandemic on mental health
suggests a positive effect from the lockdown measures on mental health
have better coping strategies than younger adults. A narrative review
mean values did not reach cut-off scores, our study suggests that the
crease of depressive and anxiety symptoms could be the period of
mental health did not change during the pandemic [30, 31]. Also, a 5-
sectional cohorts of older adults in the Netherlands and Germany
anxiety symptoms is consistent with previous research. In cross-
absolute changes of depressive and anxiety symptoms were small and
crease in mastery during the COVID-pandemic. No other risk factors for
ous years. However, perceived mastery also increased. Having more
risk factors for a change in CES-D-10, HADS-A or mastery could be identified. Since
changes of depressive and anxiety symptoms were small and mean values did not reach cut-off scores, our study suggests that the possible negative effect of the pandemic on mental health – at least in the first months – is limited. Also, the modest increase in mastery scores suggests a positive effect from the lockdown measures on mental health in older adults occurred.

Our findings of a limited effect of the pandemic on depressive and anxiety symptoms is consistent with previous research. In cross-sectional cohorts of older adults in the Netherlands and Germany mental health did not change during the pandemic [30,31]. Also, a 5-year longitudinal cohort study among the general population in the UK showed that mild symptoms of anxiety and depression increased in the COVID-year while moderate to severe scores remained the same [13]. Further, anxiety and depression symptoms increased in longitudinal population-based cohorts in the US, but especially in young adults aged 18–39 [32,33]. The LASA cohort consists only of older adults, which could explain the minor increase of depressive and anxiety symptoms in our study. A possible explanation could be that older adults have better coping strategies than younger adults. A narrative review highlights psychosocial strengths of older people such as reflection, adaptive use of personal memory and a focus on generativity [34]. Lind et al. [34] hypothesize that life expertise may protect older adults from negative psychological effects. A second explanation for the mild increase of depressive and anxiety symptoms could be the period of

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4. Discussion

This longitudinal observational study showed that depressive and anxiety symptoms slightly increased in community dwelling older adults in the Netherlands during the COVID-19 pandemic compared to previous years. However, perceived mastery also increased. Having more functional limitations or being frail was associated with a smaller increase in mastery during the COVID-pandemic. No other risk factors for a change in CES-D-10, HADS-A or mastery could be identified. Since absolute changes of depressive and anxiety symptoms were small and mean values did not reach cut-off scores, our study suggests that the possible negative effect of the pandemic on mental health – at least in the first months – is limited. Also, the modest increase in mastery scores suggests a positive effect from the lockdown measures on mental health in older adults occurred.

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sampling: In a population based cohort in the US the increase of anxiety was at the beginning of the pandemic in April 2020, but decreased in May and remained 3% above the level of 2019 in December [33]. Questionnaires of LASA were completed in summer 2020, when most of the lockdown measures were stopped in the Netherlands and cover a later stage of the first wave of the pandemic, when levels of depression and anxiety were almost back to pre-pandemic levels like observed in the US, so the mild increase in anxiety symptoms could be explained by the period of the sampling [32,33].

The current study showed an unexpected increase of perceived mastery during the COVID pandemic. A longitudinal study of adults of 60 years and older in Chile showed comparable results of increased resilience measured by the Brief Resilient Coping Scale (BRCS), next to an increase in symptoms of anxiety and depression [12]. A possible explanation is that the public health measures resulted in a more quiet and clear everyday life for older adults which could have led to an increase of perceived mastery. To our best knowledge, no other data on mastery during the COVID-pandemic has been published so far. Unpublished data from the LASA COVID-questionnaire showed that the participants had more attention for the things they enjoyed doing and reflected more on the things that were valuable in their lives. This would also fit in the theory of psychological strength of older adults of Lind [34].

In our study no risk factors for increased symptoms of depression or anxiety in older adults could be identified. Other longitudinal studies identified the following risk factors; however these studies were not restricted to an older adult population. For the medical domain, lung problems were associated with high anxiety and depressive symptom scores before and during COVID-pandemic [35]. Having heart problems was a risk factor during but not before COVID-pandemic [35]. Also, low self-rated physical health was associated with higher risk of increased anxiety (GAD-7 score) [36]. The authors of the latter study used different self-reported outcomes which may have caused the
discrepancy with our study.

To our knowledge, we are the first to report on longitudinal data which explores the relation between MMSE and symptoms of depression, anxiety, or perceived mastery during the COVID-19 pandemic. A cross-sectional study evaluating older adults with mild cognitive impairment (MCI) and subjective cognitive decline (SCD) during lockdown measures reported that 27.2% of 125 respondents felt sad or depressed. Depression was significantly associated with living alone or being in a poor relationship with cohabitants, low sleep quality and not owning a pet [37]. However, no control group was described.

For the social domain, we did not find an association between living alone and an increase in the feelings of depression or anxiety in the COVID-year. This is inconsistent with a population-based study in the UK describing living alone was associated with increased depressive symptoms scores [10]. A possible explanation could be that the questionnaire took place after most lock-down measures were elevated. Also as described earlier, other studies showed that older adults were more in touch with family and friends through internet and smartphone use [12] and could relate to this depressive symptoms [14]: the amount of communication possibilities would probably better explain negative psychological effects of the lockdown than the household composition.

