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# SSM - Population Health

# Home confinement and mental health problems during the Covid-19 pandemic among the population aged 50 and older: A gender perspective

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## ARTICLE INFO

## ABSTRACT

Home confinement during the Covid-19 pandemic is usually associated with worsening mental health. In the case of older adults, although they have been identified as a vulnerable group in terms of mental health, the results of studies on the relationship between home confinement and mental health are not consistent and few studies have adopted a gender perspective.

Using data from the SHARE Corona Survey (2020), we aimed to analyse the role of gender on the relationship between home confinement and increased depression in individuals aged 50 and over living in Europe and Israel.

Our study shows that, although women reported increased depression/sadness during the Covid-19 pandemic more often than men, it was the latter who experienced the greatest increase.

## 1. Background

Governments of countries all around the world adopted different measures to control the Covid-19 pandemic (European Commission, 2020; Suárez-González et al., 2021), with home confinement being one of the toughest. Some of the measures, including confinement, proved to be effective in terms of controlling the spread of the virus, but led to other problems, particularly for the mental health of individuals (Ammar et al., 2021).

Due to the Covid-19 pandemic, mental health has been emphasized on international and national public health agendas (Bueno-Notivol et al., 2020). Recent studies show that depression has increased during the Covid-19 pandemic (González-Sanguino et al., 2020; Nina & Benros, 2020; Rajkumar, 2020; Rodríguez-rey et al., 2020; Xiong et al., 2020). Moreover, a meta-analysis involving studies conducted in six countries (China, India, Italy, Vietnam, United Kingdom and Denmark) shows that, compared to the period before the pandemic, the prevalence of depression increased from 3.44% in 2017 to 25% in 2020 (Bueno-Notivol et al., 2020). Home confinement, in particular, is associated with increased depression during the Covid-19 pandemic (Ammar et al., 2021; Ausín et al., 2020; Pancani et al., 2020; Parrado-González et al., 2020; Sepúlveda-Loyola et al., 2020).

Some studies indicate that older adults are a vulnerable group with regard to the mental health consequences of lockdown due to the Covid-19 pandemic (Holmes et al., 2020; Troutman-Jordan & Kazemi, 2020). The World Health Organization (2020) highlights that older adults may become more anxious and stressed during the Covid-19 pandemic. In the same vein, Krendl & Perry (2020) and Sepúlveda-Loyola et al. (2020) point out that the mental health of older people has been negatively affected due to the social distancing imposed by the pandemic. Nevertheless, García-Portilla et al. (2020) showed that people aged 60 and above were at a lower risk of developing depressive symptoms compared to the under-60s. Similarly, Czeisler et al. (2020) found that individuals aged 65 plus reported less anxiety, depression, and trauma or stress-related disorder (TSRD) compared with the younger groups. Lastly, Van Tilburg et al. (2020) concluded that the mental health of older people has remained stable during the Covid-19 pandemic.

As noted by Betron et al. (2020), the Covid-19 pandemic and home confinement are at the root of several problems experienced by individuals of both genders. However, Robb et al. (2020) found that women residing in London were more than twice as likely to feel depressed than men after lockdown. Conversely, Ren et al. (2020) found

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that only the male gender displayed increased depressive symptoms and Salfi et al. (2020) found that, in Italy, men manifested worse psychological well-being and sleep deterioration during the lockdown.

Therefore, in view of the disparate results of the studies on the effects of home confinement on the mental health of the older population (González-Sanguino et al., 2020), and the limited examination of the gender perspective, this study aims: (i) to determine the prevalence of home confinement during the pandemic in Europe and Israel by gender and country; (ii) to study the relationship between home confinement and increased depression and (iii) to analyse the role of gender on the relationship between home confinement and increased depression in individuals aged 50 and over living in Europe and Israel.

Depression is a major health problem in the older population (Padayachey et al., 2017) as it is associated with feelings of anxiety, incapacity (Girgus et al., 2017), years lived with disability (WHO, 2017), increased utilization of medical services (Padayachey et al., 2017), increased risk of mortality (Holwerda et al., 2016) and suicide deaths (WHO, 2017). It is therefore important to identify, for each gender, the extent of the mental health problems associated with the home confinement measures adopted during the pandemic.

