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Original Study

Depressive Symptoms Among Older Adults Pre– and Post–COVID-19 Pandemic

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A B S T R A C T

Objectives: It is a concern that public health measures to prevent older people contracting COVID-19 could lead to a rise in mental health problems such as depression.
The aim of this study therefore is to examine trends of depressive symptoms before and during the COVID-19 pandemic in a large cohort of older people.
Design: Observational study with 6-year follow-up.
Setting & Participants: More than 3000 community-dwelling adults aged ≥60 years participating in The Irish Longitudinal Study on Ageing (TILDA).
Methods: Mixed effects multilevel models were used to describe trends in depressive symptoms across 3 waves of TILDA: wave 4 (2016), wave 5 (2018), and a final wave conducted July-November 2020. Depressive symptoms were measured using the 8-item Center for Epidemiologic Studies Depression Scale (CES-D), with a score ≥9 indicating clinically significant symptoms.
Results: The prevalence of clinically significant depressive symptoms at waves 4 and 5 was 7.2% [95% confidence interval (CI) 6.5, 7.9] and 7.2% (95% CI 6.5, 8.0), respectively. This more than doubled to 19.8% (95% CI 18.5, 21.2) during the COVID-19 pandemic. There was no change in CES-D scores between waves 4 and 5 (β = 0.09, 95% CI −0.04, 0.23), but a large increase in symptoms was observed during the pandemic (β = 2.20, 95% CI 2.07, 2.33). Age ≥70 years was independently associated with depressive symptoms (β = 0.45, 95% CI 0.18, 0.72) during the pandemic but not from wave 4 to 5 (β = 0.09, 95% CI −0.18, 0.36). Living with others was associated with a lower burden of symptoms during the pandemic (β = −0.40, 95% CI −0.71, −0.09) but not between waves 4 and 5 (β = −0.40, 95% CI −0.71, −0.09).
Conclusions and Implications: This study demonstrates significant increases in the burden of depressive symptoms among older people during the COVID-19 pandemic, particularly those aged ≥70 years and/or living alone. Even a small increase in the incidence of late life depression can have major implications for health care systems and societies in general. Improving access to age-attuned mental health care should therefore be a priority.

Older people have been disproportionately affected by the COVID-19 pandemic. If they contract SARS-CoV-2, older people are more likely to become unwell, to require hospitalization and to die from the illness.[1] People with COVID-19 aged 65-74 years are 3 to 5 times more likely to be admitted to hospital than younger people, with an even higher likelihood of hospital admission in those aged >75 years,[2,3] and frail, older people with COVID-19 are also more likely to develop delirium.[4] The mortality rate for hospitalized people aged ≥70 years with COVID-19 is 27% (compared with an overall mortality rate of 12%), and patients aged ≥80 years have a 60% higher risk of death compared with patients aged 70-79 years.[5]

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Older people also have been disproportionately affected by restrictions on social contact that have been implemented generally as part of public health response to the COVID-19 pandemic. Shielding or cocooning, which reduces face-to-face contact to prevent transmission of COVID-19, has generally been advised for older and other at-risk groups. In Ireland, people aged ≥70 years were advised to stay indoors, have groceries and medicines delivered, and avoid contact with friends and family in order to minimize spread within a high-risk group, delay peaks in case numbers, and relieve pressure on health services.[6]

Some recommendations remain in place for the general population at this current time, with restrictions on public gatherings, indoor dining, visits to nursing homes and hospitals, etc, though there has been some mitigation of the impact, especially on older people through initiatives from public bodies and private enterprise, including, for example, designated shopping hours for older people or family carers, and recommendation of support bubbles for those living alone.

Although the overall aim of shielding is to prevent transmission of COVID-19 within a vulnerable population, the restrictions on group exercise and social interaction, as well as the limitations lockdowns may impose on access to timely health care or other important services, may adversely affect the health of older people.[7] Given the well-established links between both social engagement and physical activity with mental health in later life,[8,9] it is a concern that although these measures may prevent older people contracting COVID-19, they could lead to a rise in problems such as depression.[10]

Several studies have demonstrated a high burden of depressive symptoms among older people during the COVID-19 pandemic, particularly in those who are cocooning or shielding.[11–13] There has not yet been a longitudinal analysis of a community-dwelling cohort of older adults to examine the changing prevalence of clinically significant depressive symptoms before and during the pandemic.

