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Research Article

Levels of Depression and Anxiety Among Informal Caregivers During the COVID-19 Pandemic: A Study Based on the Canadian Longitudinal Study on Aging

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Abstract

Objectives: Studies on informal caregiving during the coronavirus disease 2019 (COVID-19) pandemic have mainly focused on subgroups of caregivers using cross-sectional or convenience samples, limiting the generalizability of findings. Conversely, this longitudinal study examines the effects of the pandemic and caregiving factors on depressive symptoms and anxiety over 9 months among informal caregivers in Canada.
Methods: This study uses data from the Baseline (2011–2015), Follow-up 1 (2015–2018), and COVID-19 Study Baseline survey (April to May 2020) and Exit surveys (September to December 2020) of the Canadian Longitudinal Study on Aging (CLSA). A total of 14,118 CLSA participants who were caregivers at Follow-up 1 and participated in the COVID-19 studies were selected. Linear mixed models were used to examine the effect of sex of caregiver, changes in caregiving (increase in caregiving hours and inability to care), and location of care (same household, another household, and health care institution) on depressive symptoms and anxiety from COVID-19 studies Baseline to Exit surveys (about 6–7 months apart).
Results: Informal caregivers reported more frequent depressive symptoms from the COVID-19 Baseline to Exit surveys, but not anxiety. Female caregivers reported greater depressive symptoms and anxiety, and male caregivers exhibited a greater increase in depressive symptoms and anxiety over time. More caregiving hours and inability to provide care were significantly positively associated with depressive symptoms and anxiety. Also, in-home caregivers reported more depressive

symptoms and anxiety than those who cared for someone in health care institution, and more anxiety than those who cared for some in another household.

Discussion: The findings shed light on the change in mental health among informal caregivers during the outset of the pandemic. The demonstrated associations between studied variables and mental health among informal caregivers provide empirical evidence for intervention programs aiming to support caregivers, particularly those who are female, and providing intensive care at home.

Keywords: Anxiety, CLSA, COVID-19, Depressive symptoms, Informal caregiving

The novel coronavirus disease 2019 (COVID-19) pandemic drastically altered the provision of informal (unpaid) care. Some informal caregivers have had to shoulder increased caregiving tasks to cover the care gap left by home care and health care systems (Irani et al., 2021). Due to ongoing safety protocols, informal caregivers often received less support from both formal and informal sources, and consequently, needed to spend more time and effort in care provision. It is well-established that greater caregiver intensity leads to worse mental health outcomes among informal caregivers (Li & Lee, 2020). Conversely, many informal caregivers had to reduce or stop visiting their care recipients due to enforced pandemic restrictions, which can also increase stress levels (Cohen et al., 2020). Indeed, many informal caregivers lost contact with their care recipients living in institutional care for periods of time during the height of the pandemic.

Informal caregivers usually experience worse mental health compared to noncaregivers, and this tends to become more severe with a longer duration of caregiving (Hoyert & Seltzer, 1992; Pinquart & Sörensen, 2003a). Cross-sectional and qualitative studies during the initial phases of the pandemic provide evidence that informal caregivers experienced greater caregiving burden and psychological distress since the outbreak of the COVID-19 pandemic (Beach et al., 2021; G. Cohen et al., 2020; S. A. Cohen et al., 2021; Park, 2021; Russell et al., 2021). Contributing factors likely include physical/distancing restrictions, lockdown of households and institutions to prevent the transmission of the virus, previous disease and health status history, as well as fear of contracting COVID-19, and perceptions of its seriousness. Research gaps remain in demonstrating linkages between caregiving and mental health outcomes during the pandemic using methodologically rigorous designs. This study examines the mental health of informal caregivers (defined as persons providing unpaid care to someone with a health condition or limitation) during the pandemic in 2020 based on a large Canadian national cohort study.

Preliminary studies of the impact of the pandemic on informal caregivers have focused on a variety of mental health outcomes and subpopulations. Informal caregivers of individuals with epilepsy report higher levels of anxiety, stress, and worse quality of sleep when compared to prepandemic levels (Reilly et al., 2021). Caregivers of persons with dementia have been found to have elevated levels of depressive symptoms peripandemic (Altieri & Santangelo, 2021),

as have caregivers of children with special needs (Dhiman et al., 2020). In addition, based on a national U.S. study, Park (2021) reported that informal caregivers, particularly long-term caregivers (i.e., more than 1 year), had worse mental health and somatic symptoms (e.g., fatigue) than noncaregivers during the pandemic. Similar findings were reported by Beach et al. (2021), who found that family caregivers experienced higher levels of anxiety, depression, sleep disturbance, and fatigue during the early stage of the pandemic (April to May 2020). However, self-reported changes in mental health outcomes or caregiver circumstances at one point during the pandemic (Cohen et al., 2021), or retrospective information (Altieri & Santangelo, 2021) provide only partial evidence; thus, longitudinal data are required to arrive at more definitive conclusions.