## 2. Data and methods

### 2.1. Study population

This study uses SHARE (Survey of Health, Ageing and Retirement in Europe) Wave 8 Covid-19 data, release 1.0.0 (Börsch-Supan, 2020a), but also SHARE data from wave 8 (release 0.0.0) and wave 7 (release 7.1.0) in order to assess the level of education and chronic diseases of the individuals. For more details on the methodology, please see Börsch-Supan (2020b), Börsch-Supan et al. (2013) and Scherpenzeel et al. (2020).

From June to August 2020, a sub-sample of the SHARE respondents was interviewed by telephone (CATI interviews) to obtain information on how the pandemic had affected the older population and how this group had reacted to it.

SHARE uses representative samples of the 50+ population in each participating country. This study focuses on 51,784 respondents from 26 European countries that agreed to participate in the SHARE Corona Survey (Germany N = 2655; Sweden N = 1356; Netherlands N = 780; Spain N = 2044; Italy N = 3703; France N = 2040; Denmark N = 1980; Greece N = 3632; Switzerland N = 1880; Belgium N = 3779; Czech Republic N = 2613; Poland N = 2922; Luxemburg N = 927; Hungary N = 995; Portugal N = 1111; Slovenia N = 3110; Estonia N = 4532; Croatia N = 2005; Lithuania N = 1262; Bulgaria N = 808; Cyprus N = 784; Finland N = 1461; Latvia N = 975; Malta N = 826; Romania N = 1479; Slovakia N = 937), plus Israel (N = 1437).

The SHARE study is guided by international research ethics principles, such as the Respect Code of Practice for Socio-Economic Research and the 'Declaration of Helsinki' (World Medical Association, 2004). SHARE was reviewed and approved by the Ethics Council of the Max Planck Society, and by Ethics Councils of the participating countries.

### 2.2. Measures

Dependent variable: Increased depressive symptoms is our dependent variable. In the SHARE Corona Questionnaire, respondents were asked: "In the last month, have you been sad or depressed?". Those who answered "Yes", were then asked: "Has that been more so, less so, or about the same as before the outbreak of Corona?". Based on both questions, we constructed a new variable named "increased depressive symptoms".

This variable integrates 2 categories: *not depressed* when the respondent answered that he/she has not been sad or depressed and *depressed* when the respondent answered that he/she has been sad or depressed and this state was more intense than before the outbreak of coronavirus. To avoid problems of misclassification, those who answered "Yes" to first question and simultaneously answered "less so" or "about the same" to the second question were deleted from our sample (9.5%) in order to compare non-depressed individuals with those who reported increased depression.

Interest variable: Home confinement during the pandemic is assessed using the question "Since the outbreak of Corona, have you ever left your home?". Those who answered "Yes" were considered not to be confined to the home and those who answered "No" were considered to be confined to the home during the period March to August 2020.

Covariates: Based on a literature review, several sociodemographic, economic and health co-variables were considered in our analyses. Sociodemographic variables comprise age at the time of interview, gender and educational level classified according to the International Standard Classification of Education (ISCED-97). ISCED-97 is divided into three categories: primary schooling or less, secondary education, and post-secondary education (Litwin et al., 2014).

The economic situation of the respondent is analysed according to financial distress. These distinguished individuals who reported that they experienced "major" or "some difficulties" paying monthly expenses from those who claimed that their income meant it was "easy" or "very easy" to pay such expenses. Living alone was categorized according to household size equal to one person and household size equal or greater than two persons.

Several health variables were also controlled. Trouble sleeping was estimated by asking the question "Have you had trouble sleeping recently?". If the respondent answered "Yes", it meant that the respondent had trouble sleeping or had a recent change in pattern. The chronic conditions variable covers cardiovascular diseases, high blood pressure or hypertension, diabetes, lung diseases, cancer, hip fracture, and others. In this study, reporting at least one of the above chronic conditions is taken to mean having a chronic condition.

A positive Covid-19 test of the respondent or someone close to him/her was also introduced into the model as a co-variable. It was assessed using the question "Have you or anyone close to you been tested for the coronavirus and had a positive result, meaning that the person had the Covid disease?". This made it possible to distinguish those who had direct experience of Covid-19 infection from those who did not.

Help from someone outside the home was estimated using the question "Since the outbreak of Corona, were you helped by others from outside the home to obtain necessities, e.g. food, medication or emergency household repairs?", differentiating between those who did not receive help and those who received help in the period from March to August 2020.

Lastly, in order to take into account the country context, we also considered country as a co-variable of the model. Since Portugal is the country with the highest percentage of increased depressive symptoms (please see Fig. 2), Portugal is the reference category in the regression analysis.