The aim of this study therefore is to examine the trend of depressive symptoms and ascertain the prevalence of clinically significant symptoms, pre and post the COVID-19 pandemic in a nationally representative cohort of community-dwelling older people. We also estimate the effect of known risk factors related to COVID-19 and related restrictions on depression during the pandemic. Our hypothesis was that factors such as age ≥70 years and living alone would have a greater influence on the likelihood of developing depressive symptoms during the COVID-19 pandemic compared with the preceding 4 years.

Methods

Study Design

This study is embedded within the Irish Longitudinal Study on Ageing (TILDA), a large population-based study of a nationally representative sample of community-dwelling older adults aged ≥50 years. The study was designed to investigate how the health, social, and economic circumstances of the older Irish population interact in the determination of "healthy" ageing.

The TILDA study design has been outlined previously[14] but in brief; the first wave of data collection (wave 1, completed in 2011) was conducted using a stratified clustered procedure to randomly sample postal addresses from the Irish Geo-Directory (a listing of all residential addresses in the Republic of Ireland). All postal addresses in Ireland were assigned to one of 3155 geographic clusters; using RANSAM (a random sampling design for Ireland), a sample of 640 of these clusters was selected stratified by socioeconomic group and geography, where all household residents aged ≥50 years were eligible to participate. Wave 4 was completed in 2016 and wave 5 was completed in 2018.

There are 3 components to data collection: a computer-assisted personal interview carried out by social interviewers in the participants' own home; a self-completion questionnaire (SCQ) completed and returned by the participant; and a comprehensive center-based health assessment or a modified home-based health assessment carried out by trained research nurses.

TILDA COVID-19 Study

When the COVID-19 pandemic reached Ireland in March 2020, TILDA was uniquely positioned to document the impact the pandemic has on the lives of older adults. TILDA surveyed its existing participants between July and November 2020.[15]

The TILDA COVID-19 Study covers a range of aspects of the lives of older adults aged ≥60 years during the first few months of the pandemic. In addition to analyzing information on changes to normal day activities due to social distancing and other restrictions on social interactions, we examine how these alterations to people's lives have impacted their physical and mental well-being.

The COVID-19 Study data were collected via SCQs. SCQs were sent to the homes of TILDA participants, and once completed, they were returned by prepaid post. Data collection took place during the early months of the pandemic, from July 2020 to November 2020. During this time, 3922 questionnaires were returned, giving a response rate of 71%.

Compared with nonrespondents, COVID survey respondents were younger [68.6 years, 95% confidence interval (CI) 68.4, 68.9, vs 71.7 years, 95% CI 71.3, 72.1; $P < .001$], less likely to be living alone (25% vs 27%), had a higher likelihood of tertiary educational (45% vs 27%), were less likely to smoke (8% vs 13%), and to have functional impairment (39% vs 11%). There were no differences in sex distribution (both 56% female).

Depressive Symptoms

Depressive symptoms were measured at waves 4 and 5 and during the COVID-19 Study using the 8-item Center for Epidemiologic Studies Depression Scale (CES-D). The CES-D-8 consists of 8 items taken from the original CES-D-20 rated on a 4-point Likert-type scale from none or almost none of the time (score 0) to all or almost or all of the time (score 3). The range of the CES-D-8 is, therefore, 0 to 24, with higher scores indicating higher depressive symptom severity. It has been shown to be consistent, reliable, and valid for use within the TILDA cohort.[16] A score ≥9 was used to define cases of clinically significant depressive symptoms, which has been demonstrated to have good sensitivity and specificity in TILDA.[17]

Covariates

Covariates were selected a priori based on previous data demonstrating an association with depressive symptoms in later life, either from within the TILDA study[18–20] or elsewhere.[21]

Detailed social and health-related data were also collected, including living arrangement (alone or with others), educational attainment (primary, secondary, or tertiary or higher), and smoking status (current, former, or never smoker). Excess alcohol consumption was assessed using the CAGE Alcohol Scale.[22] Impairment in instrumental activities of daily living was defined as self-reported number of deficits in the following activities: walking 100 m (100 yards); running or jogging about 1.5 km; sitting for about 2 hours; getting up from a chair after sitting for long periods; climbing several flights of stairs without resting; climbing one flight of stairs without resting; stooping, kneeling, or crouching; reaching or extending your arms above shoulder level; pulling or pushing large objects like a living room chair; lifting or carrying weights over 10 lb/5 kg, like a heavy bag of

groceries; and picking up a small coin from a table. Heart disease was defined as prior heart attack/myocardial infarction, congestive cardiac failure or angina, ascertained by self-report. Self-report was also elicited for chronic disease burden, with respondents asked specifically about a history of cancer, liver disease, kidney disease, thyroid problems, arthritis, or lung disease. Cognitive impairment was defined as Mini Mental State Examination score <25.[23]