We were able to study trajectories of feelings of depression, anxiety, and perceived mastery in a large cohort of community dwelling older adults over a 10-year period. An important limitation of our study is possible survivorship bias: previous analysis of non-responders of the LASA COVID study showed that the participants were younger and had a higher MMSE score [18]. Furthermore, as shown in sensitivity analyses of the current paper, participants with complete outcomes were younger, had a higher MMSE score and less functional limitations compared to participants without complete outcomes. Also, our cohort has an overrepresentation of participants of the last refresher wave of 2012, which consisted of older adults aged 55–64 and could explain the high MMSE score in general and the limited comorbidities and functional limitations. This could have resulted in bias of a cohort of older adults with limited health and social problems, but with the protective effect of life experience and so limited negative psychological effects.

In conclusion, negative psychological effects of the pandemic are limited in community dwelling older adults of the LASA cohort in the Netherlands. The observed increase in perceived mastery during the pandemic adds to the theory of the resilience of older adults for negative effects of lockdown measures. No risk factors for feelings of depression or anxiety could be identified, however functional limitations and being frail tempered the increased perceived mastery older adults experienced. To evaluate if the changes are persistent, follow-up data are needed to evaluate further trajectories.

Data statement

The data underlying the results presented in this study are available from the Longitudinal Aging Study Amsterdam (LASA). Data of LASA, including data from the LASA COVID-19 questionnaire, may be requested for research purposes. More information on data requests can be found on the LASA website: www.lasa-vu.nl.

Author contributions

Study concept and design: MH, AK, EH. Acquisition of data: MH, AK, EH. Analysis and interpretation: JB, JMV, AK, EH. Preparation of manuscript: JB, JMV, BB, CH, MH, AK, EH. All authors read and approved the final version of the manuscript.

Declaration of Competing Interest

The authors have no competing interests to report.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jspychres.2021.110656.

References

[1] L.C. Blommaard, C.M.J. van der Linden, J.M. van der Bol, et al., Frailty is associated with in-hospital mortality in older hospitalised COVID-19 patients in the Netherlands: the COVID-OLD study, Age Ageing 50 (2021) 631–640, https://doi.org/10.1093/ageing/abb018.
[2] L. Kim, S. Garg, A. O’Halloran, et al., Risk factors for intensive care unit admission and in-hospital mortality among hospitalized adults identified through the US coronavirus disease 2019 (COVID-19)-associated hospitalization surveillance network (COVID-NET), Clin. Infect. Dis. 72 (2021) e206–e214.
[3] R. Armitage, L.B. Nellums, COVID-19 and the consequences of isolating the elderly, Lancet Public Health 5 (2020), e256.
[4] M.T. Tall, K.A. Edmonds, K.M. Scamaldio, J.R. Richmond, J.P. Rose, K.L. Gratz, Psychological outcomes associated with stay-at-home orders and the perceived impact of COVID-19 on daily life, Psychiatry Res. 289 (2020), 113098.
[5] B. Pfeiferbaum, C.S. North, Mental health and the Covid-19 pandemic, N. Engl. J. Med. 383 (2020) 510–512.
[6] Stress in America, 2020: A national mental health crisis, Retrieved from, https://www.apa.org/news/press/releases/stress/2020/iaa-mental-health-crisis.pdf, 2020.
[7] S.E. Taylor, A.L. Stanton, Coping resources, coping processes, and mental health, Annu. Rev. Clin. Psychol. 3 (2007) 377–401.
[8] D.J. Kahneman, A.M. Krueger, R.A. Schkade, J.H. Schwarz, T. Smith, Subjective well-being, Science 314 (2006) 1090–1093.
[9] J. Banks, X. Xu, The mental health effects of the first two months of lockdown and social distancing during the COVID-19 pandemic in the UK, in: IFS Working Papers, No. W20/16, Institute for Fiscal Studies (IFS), London, 2020, https://doi.org/10.1920/wpIFS.2020.1620.
[10] A.S.F. Kwong, R.M. Pearson, M.J. Adams, et al., Mental health before and during the COVID-19 pandemic in two UK longitudinal population cohorts, Br. J. Psychiatry 1–10 (2020).
[11] J.H.M. Hovenkamp-Hermelink, B.F. Jeronimus, D.C. van der Veen, et al., Differential associations of locus of control with anxiety, depression and life-events: a five-wave, nine-year study to test stability and change, J. Affect. Disord. 253 (2019) 26–34.
[12] M.S. Herrera, R. Elgueta, M.B. Fernández, et al., A longitudinal study monitoring the quality of life in a national cohort of older adults in Chile before and during the COVID-19 outbreak, BMC Geriatr. 21 (2021) 143.
[13] B. Creese, Z. Khan, W. Henley, et al., Loneliness, physical activity, and mental health during COVID-19: a longitudinal study of depression and anxiety in adults over the age of 50 between 2015 and 2020, Int. Psychogeriatr. (2020) 1–10.
[14] A. Nakagomi, K. Shiba, K. Kondo, I. Kawachi, Can online communication prevent depression among older people? A longitudinal analysis, J. Appl. Gerontol. (2020), https://doi.org/10.1177/0733464820982147, 733468420982147.
[15] G. Ellis, M. Gardner, A. Tsakiris, et al., Comprehensive geriatric assessment for older adults admitted to hospital, Cochrane Database Syst. Rev. 9 (2017) CD006211.
[16] M.G. Cole, N. Dedukuri, Risk factors for depression among elderly community subjects: a systematic review and meta-analysis, Am. J. Psychiatr. 160 (2003) 1147–1156.
[17] E.O. Hoogendijk, D.J.H. Deeg, S. de Breij, et al., The longitudinal aging study Amsterdam: cohort update 2019 and additional data collections, Eur. J. Epidemiol. 35 (2020) 61–74.
[18] E.O. Hoogendijk, M.H.L. van der Horst, J. Poppelaars, M. van Vliet, M. Huisman, Multiple domains of functioning in older adults during the pandemic: design and basic characteristics of the Longitudinal Aging Study Amsterdam COVID-19 questionnaire, Aging Clin. Exp. Res. 33 (2021) 1423–1428.
[19] L.S. Radloff, The CES-D scale: a self-report depression scale for research in the general population, Appl. Psychol. Meas. 1 (1977) 385–401.
[20] A.T.F. Beekman, D.J.H. Deeg, J. Van Limbeek, A.W. Braam, M.Z. De Vries, W. Van Tilburg, Brief communication: criterion validity of the Center for Epidemiologic Studies Depression scale (CES-D): results from a community-based sample of older subjects in the Netherlands, Psychol. Med. 27 (1997) 231–235.
[21] E.M. Andresen, J.A. Malmgren, W.B. Carter, D.L. Patrick, In well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression scale), Am. J. Prev. Med. 10 (1994) 77–84.
[22] A.S. Zigmond, R.P. Snaith, The hospital anxiety and depression scale, Acta Psychiatr. Scand. 67 (1983) 361–370.
[23] R.P. Snaith, The hospital anxiety and depression scale, Health Qual. Life Outcomes 1 (2003) 1–4.
[24] L.I. Pearlin, C. Schooler, The structure of coping, J. Health Soc. Behav. 2-21 (1978).
[25] M.F. Folstein, S.E. Folstein, P.R. McHugh, “Mini-mental state”: a practical method for grading the cognitive state of patients for the clinician, J. Psychiatr. Res. 12 (1975) 189–198.