### 2.3. Statistical analysis

This cross-sectional study was developed in three stages. In the first stage, the prevalence of home confinement by gender and country was calculated. In the second stage, tests for a two-group comparison (T test (t) and chi-square ($\chi2$) tests) were carried out to assess sociodemographic, economic and health differences between the home confined and not home confined groups. The statistical results of the tests with p < .05 were considered to be significant. These results were also complemented with effect size measures (Cohen's d/Phi) and Confidence Intervals (CI). Effect size measures should be used in large sample sizes because they can lead to statistically significant results even if differences between groups are small (Marôco, 2014, p. 248). The interpretation of these results was based on Cohen (1988).

In the previous descriptive analyses, calibrated individual weights were used, as the SHARE survey did not have a uniform sample design.

In the third stage, logistic regressions were performed in order to analyse the relation between home confinement and increased depression/sadness during the Covid-19 pandemic in Europe (Model 1). Lastly, an interaction term was introduced (Model 2) to analyse if gender alters the association between home confinement and increased depression/sadness.

Statistical analyses were performed using SPSS software, version 25 (IBM, 2017).

## 3. Results

Fig. 1 shows the prevalence of home confinement during the pandemic in Europe according to gender, by country. Our results indicate that Malta, Cyprus, Croatia and Italy were the countries where people over 50 were most confined to their homes. Moreover, women from Germany, Netherlands, Spain, Italy, Belgium, Israel, Czech Republic, Poland, Portugal, Slovenia, Estonia, Croatia, Lithuania, Bulgaria, Cyprus, Malta and Romania reported higher levels of home confinement than men.

The prevalence of increased depression/sadness during the pandemic according to the home confinement situation is shown in Fig. 2. The data show that increased depression/sadness during the pandemic was greater in the group who was confined to the home compared to the group not confined to the home in the following countries: Portugal (46.5% compared to 29.9%), Italy (36.8% compared to 23%), Malta (34.3% compared to 17.4%), Netherlands (33.9% compared to 14%), Lithuania (31% compared to 16.2%)%), Greece (22.7% compared to 18%), Estonia (22.5% compared to 15.7%), Czech Republic (21% compared to 10%) and Croatia (19.4% compared to 11.2%).

The characteristics of the study population according to the home confinement situation during the Covid-19 pandemic are shown in Table 1. Statistical tests for a two-group comparison showed significant differences for all the analysed variables between the group confined to the home and the group that was not confined. Overall, the group of individuals confined to the home were older (74.5 years compared to 66.5 years), had a higher percentage of women (63.3% compared to 52.5%), were less educated (64.8% with low education compared to 31.3%) and reported higher percentages of financial distress (50.3% compared to 29.7%) than the group of individuals not confined to home. Regarding the living alone situation, our data showed that the group confined to home had a higher percentage of individuals living alone compared to the group that was not confined (32.5% compared to 26.1%). Concerning health, the group confined to home had a higher

percentage of individuals who had trouble sleeping (33.4% compared to 26.4%) and a higher percentage of one or more chronic conditions (80.9% compared to 72.6%) in comparison with the group of individuals not confined to the home.

The percentage of individuals who tested positive for Covid-19 or who had someone close to them testing positive was lower in the group confined to their home than in the non-confined group (5.6% versus 10.2%). By contrast, the confined group received more help from others outside the home (40.3% compared to 19.1% of the group not confined to home).

Finally, more individuals reported increased depression/sadness during the pandemic in the group confined to home than in the other group (28.4% as against 18.9%).

In view of effect size, which measures the magnitude of the differences found, only age, education, financial distress, and help received were significant.

To test the relationship between home confinement and increased depression/sadness during the pandemic in individuals aged 50 and over living in Europe and Israel, logistic regressions were performed (Table 2).

Model 1 indicates that individuals who reported having been confined to home (OR = 1.10; 95% CI:1.02 to 1.18) had a higher odds of increased depression/sadness during the pandemic and that men (OR = 0.56; 95% CI:0.53 to 0.59) had a lower odds of increased depression/sadness. Moreover, older people, had a lower odds of increased depression/sadness. Those who reported financial distress, as well as those who lived alone, demonstrated a higher odds of increased depression/sadness. With regard to health, people who reported having trouble sleeping, one or more chronic conditions and had someone close to them test positive for Covid-19 had a higher odds of increased depression/sadness during the pandemic. In addition, individuals who reported having received help from someone outside the home also showed a higher odds of increased depression/sadness during the pandemic.