Statistical Analysis

Data were analyzed using Stata (Stata 14.1, StataCorp, TX). Participant characteristics are presented for categorical variables as proportions with 95% CIs and for continuous variables as means with 95% CIs for both waves 4 and 5 and the COVID-19 Study sample.

Analyses are presented both for full samples at waves 4 and 5 (ie, including those who did not participate in the COVID-19 Study) and for participants who participated across all 3 time points (waves 4 and 5 and the COVID-19 Study). Prevalence of clinically significant depressive symptoms is also reported for those who participated at wave 4 or 5 but did not participate in the COVID-19 Study.

Mixed effects multilevel models with CES-D score as the dependent variable were used to estimate the change in burden of depressive symptoms across time points, that is, waves 4 and 5 and the COVID-19 Study. These models assessed the effect of the 2-way interaction between variables of interest, specifically age ≥70 years, sex, living alone or with others, and living in urban or in rural setting and time (variable of Interest × Time) on CES-D, which accounts for the fact that CES-D scores at wave 5 is significantly influenced by CES-D scores at wave 4 and so on. It allows us to examine the independent effect of these variables on the trend in depressive symptoms as we moved into the COVID-19 pandemic. These specific variables of interest were chosen as restrictions related to COVID-19 were aimed specifically at those aged ≥70 years and factors such as sex, living alone, or living in an urban setting may influence the effect of the pandemic and the pandemic-related restrictions could have on depressive symptom burden.

As the CES-D is based on a Likert-type scale, it has a right-skewed distribution and it is not possible to transform the data so that distribution is normalized. Given the size of the data set involved, however, breaking this assumption of normal distribution carries limited risk,[24,25] whereas the linear model used also makes interpretation easier as the coefficients refer to a unit change (ie, a point in the CES-D).

Model 1 was unadjusted, whereas Model 2 was adjusted for age, sex, educational attainment, living alone or with others, urban or rural dwelling, alcohol excess (CAGE Scale), smoking status, instrumental activities of daily living. impairment, heart disease, chronic disease burden, and cognitive impairment. These models were used to calculate average marginal effects, which were then plotted across data time points by variables of interest.

Ethics

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human subjects or patients were approved by the Trinity College Dublin Research Ethics Committee. Ethical approval for the COVID-19 Study was obtained from the Irish National Research Ethics Committee COVID-19 on June 17, 2020 (Application number: 20-NREC-COV-030-2).

Results

Table 1 shows the characteristics of TILDA participants at wave 5 and of those who also participated in the COVID-19 Study. A higher proportion of those who also participated in the COVID-19 Study were aged ≥70 years, lived in an urban setting, had tertiary and higher levels of educational attainment, and had higher rates of alcohol misuse and activities of daily living impairment. Just under 6% (196/3490) either contracted COVID-19 themselves or unfortunately lost a friend or relative to COVID-19.

The prevalence of clinically significant depressive symptoms at wave 4 was 7.2% (95% CI 6.5, 7.9) and 7.2% (95% CI 6.5, 8.0) at wave 5, rising significantly to 19.8% (95% CI 18.5, 21.2) in the early months of the COVID-19 pandemic.

When we analyze only individuals who participated in all 3 waves, that is, just the COVID-19 Study sample, the prevalence of clinically significant depressive symptoms at waves 4 and 5 and the COVID-19 Study was 5.8% (95% CI 4.1, 6.7), 5.9% (95% CI 5.1, 6.8), and 19.8% (18.5, 21.2), respectively. The prevalence of significant depressive