[26] E.O. Hoogendijk, O. Theou, K. Rockwood, B.D. Onwuteaka-Philipsen, D.J.H. Deeg, M. Huisman, Development and validation of a frailty index in the Longitudinal Aging Study Amsterdam, Aging Clin. Exp. Res. 29 (2017) 927–933.

[27] K. Rockwood, A. Mitnitski, Frailty in relation to the accumulation of deficits, J. Gerontol. A Biol. Sci. Med. Sci. 62 (2007) 722–727.

[28] K. Rockwood, M. Andrew, A. Mitnitski, A comparison of two approaches to measuring frailty in elderly people, J. Gerontol. A Biol. Sci. Med. Sci. 62 (2007) 738–743.

[29] X. Song, A. Mitnitski, K. Rockwood, Prevalence and 10-year outcomes of frailty in older adults in relation to deficit accumulation, J. Am. Geriatr. Soc. 58 (2010) 681–687.

[31] T.G. van Tilburg, S. Steinmetz, E. Stolte, H. van der Roest, D.H. de Vries, Loneliness and mental health during the COVID-19 pandemic: a study among Dutch older adults, J. Gerontol. B Psychol. Sci. Soc. Sci. 76 (2021) e249–e255.

[32] M. Daly, A.R. Sutin, E. Robinson, Depression reported by US adults in 2017-2018 and March and April 2020, J. Affect. Disord. 278 (2021) 131–135.

[33] M. Daly, E. Robinson, Anxiety reported by US adults in 2019 and during the 2020 COVID-19 pandemic: population-based evidence from two nationally representative samples, J. Affect. Disord. 286 (2021) 296–300.

[34] M. Lind, S. Bluck, D.P. McAdams, More vulnerable? The life story approach highlights older People’s potential for strength during the pandemic, J. Gerontol. B Psychol. Sci. Soc. Sci. 76 (2020) e45–e48.

[35] P.G. van der Velden, C. Contino, M. Das, P. van Loon, M.W.G. Bosmans, Anxiety and depression symptoms, and lack of emotional support among the general population before and during the COVID-19 pandemic. A prospective national study on prevalence and risk factors, J. Affect. Disord. 277 (2020) 540–548.

[36] L. Ramiz, B. Contrand, M.Y. Rojas Castro, et al., A longitudinal study of mental health before and during COVID-19 lockdown in the French population, Glob. Health 17 (2021) 29.

[37] S.G. Di Santo, F. Franchini, B. Filiputti, A. Martone, S. Sannino, The effects of COVID-19 and quarantine measures on the lifestyles and mental health of people over 60 at increased risk of dementia, Front. Psychiatry. 11 (2020), 578628.