Lastly, individuals from France, Israel, Luxemburg, Slovenia, Estonia, Croatia, Bulgaria, Finland, Latvia, Romania and Slovakia were less prone to report increased depression/sadness during the pandemic than those in Portugal (reference country). Conversely, individuals from the Netherlands, Spain, Italy, Switzerland, Poland, Hungary and Malta presented a higher odds of increased depression/sadness than those in Portugal (reference country). In order to analyse whether gender alters the association between home confinement and increased depression/sadness, an interaction term (home confinement*gender) was included. Model 2 shows that the results for all variables remain stable, with the
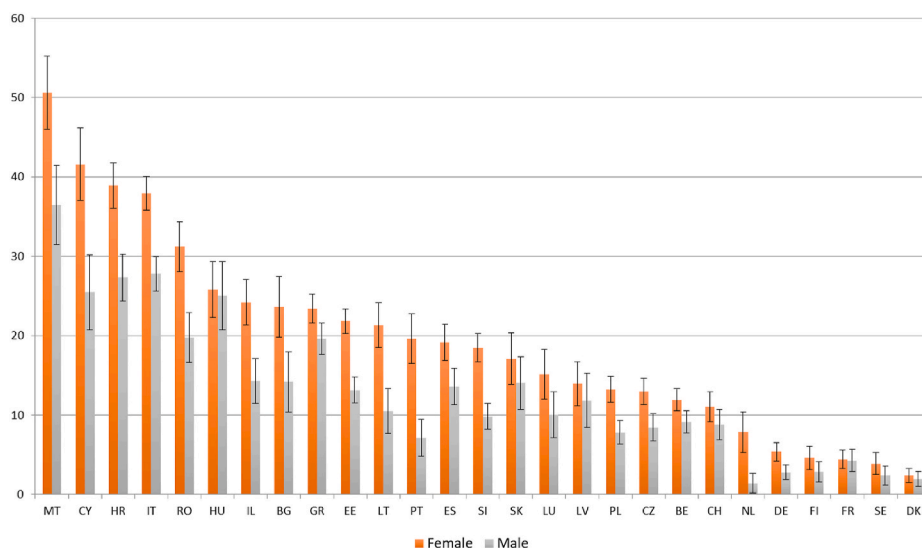


**Fig. 1.** Prevalence of home confinement during the pandemic according to gender, by country
Source: SHARE Corona Questionnaire (release 1.0.0), N = 51784.
Notes: Brackets denote 95% confidence intervals. Countries: Germany (DE); Sweden (SE); Netherlands (NL); Spain (ES); Italy (IT); France (FR); Denmark (DK); Greece (GR); Switzerland (CH); Belgium (BE); Israel (IL); Czech Republic (CZ); Poland (PL); Luxembourg (LU); Hungary (HU); Portugal (PT); Slovenia (SI); Estonia (EE); Croatia (HR), Lithuania (LT); Bulgaria (BG), Cyprus (CY), Finland (FI); Latvia (LV); Malta (MT); Romania (RO) and Slovakia (SK).
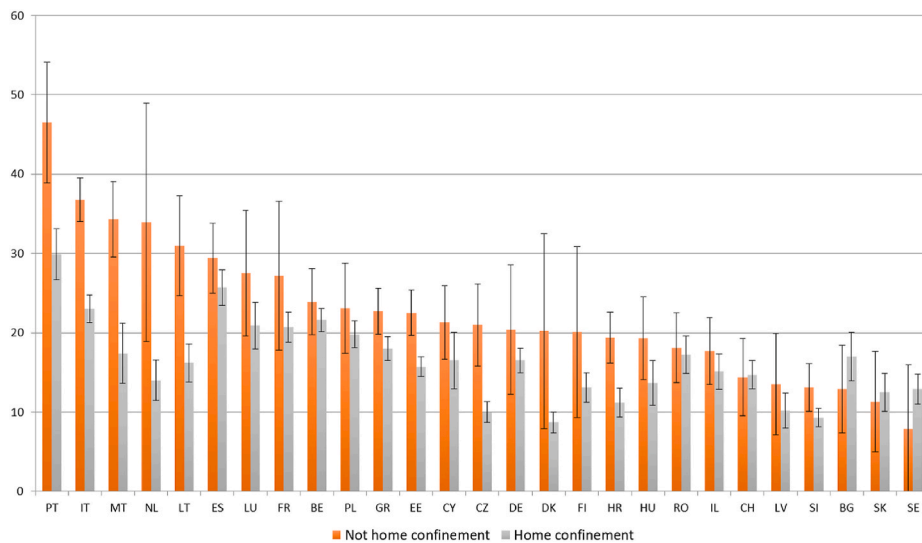
**Fig. 2.** Prevalence of increased depression/sadness during the pandemic according to the home confinement situation, by country
Source: SHARE Corona Questionnaire (release 1.0.0), N = 46647.
Notes: Brackets denote 95% confidence intervals. Countries: Germany (DE); Sweden (SE); Netherlands (NL); Spain (ES); Italy (IT); France (FR); Denmark (DK); Greece (GR); Switzerland (CH); Belgium (BE); Israel (IL); Czech Republic (CZ); Poland (PL); Luxembourg (LU); Hungary (HU); Portugal (PT); Slovenia (SI); Estonia (EE); Croatia (HR), Lithuania (LT); Bulgaria (BG), Cyprus (CY), Finland (FI); Latvia (LV); Malta (MT); Romania (RO) and Slovakia (SK).