Table 1
Characteristics of TILDA Cohort at Wave 5 and COVID-19 Study

	Wave 5 (n = 5078)	COVID-19 Study (n = 3490)
Mean age, y	69.4 (69.2, 69.7)	69.5 (69.1, 70.0)
Proportion aged ≥70 y	46.2 (44.9, 47.6)	49.5 (47.8, 51.2)
Female sex	56.2 (54.8, 57.5)	56.1 (54.4, 57.8)
Living alone	22.5 (21.4, 23.7)	25.0 (23.6, 26.5)
Living location		
Urban	53.1 (51.7, 54.4)	56.1 (54.3, 57.8)
Rural	46.9 (45.6, 48.3)	43.9 (42.2, 45.6)
Educational attainment		
Primary	21.4 (20.3, 22.5)	15.8 (14.6, 17.1)
Secondary	39.3 (38.0, 40.6)	39.5 (37.8, 41.2)
Tertiary or higher	39.3 (38.0, 40.4)	44.7 (43.0, 46.4)
CAGE Alcohol Scale		
CAGE <2	72.5 (71.3, 73.7)	72.9 (71.4, 74.4)
CAGE ≥2	8.7 (8.0, 9.5)	9.7 (8.7, 10.7)
Did not answer	18.7 (17.7, 19.8)	17.4 (16.2, 18.7)
Smoking status		
Never smoked	46.6 (45.3, 48.0)	47.8 (45.9, 49.4)
Ex-smoker	43.1 (41.8, 44.5)	43.9 (42.2, 45.7)
Current smoker	10.3 (9.5, 11.1)	8.4 (7.5, 9.4)
Instrumental ADL impairments*		
None	95.2 (94.6, 95.8)	88.5 (87.4, 89.6)
1	2.8 (2.4, 3.3)	2.2 (1.8, 2.8)
2 or more	2.0 (1.6, 2.4)	9.3 (8.3, 10.3)
Heart disease†	8.4 (7.7, 9.2)	6.9 (6.1, 7.8)
Chronic disease burden‡		
None	50.2 (48.8, 51.6)	51.9 (50.2, 53.7)
1 chronic disease	38.2 (36.8, 39.5)	37.6 (35.9, 39.3)
≥2 chronic diseases	11.6 (10.8, 12.6)	10.5 (9.5, 11.6)
Cognitive impairment§	4.6 (4.1, 5.2)	1.9 (1.5, 2.5)

ADL, activities of daily living.
Data presented are percentages with 95% CIs.

*Defined as self-reported number of deficits in the following instrumental activities of daily living: walking 100 m (100 yards); running or jogging about 1.5 km; sitting for about 2 hours; getting up from a chair after sitting for long periods; climbing several flights of stairs without resting; climbing 1 flight of stairs without resting; stooping, kneeling, or crouching; reaching or extending the arms above shoulder level; pulling or pushing large objects like a living room chair; lifting or carrying weights >10 lb/5 kg, like a heavy bag of groceries; picking up a small coin from a table.

†Defined as prior heart attack or myocardial infarction, congestive cardiac failure, or angina, ascertained by self-report.

‡Defined as the number of the following chronic diseases: cancer, liver disease, kidney disease, thyroid problems, arthritis, or lung disease, ascertained by self-report.

§Defined as Mini Mental State Examination score <25.

symptoms in participants who participated at wave 4 or 5 but not in the COVID-19 Study was therefore higher: 9.1% (95% CI 8.9, 9.2) at wave 4 and 9.5% (95% CI 8.2, 10.9) at wave 5. Sensitivity analysis run with full case and listwise deletion show no difference in the estimates.

Changing prevalence of clinically significant depressive symptoms stratified by age ≥70 years, sex, living alone status, and urban vs rural dwelling is shown in Table 2. For those aged ≥70 years, the prevalence of depressive symptoms remained stable from wave 4 to wave 5 at 7.6% to 7.7% but rose 3-fold to almost 21% during the pandemic. Depressive symptoms were also more than 2 times higher during the COVID-19 pandemic among older people living alone compared with waves 4 and 5, with more than one-quarter meeting criteria for clinically significant symptoms during the COVID-19 pandemic.

Table 3 demonstrates the significant unadjusted increase in overall mean CES-D scores for those who participated across both waves 4 and 5 and the COVID-19 Study, with a β = 2.20 (95% CI 2.07, 2.33) reflecting an increase from wave 5 to the COVID-19 Study, whereas the increase from wave 4 to wave 5 was much lower (β = 0.09, 95% CI −0.04, 0.23). Findings were attenuated only marginally in fully adjusted models. In addition to variables of interest analyzed in 2-way models, other covariates associated with depressive symptoms in fully adjusted models were excess alcohol, smoking, functional impairment, and chronic and cardiac disease.