Early COVID-19 studies on informal caregiving have identified high-risk groups of caregivers for burden, stress, and depression, including those who are female, younger, in lower socioeconomic status, separated from family, and those providing high-intensity care in terms of hours and demands (Beach et al., 2021; Noguchi et al., 2021; Raina et al., 2021; Wade et al., 2021); however, there may be other pandemic-specific associations and nuances. For example, Beach and associates (2021) did not support an expected sex difference among caregivers regarding escalated loneliness and worry about their food and finances during the pandemic. Further, Cohen et al. (2021) found an association between a higher level of caregiving intensity and an increase in caregiving burden among only male caregivers. Thus, it is critical to further explore this aspect and other negative outcomes, such as sex differences, associated with caregiving during the COVID-19 pandemic using longitudinal data.

To address these gaps, the following research questions are addressed: (a) How is the mental health of informal caregivers affected during the COVID-19 pandemic? (b) How do changes of care provision affect caregivers' mental health during the pandemic? (c) What demographic and socioeconomic factors affect mental health during this period?

Caregiving Stress Process Model

The current study is framed by the caregiver Stress Process Model (SPM; Pearlin & Bierman, 2013; Pearlin et al., 1990), widely applied to understanding the adverse mental health and well-being outcomes of caregiving. In the SPM,

primary and secondary stressors are linked to caregiving circumstances and experiences which, if not altered or buffered, impose negative effects on emotions, physiological functioning, and well-being (Pearlin & Bierman, 2013). Primary stressors include the health conditions and various needs of care receivers, whereas secondary stressors encompass caregiver contexts, including multiple-role strain, and financial problems.

One key feature of the SPM posits that stressors can be influenced by demographic, social, and economic status (Pearlin & Bierman, 2013). Notably, women tend to experience greater expectations to provide informal care and more arduous caregiving demands. Generally, they tend to face higher hours of care, more personal care, longer duration, and complex multiple-role demands with fewer coping resources (e.g., nonpartnered status, lower socioeconomic status) than men, resulting in worse mental health outcomes (Fast et al., 2013; Li & Lee, 2019; Pinquart & Sörensen, 2006; Wister, Li, et al., 2021). Turning to the pandemic, women are known to have undertaken more family and household responsibilities, including informal caregiving (Ranji et al., 2021), although the consequences are not well-understood. Thus, this study proposes *Hypothesis 1: Female caregivers experience more depressive symptoms and anxiety than male caregivers during the pandemic (i.e., from the start of the pandemic).*

The SPM also incorporates stress accumulation and proliferation over time. One essential caregiving-related factor is caregiving intensity, usually measured by caregiving hours or caregiving tasks (Lilly et al., 2010). Informal caregivers who spend more time on caregiving tend to have limited attention for self-care, healthy behaviors, or social/leisure activities, and experience more social isolation and loneliness (Kim et al., 2014; Li et al., 2021; Schulz et al., 2016). During the pandemic, a substantial number of informal caregivers undertake more caregiving responsibilities, due to limited access to health care and community services. For instance, a recent study (Cohen et al., 2021) reported that most informal caregivers (56%) reported an increase in caregiving hours since the start of the COVID-19 pandemic. Similarly, a multicontinent survey of caregivers from Asia, Europe, and Americas reported that participants spent an average of extra 7.6 hr per week (3.7 hr/week in Germany to 15.4 hr/week in China) on caregiving compared to prepandemic (Merck KGaA, 2021). Finally, a survey conducted in Alberta, Canada, revealed that 47% of in-home caregivers and 18% of out-of-home caregivers provided at least an additional 20 hr of caregiving per week once the pandemic began (Anderson & Parmar, 2020). Thus, this study proposes *Hypothesis 2: Higher number of caregiving hours will be positively associated with more depressive symptoms and anxiety during the pandemic.*

Previous studies have also connected feeling unable to care for others with negative emotional states (Lai, 2007; Unson et al., 2016). During the pandemic, informal caregivers face a myriad of barriers to visit their family members or friends in other residences, particularly health care institutions due to public health restrictions. Informal caregivers also experience more difficulties in coordinating with health care providers to support their family members due to appointment cancellation or challenges in accessing regular health care or supportive programs (Dang et al., 2020). We propose to test *Hypothesis 3: The inability to provide care will be positively associated with more depressive symptoms and anxiety during the pandemic.*