**Table 1**
Characteristics of the study population according to the home confinement situation during the COVID-19 pandemic.

| | N | No home confinement<br>N = 42296 | Home confinement<br>N = 9488 | T/$\chi^2$ | p-value | Cohen's d/phi | 95% CI |
|---|---|---|---|---|---|---|---|
| **Age**, years mean (SD) | 51784 | 66.5 (9.4) | 74.5 (11.4) | 60.9 | p < .001 | 0.82** | 0.79–0.84 |
| **Gender** | | | | | | | |
| Female | 29902 | 52.5 | 63.3 | 195.7 | p < .001 | 0.06 | 0.05–0.07 |
| Male | 21882 | 47.5 | 36.7 | | | | |
| **Education (%)** | | | | | | | |
| Low | 16951 | 31.3 | 64.8 | 2143.0 | p < .001 | 0.21* | 0.20–0.22 |
| Medium | 18032 | 40.6 | 24.4 | | | | |
| High | 13804 | 28.1 | 10.8 | | | | |
| **Financial distress(%)** | | | | | | | |
| No | 32244 | 70.3 | 49.7 | 1018.4 | p < .001 | 0.14* | 0.13–0.15 |
| Yes | 18045 | 29.7 | 50.3 | | | | |
| **Living alone (%)** | | | | | | | |
| No | 39231 | 73.9 | 67.5 | 193.1 | p < .001 | 0.06 | 0.05–0.07 |
| Yes | 12552 | 26.1 | 32,5 | | | | |
| **Trouble sleeping** | | | | | | | |
| No | 37253 | 73.6 | 66.6 | 250.4 | p < .001 | 0.07 | 0.06–0.08 |
| Yes | 14443 | 26.4 | 33.4 | | | | |
| **Chronic conditions** | | | | | | | |
| No | 10871 | 27.4 | 19.1 | 363.7 | p < .001 | 0.09 | 0.08–0.10 |
| One or more | 37397 | 72.6 | 80.9 | | | | |
| **Anyone tested positive for COVID-19** | | | | | | | |
| No | 47716 | 89.8 | 94.4 | 110.3 | p < .001 | 0.05 | 0.04–0.06 |
| Yes | 3694 | 10.2 | 5.6 | | | | |
| **Social help received** | | | | | | | |
| No | 37882 | 80.9 | 59.7 | 2162.6 | p < .001 | 0.20* | 0.19–0.21 |
| Yes | 13867 | 19.1 | 40.3 | | | | |
| **Increased depressive symptoms** | | | | | | | |
| No | 38153 | 81.1 | 71.6 | 249.2 | p < .001 | 0.07 | 0.06–0.08 |
| Yes | 8494 | 18.9 | 28.4 | | | | |

Notes: SD: Standard Deviation; Tests for two-group comparison (i.e., T test for independent samples (t); chi-square tests (X2)); Tests for effect size: Cohen's d: *small effect (≥0.20); **medium effect (≥0.50); *** large effect (≥0.80); Phi: *small effect (≥0.10); **medium effect (≥0.30); *** large effect (≥0.50).
Source: Source: SHARE Corona Questionnaire (release 1.0.0), wave 8 (release 0.0.0) and wave7 (release 7.1.0), weighted data, N = 51784

exception of the result for home confinement during the pandemic. In fact, having been confined to home and being male (home confinement * gender) was significantly associated with increased depression/sadness during the pandemic. As shown in Fig. 3, women did not experience a significant increase in depression/sadness when confined to home. Conversely, men who were home confined experienced a significant increase in depression/sadness.