The 2-way interaction models shown in Table 4 outline the independent effects female sex, age ≥70 years, living with others, and urban or rural dwelling have specifically on the change in depressive symptom burden from wave 5 to during the COVID-19 pandemic for those who participated across both waves 4 and 5 and the COVID-19 Study. Age ≥70 years was independently associated with a significant rise in depressive symptoms (β = 0.45, 95% CI 0.18, 0.72) during the pandemic but not between waves 4 and 5 (β = 0.09, 95% CI −0.18, 0.36). Living with other people was independently associated with a lower burden of depressive symptoms during the pandemic (β = −0.40, 95% CI −0.71, −0.09) but not between waves 4 and 5 (β = −0.40, 95% CI −0.71, −0.09). Sex and urban or rural dwelling were not associated with change in CES-D score from waves 4 to 5 or from wave 5 to the COVID-19 pandemic.

Figure 1 demonstrates the trend in mean CES-D scores from wave 4 to 5 and then to the COVID-19 Study for those who participated across waves 4 and 5 and the COVID-19 Study. In adjusted models, the rise in CES-D score in those aged ≥70 years was greater than in those aged <70 years, with an increase from 2.9 (95% CI 2.7, 3.2) to 5.2 (95% CI 4.9, 5.4) in those aged ≥70 years compared with an increase from 3.1 (95% CI 2.8, 3.3) to 5.0 (95% CI 4.7, 5.2) in those aged <70 years.

The prevalence of significant depressive symptoms among participants who either contracted COVID-19 themselves or lost a relative or friend to COVID-19 was similar to that of the rest of the cohort (21% vs 20%, $P = .61$) and there was also no significant difference in mean CES-D scores between these groups (5.6, 95% CI 5.0, 6.2, vs 5.1, 95% CI 4.9, 5.2; $t = -1.79$; $P = .08$).

Discussion

This study measures the mean trajectory of depressive symptoms by CES-D score and the changing prevalence of clinically significant depressive symptoms in a large cohort of community-dwelling older people from TILDA wave 4 (2016) to wave 5 (2018) to during the COVID-19 pandemic (July to November 2020).

In fully adjusted models, the mean score on the 8-item CES-D was on average 2 points higher (an increase of 60%) when assessed during the COVID-19 pandemic, and the prevalence of clinically significant depressive symptoms on the CES-D, which correlates closely with clinical depression,[26] was 3-fold higher, at almost 20% of participants, when compared to TILDA waves 4 and 5.

Recent studies have outlined the impact the COVID-19 pandemic has had on mental health. A survey of almost 1500 adults aged ≥18 years found similarly that the prevalence of depressive symptoms in the United States was more than 3-fold higher during the COVID-19 pandemic compared with before.[11] Additionally, almost half of a sample of European adults aged ≥50 years reported feeling sad or depressed more often than usual during the COVID-19 lockdown.[12] Analysis of >17,500 participants aged ≥16 years in the UK Household Longitudinal Study panel further demonstrated a significant rise in the population prevalence of clinically significant levels of mental distress in April 2020 compared with 2018-2019.[13]

This study adds to this growing evidence base but crucially differs from studies to date as it includes a large, well-described exclusively older population of almost 3500 participants, identifies trends in depressive symptom burden using well-validated measures carried out pre and post the COVID-19 pandemic within the same cohort and also examines the role of specific risk factors related to COVID-19 restrictions such as age ≥70 years and living with other/alone, while adjusting for important covariates.

Between waves 4 (2016) and 5 (2018), age ≥70 years was not associated with change in CES-D score; however, between wave 5 and COVID-19 pandemic, age ≥70 years was significantly independently associated with increase in CES-D score, and therefore depressive symptom burden, after adjusting for covariates including alcohol excess, chronic disease, heart disease, and cognitive impairment.