## 4. Discussion

The Covid-19 pandemic has posed unprecedented social, economic and health challenges. Home confinement was an important measure imposed by governments to control the pandemic. This study focuses on the relationship between home confinement and increased depression during the Covid-19 pandemic in European and Israeli individuals aged 50 plus, from a gender perspective.

The findings indicate a significant positive association between home confinement and increased depression/sadness during the pandemic

**Table 2**
Logistic regression models for increased depression/sadness during the Covid-19 pandemic.

| | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|
| | OR | 95% IC | p-value | OR | 95% IC | p-value |
| **Age** | 0.99 | 0.99–0.99 | * | 0.99 | 0.99–0.99 | * |
| **Gender** | | | | | | |
| Male | 0.56 | 0.53–0.59 | *** | 0.53 | 0.49–0.56 | *** |
| **Education (Low)** | | | | | | |
| Medium | 0.96 | 0.89–1.02 | | 0.95 | 0.89–1.02 | |
| High | 0.97 | 0.90–1.05 | | 0.96 | 0.89–1.04 | |
| **Financial distress** | | | | | | |
| Yes | 1.63 | 1.53–1.74 | *** | 1.63 | 1.53–1.74 | *** |
| **Living alone** | | | | | | |
| Yes | 1.17 | 1.10–1.25 | *** | 1.18 | 1.11–1.26 | *** |
| **Trouble sleeping** | | | | | | |
| Yes | 3.84 | 3.63–4.06 | *** | 3.83 | 3.62–4.05 | *** |
| **Chronic conditions** | | | | | | |
| One or more | 1.50 | 1.39–1.61 | *** | 1.50 | 1.39–1.61 | *** |
| **Anyone tested positive for COVID-19** | | | | | | |
| Yes | 1.27 | 1.15–1.41 | *** | 1.27 | 1.15–1.40 | *** |
| **Social help received** | | | | | | |
| Yes | 1.57 | 1.47–1.67 | *** | 1.57 | 1.47–1.67 | *** |
| **Home confinement** | | | | | | |
| Yes | 1.10 | 1.02–1.18 | * | 1.00 | 0.92–1.09 | |
| **Home confinement * Gender (male)** | | | | 1.36 | 1.18–1.67 | *** |
| **Country (Portugal)** | | | | | | |
| Germany | 0.90 | 0.73–1.12 | | 0.90 | 0.73–1.12 | |
| Sweden | 1.13 | 0.14–9.37 | | 1.15 | 0.14–9.55 | |
| Netherlands | 1.96 | 1.64–2.34 | *** | 1.96 | 1.64–2.34 | *** |
| Spain | 2.02 | 1.73–2.36 | *** | 2.02 | 1.73–2.35 | *** |
| Italy | 1.33 | 1.12–1.59 | ** | 1.33 | 1.11–1.58 | ** |
| France | 0.70 | 0.57–0.86 | ** | 0.70 | 0.57–0.86 | ** |
| Denmark | 0.97 | 0.82–1.15 | | 0.97 | 0.82–1.14 | |
| Greece | 0.96 | 0.79–1.16 | | 0.96 | 0.79–1.16 | |
| Switzerland | 1.34 | 1.15–1.55 | *** | 1.34 | 1.15–1.55 | *** |
| Belgium | 0.92 | 0.75–1.14 | | 0.93 | 0.75–1.14 | |
| Israel | 0.59 | 0.49–0.71 | *** | 0.59 | 0.49–0.71 | *** |
| Czech Republic | 0.99 | 0.83–1.16 | | 0.99 | 0.84–1.17 | |
| Poland | 1.31 | 1.04–1.65 | * | 1.31 | 1.04–1.65 | * |
| Luxembourg | 0.62 | 0.47–0.82 | ** | 0.62 | 0.47–0.82 | ** |
| Hungary | 1.97 | 1.60–2.43 | *** | 1.98 | 1.61–2.43 | *** |
| Slovenia | 0.47 | 0.40–0.57 | *** | 0.47 | 0.40–0.57 | *** |
| Estonia | 0.81 | 0.69–0.94 | ** | 0.81 | 0.70–0.95 | ** |
| Croatia | 0.69 | 0.57–0.84 | *** | 0.69 | 0.57–0.84 | *** |
| Lithuania | 0.86 | 0.70–1.06 | | 0.87 | 0.71–1.06 | |
| Bulgaria | 0.68 | 0.53–0.86 | ** | 0.66 | 0.53–0.87 | ** |
| Cyprus | 0.91 | 0.70–1.18 | | 0.91 | 0.70–1.18 | |
| Finland | 0.73 | 0.58–0.90 | ** | 0.72 | 0.58–0.90 | ** |
| Latvia | 0.47 | 0.36–0.60 | *** | 0.46 | 0.36–0.60 | *** |
| Malta | 1.82 | 1.47–2.26 | *** | 1.81 | 1.46–2.25 | *** |
| Romania | 0.83 | 0.68–1.01 | | 0.83 | 0.68–1.01 | |
| Slovakia | 0.66 | 0.51–0.86 | ** | 0.66 | 0.51–0.86 | ** |