Table 2
Prevalence of Clinically Significant Depressive Symptoms at Wave 4 and 5 and During the COVID-19 Study

	Wave 4 (n = 5832)	Wave 5 (n = 5078)	COVID-19 Study (n = 3490)
Overall	7.2 (6.5, 7.9)	7.2 (6.5, 8.0)	19.8 (18.5, 21.2)
Age			
<70 y	6.8 (5.9, 7.6)	6.9 (6.0, 7.9)	18.5 (16.7, 20.4)
≥70 y	7.7 (6.7, 8.8)	7.6 (6.5, 8.7)	20.9 (18.9, 22.8)
Sex			
Female	8.2 (7.1, 9.2)	8.4 (7.4, 9.4)	23.1 (21.1, 25.1)
Male	4.8 (3.9, 5.7)	5.8 (4.8, 6.7)	14.8 (13.0, 16.7)
Living arrangements			
Alone	10.2 (8.4, 11.9)	11.2 (9.4, 13.0)	26.1 (23.2, 29.0)
With others	5.6 (4.9, 6.4)	6.1 (5.3, 6.8)	17.7 (16.2, 19.2)
Living location			
Urban	7.3 (6.3, 8.3)	8.3 (7.2, 9.3)	20.6 (18.7, 22.5)
Rural	5.9 (5.0, 6.9)	6.0 (5.1, 7.0)	18.1 (16.1, 20.1)

Clinically significant depressive symptoms defined as an 8-item CES-D score ≥9.
Data presented are percentages with 95% CIs.

Table 3
Mixed Effects Multilevel Model With CES-D at Waves 4 and 5 and During the COVID-19 Study as Dependent Variable

	B Coefficient (95% CI)	*z*	*P*
Model 1: Unadjusted			
TILDA wave (ref: wave 4)			
Wave 5	0.09 (−0.04, 0.23)	1.37	.17
COVID-19 study	2.20 (2.07, 2.33)	33.05	<.001
Model 2: Fully adjusted			
TILDA wave: (ref: wave 4)			
Wave 5	0.05 (−0.14, 0.24)	0.53	.60
COVID-19 study	1.96 (1.77, 2.15)	20.31	<.001
Age (ref: age < 70 y)			
Age ≥70 y	−0.27 (−0.65, 0.11)	−1.39	.16
TILDA wave × Age (ref: Wave 4 × Age ≥70 y)			
Wave 5 × Age ≥70 y	0.09 (−0.18, 0.36)	0.68	.50
COVID-19 study × Age ≥70 y	0.45 (0.18, 0.72)	3.30	.001
Age, y	−0.00 (−0.03, 0.01)	−0.79	.43
Female sex	0.76 (0.55, 0.97)	7.07	<.001
Educational attainment (ref: primary)			
Secondary	−0.40 (−0.71, −0.09)	−2.51	.012
Tertiary or higher	−0.47 (−0.78, −0.15)	−2.92	.003
Living with others (ref: living alone)	−0.63 (−0.86, −0.39)	−5.18	<.001
Rural location (ref: urban location)	−0.38 (−0.58, −0.17)	−3.62	<.001
CAGE Alcohol Scale (ref: CAGE score <2)			
CAGE score ≥2	0.87 (0.53, 1.20)	5.08	<.001
Did not answer	0.43 (0.09, 0.78)	2.46	.014
Smoking status (ref: never smoked)			
Ex-smoker	0.24 (0.03, 0.46)	2.24	.025
Current smoker	0.87 (0.48, 1.25)	4.42	<.001
Instrumental ADL impairments (ref: none)*			
1	1.61 (0.95, 2.27)	4.79	<.001
2 or more	3.81 (2.63, 4.99)	6.33	<.001
Heart disease†	0.71 (0.31, 1.12)	3.46	.001
Chronic disease burden (ref: none)‡			
1 chronic disease	0.74 (0.52, 0.96)	6.63	<.001
2 or more chronic diseases	1.15 (0.80, 1.50)	6.47	<.001
Cognitive impairment§	0.59 (−0.17, 1.35)	1.53	.13

ADL, activities of daily living; ref, reference variable.

*Defined as self-reported number of deficits in the following instrumental activities of daily living: walking 100 m (100 yards); running or jogging about 1.5 km; sitting for about 2 hours; getting up from a chair after sitting for long periods; climbing several flights of stairs without resting; climbing 1 flight of stairs without resting; stooping, kneeling, or crouching; reaching or extending the arms above shoulder level; pulling or pushing large objects like a living room chair; lifting or carrying weights >10 lb/5 kg, like a heavy bag of groceries; picking up a small coin from a table.

†Defined as prior heart attack/myocardial infarction, congestive cardiac failure or angina, ascertained by self-report.