Source: SHARE Corona Questionnaire (release 1.0.0), wave 8 (release 0.0.0) and wave7 (release 7.1.0), unweighted data, N = 40897 Odds ratios (ORs) with CI (Confidence Intervals 95% in parentheses) are reported: $*p < .05$; $**p < .01$; $***p < .001$.

among our study population. These results are in line with several recent studies (Ammar et al., 2021; Ausín et al., 2020; Pancani et al., 2020; Parrado-González et al., 2020; Sepúlveda-Loyola et al., 2020) high-lighting that individuals who reported being confined to home during the Covid-19 pandemic are more prone to depression. Since social interactions are crucial for mental health (Litwin et al., 2015; Litwin & Levinsky, 2021), the increase of depression/sadness in the group confined to home can be explained by the reduction of their social interactions (Ammar et al., 2020). Furthermore, enforced confinement to the home leads to a reduction of face-to-face interactions, on the one hand, and increased social contact using digital technologies, on the other (Ammar et al., 2020). A recent study underlines that face-to-face interactions exert a significant protective effect on depression, while

digital interactions have no effect in preventing depression (Litwin & Levinsky, 2021).

The findings of our study also show that women tended to report increased depression/sadness during Covid-19 more than men (Ausín et al., 2020; González-Sanguino et al., 2020; Mazza et al., 2020; Nina & Benros, 2020; O'Connor et al., 2020; Salfi et al., 2020). This results corroborate Boerma et al. (2016), who found that women tend to report poorer health than men on self-reported health indicators. Nevertheless, when considering the role of gender on the relationship between home confinement and increased depression/sadness during the pandemic, men confined to the home experienced the greatest increase in depression/sadness. This results are in line with Salfi et al. (2020), who reported that Italian men have lower levels of resilience during prolonged home confinement compared to Italian women.

Besides, according to Taylor et al. (2000), men and women tend to have different physiological and behavioural responses to stress. While men's primary response to stress is "fight-or-flight", women assume a "tend-and-befriend" pattern that relates to neuroendocrine responses to stress, and also social and cultural roles (Salfi et al., 2020; Taylor et al., 2000). In this sense, home confinement can have a greater impact on men because they have a more active social life (Arpino & Bordone, 2017; Bukov et al., 2002; Salfi et al., 2020) and also because they were forced to redefine their identity when confined to home (White, 2020). On the other hand, women are more socialised in the domestic environment (Salfi et al., 2020) and are more likely to generate and preserve social networks in stressful circumstances (Taylor et al., 2000) which may mitigate the impact of home confinement on mental health.

Additionally, social constructions of gender lead to gender health disparities (Simoni, 2014). While women tend to adopt healthier behaviours and seek more help if they have health problems, in order to reinforce the idea of masculinity and power, men usually assume less healthy behaviours and seek less help (Courtenay, 2000). According to the same author (Courtenay, 2000), by not meeting their health needs, men are taking health risks and asserting themselves as the stronger sex.

Regarding mental health, according to Needham and Hill (2010) women experience more internalizing disorders, like anxiety, stress and depression, and men more externalizing disorders, like substance use disorders and impulse control disorders. Since psychological disorders are more frequently associated with women, men tend to expect a higher loss of gender status and to report a higher degree of distress when they experience this type of disorder (Michniewicz et al., 2016). Important gender differences were also found in relation to taking psychotropic medication, with women being more likely to take this type of medication than men (Boyd et al., 2015). In addition, women seek more health information, are more aware of aspects that affect their health and more aware of potential global pandemics (Ek, 2015).

In this sense, women who are confined to home may have greater medical knowledge and more help in dealing with home confinement in comparison with men.

Our results also show that women were confined to home more than men during the pandemic. These results can partly be explained by the fact that women are more responsive to Covid-19 preventive measures (Capraro & Barcelo, 2020; Delerue Matos et al., 2021; Ferreira, 2021). Furthermore, since older women have higher levels of disability (OECD, 2020), they may have adopted more preventive behaviors. Conversely, older men are less concerned about disease and found it harder to adjust to the Covid-19 preventive measures (Barber & Kim, 2021). These results can be explained by masculinity stereotypes that suggest men should be strong, brave, independent and virile, and are not in line with the health prevention measures adopted during Covid-19 pandemic (Ferreira, 2021).

This study has some limitations. The first limitation is that depression/sadness measures are based on self-reported measures, which can be imprecise and subject to reporting bias. Secondly, as we are performing a gender analysis, the low number of individuals who were confined to home during the pandemic in some countries prevented us
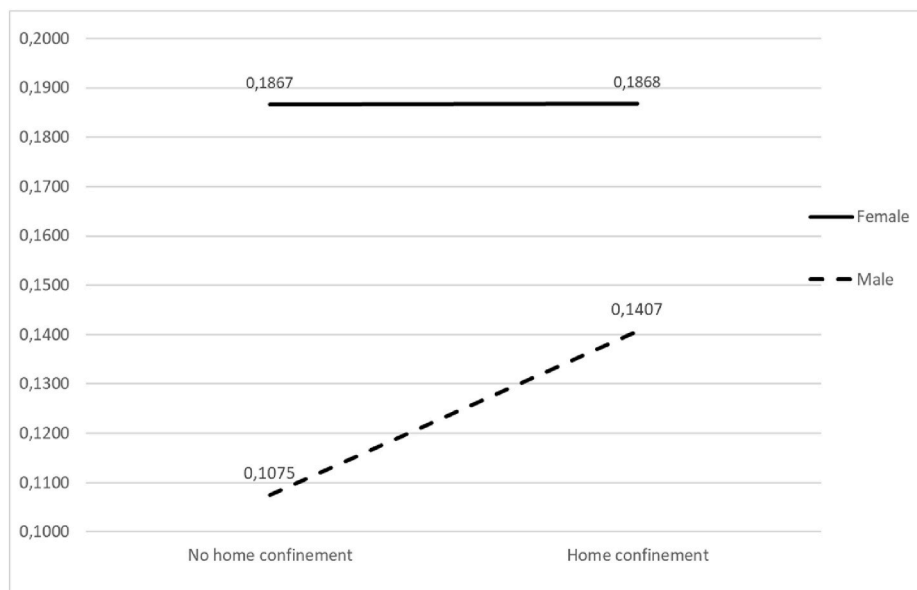
**Fig. 3.** Home confinement and increased depression/sadness according to gender
Source: SHARE Corona Questionnaire (release 1.0.0), wave 8 (release 0.0.0) and wave7 (release 7.1.0), unweighted data, N = 40897.

performing a regression analysis per country. Another limitation of our study is that the SHARE Corona Survey data does not allow us to identify the main reason for the home confinement of each individual during the pandemic, as well the duration. This limitation prevents us knowing whether the respondents were confined to home due to the pandemic or for some other reason (illness, for example), and also how long they stayed at home. Lastly, because the current study is cross-sectional, we cannot assume causality.

The study contributes to scientific knowledge insofar as it focuses on the relationship between home confinement and increased depression/sadness during the Covid-19 pandemic in relation to older adults in a large number of European countries and Israel, and from a gender perspective. In conclusion, this study found that, although women aged 50 plus reported being more confined to home and having a greater increase in depression/sadness during the Covid-19 pandemic, men aged 50 plus who reported being confined to home are at a higher risk of increased depression/sadness. Further studies are needed to investigate the longitudinal effect of home confinement on depression/sadness according to gender.

Considering that depression is one of the most common mental disorders in later life (Gennaro et al., 2019) and the fact that it is a highly disruptive and costly condition (Acciai & Hardy, 2017), the mental health of older individuals confined to the home should be a priority for policy-makers. In this regard, measures requiring home confinement should take into account the mental health risks involved and, when introduced, should be accompanied by mental health interventions, particularly for men aged 50 and over.

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**CRediT authorship contribution statement**

**Patrícia Silva:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Roles/. **Fátima Barbosa:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Roles/. **Manuela André:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Roles/. **Alice Delerue Matos:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Roles/.

**Declaration of competing interest**

None.

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