‡Defined as the number of the following chronic diseases: cancer, liver disease, kidney disease, thyroid problems, arthritis or lung disease, ascertained by self-report.

§Defined as Mini Mental State Examination score <25.

Similarly, although living with others rather than alone had no significant impact on depressive symptom burden between waves 4 and 5, living with others was associated with a significant independent reduction in CES-D score between wave 5 and the COVID-19 pandemic.

Given the relatively low number of participants in the study who contracted COVID-19 and/or who lost family members, friends, or colleagues to COVID-19, it is likely that rather than the direct effect of illness or bereavement, COVID-19 restrictions in the form of cocooning or shielding played a significant role in these trends, even more so when we consider the differential effects on people in the shielding and cocooning age groups and those living alone. Further, the substantive increase in risk of serious morbidity and mortality associated

Table 4
Two-Way Interactions with Time From Multilevel Models for Variables of Interest

	B Coefficient (95% CI)	*z*	*P*
TILDA wave × Age ≥70 y (Ref: Wave 4 × Age ≥70 y)			
Wave 5 × Age ≥70 y	0.09 (−0.18, 0.36)	0.68	.50
COVID-19 Study × Age ≥70 y	0.45 (0.18, 0.72)	3.30	.001
TILDA wave × Sex (ref: Wave 4 × Female)			
Wave 5 × Female	0.21 (−0.06, 0.48)	1.52	.13
COVID-19 Study × Female	0.26 (−0.00, 0.53)	1.93	.05
TILDA wave × Living arrangements (ref: Wave 4 × Living with others)			
Wave 5 × Living with others	−0.24 (−0.55, 0.066)	−1.54	.12
COVID-19 Study × Living with others	−0.40 (−0.71, −0.09)	−2.53	.012
TILDA wave × Living location (ref: Wave 4 × Rural dwelling)			
Wave 5 × Rural dwelling	−0.10 (−0.37, 0.17)	−0.74	.46
COVID-19 Study × Rural dwelling	0.04 (−0.23, 0.31)	0.28	.78

ref, reference variable.

Data presented are the 2-way association between change in depressive symptom burden (measured by CES-D) from wave 4 to 5 and wave 5 to 6 and variables of interest that may affect this trend (age ≥70 years, sex, living alone or with others and rural or urban dwelling) from multilevel modeling.

Analysis is adjusted for age, sex, educational attainment, living alone or with others, urban or rural dwelling, alcohol excess (CAGE Scale), smoking status, instrumental activities of daily living, impairment, heart disease, chronic disease burden, and cognitive impairment.

Wave 4 was completed in 2016, wave 5 was completed in 2018, and COVID-19 Study was completed in 2020.

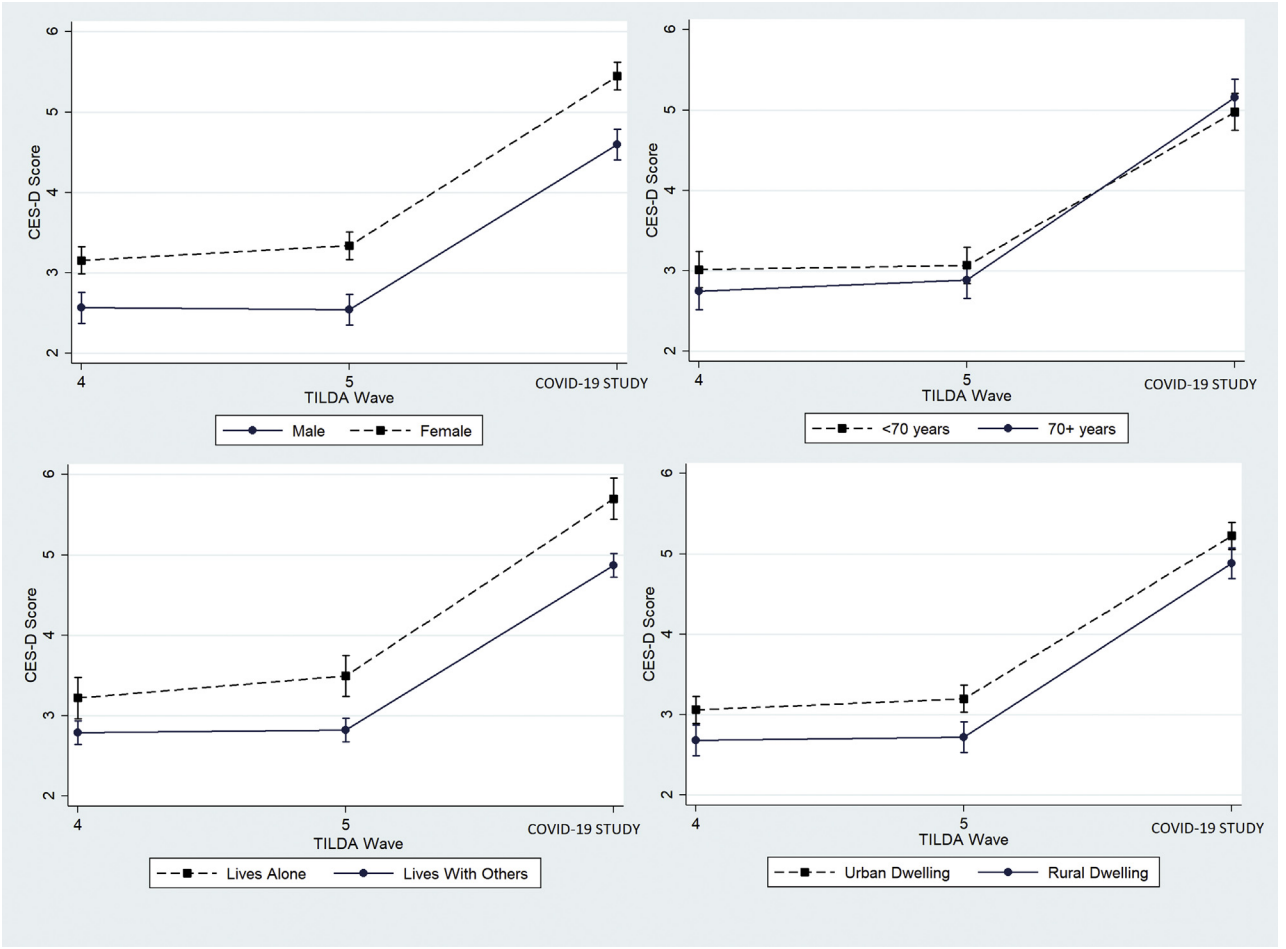

Fig. 1. Mean CES-D score from multilevel models from wave 4 to wave 5 to COVID-19. The analysis was adjusted for age, sex, educational attainment, living alone or with others, urban or rural dwelling, alcohol excess (CAGE Scale), smoking status, instrumental activities of daily living, impairment, heart disease, chronic disease burden, and cognitive impairment. Wave 4 was completed in 2016, wave 5 was completed in 2018, and the COVID-19 Study was completed in 2020.

with COVID-19 has also likely been a major stressor on older adults and contributed to the large increase in clinically significant depressive symptoms seen in the current study. The need for mitigation strategies that protect the physical health and lives of older adults is clear; however, it is essential that these strategies actively facilitate and encourage activities or behaviors that are beneficial for mental health (eg, socializing in a COVID-19–safe manner and physical activity). This is especially important for older adults aged ≥70 years and those living alone who experienced the greatest increases in depression and depressive symptoms in the current study, and older people attending ambulatory care services, 40% of whom previously reported that their mental health was worse since they began cocooning.[7]

A limitation of this study was that the CES-D was used to assess depressive symptoms, and although it has been well validated, including in the TILDA cohort,[16,17] the gold standard to establish a clinical diagnosis of depression is a diagnostic structural interview. The strengths of the study include the use of well-validated measures pre and post the COVID-19 pandemic to track depressive symptoms in a large nationally representative cohort of older people.

Conclusions and Implications

Although this study demonstrates a significant increase in the burden of depressive symptoms among older people, highlighting an important secondary impact of the COVID-19 pandemic, we do not yet know if this will persist over time. To address this, TILDA will again measure CES-D scores among the same cohort during 2021. Given the profound effect depression in later life can have on quality of life,[27] cognition,[28] health care use,[29] nursing home admission,[30] and early mortality,[31] a relatively small increase in the incidence of late life depression would have major implications for health care systems and societies in general. It is therefore critically important that we fully understand the impact of the pandemic on the mental health of older adults in the short, medium, and longer term. Improving access to age-attuned mental health assessment and care, especially for groups identified as at risk, should therefore be a priority.

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