Finally, the location of care provision is particularly critical during the COVID-19 pandemic due to extensive public health infection mitigation policies that were instituted unevenly across locations. Prepandemic evidence on the association between location of care and the mental health of caregivers is equivocal. Some research suggests that caregiving in the same household (compared to another household or institution) is associated with greater caregiver burden, higher depression, and lower well-being due to greater intensity (Lee et al., 2020; Schulz et al., 2016). Other research shows a decrease in burden and depressive symptoms among informal caregivers after nursing home admission of care receivers (Gaugler et al., 2009), or no change (Lieberman & Fisher, 2001). During the pandemic, feelings of loss or guilt were likely exacerbated by the inability to provide needed care due to physical distancing and stay-at-home policies, such as navigating complex health care services. These frustrations can lead to psychological distress. Therefore, this study tests *Hypothesis 4: The physical location of the care receiver will be associated with more depressive symptoms and anxiety, and is expected to be highest when it is the same household, followed by an institution, and in a different household.*

Method

Data and Sample

This study is based on data from the Canadian Longitudinal Study on Aging (CLSA), including the CLSA Baseline (2011–2015), Follow-up 1 (FUP1, 2015–2018), CLSA COVID-19 Questionnaire Study Baseline (COVID-B, April 2020 to May 2020) and Exit (COVID-E, September 2020 to December 2020) surveys. The CLSA is a population-based national population study with 51,338 participants aged between 45 and 85 years when recruited at Baseline between 2011 and 2015 (Raina et al., 2019). The CLSA collects data on multifaceted dimensions of health during the aging process and covers a wide range of topics. The CLSA data are comprised of two cohorts of participants: the Comprehensive cohort and Tracking cohort. Detailed information about the CLSA is reported elsewhere (Raina et al., 2009, 2019), and on the CLSA website (www.clsa-elcv.ca).

A total of 44,817 participants were included in FUP1. After the outbreak of pandemic, the CLSA launched the COVID-19 study in April 2020 to examine the impact

of the pandemic on the lives of older adults. A total of 28,559 CLSA participants (67.2% of the eligible sample) took part in the COVID-B survey, of whom 24,114 completed the COVID-E survey. Participants were identified as an informal caregiver based on the CLSA FUP1 question "During the past 12 months, have you provided any of the following types of assistance to another person because of a health condition or limitation?" The types of assistance include: personal care, medical treatment, scheduling or coordinating care-related tasks, meal preparation/cleanup and house cleaning/laundry/sewing, house maintenance or outdoor work, transportation, social/emotional support, mobility, monetary assistance or financial management, and others. This measurement approach was necessary, because the COVID-19 study surveys did not ask this question. A total of 23,563 participants reported providing at least one type of support and were identified as informal caregivers from CLSA FUP1. Of these, a total of 14,118 participated in the COVID-19 studies in 2020 (14,118 completed the COVID-B survey, and 11,945 completed the COVID-E survey). In our study, we utilize the sample of 14,118 informal caregivers. Figure 1 details all sample sizes and attrition across the surveys.

Measures

Mental health is assessed using depressive symptoms and anxiety scales. Depressive symptoms were measured by the Center for Epidemiological Studies—Depression (CES-D 10) scale (Andresen et al., 1994). The CES-D 10 contains 10 items asking people's feelings (in the past week), regarding loneliness, hopefulness, and restlessness, etc. and has been used extensively in caregiver research (Pinquart & Sörensen, 2003a, 2006). The CES-D 10 score ranges from 0

Figure 1. Final study sample selection flow chart. CLSA = Canadian Longitudinal Study on Aging; COVID-19 = coronavirus disease 2019; FUP1 = Follow-up 1.

to 30, and higher scores indicate higher levels of depressive symptoms. Anxiety was measured using the Generalized Anxiety Disorder (GAD-7) scale (Spitzer et al., 2006), commonly used in caregiving studies (Loh et al., 2020). The GAD-7 score ranges from 0 to 21 based on seven items regarding the feelings of nervousness, worrying, or irritation and so on, and higher scores indicate higher anxiety levels. Both CES-D 10 and GAD-7 information were collected at the CLSA COVID-B and COVID-E surveys.

Four primary independent variables were analyzed, including sex, increased caregiving hours, inability to provide care, and the location of care. Sex was measured as male and female. Increased caregiving hours and inability to provide care were captured by the following question "Which of the following have you experienced during the COVID-19 pandemic?" Participants provided binary responses (Yes or No) to two caregiving-related items, including: "Increased time caregiving" and "Unable to care for people who require assistance due to health condition or limitation." The information related to increased caregiving hours and unable to provide care was collected at the CLSA COVID-B and COVID-E surveys. The location of care information was extracted from the CLSA FUP1, including the same household, another household, and a health care institution.

Several demographic and socioeconomic background characteristics of participants were also included as covariates. Table 1 shows data for all variables for the CLSA surveys. Age of participants was grouped into three age ranges, including 50–64 years old, 65–74 years old, and 75 years and older. Marital status includes two categories: unmarried (single, widowed, divorced, and separated) and married/common-law (married/living with a partner in a common-law relationship). Highest educational attainment was measured at Baseline using six levels, and regrouped into three levels: no postsecondary education (no postsecondary degree), some postsecondary education (trade certificate or diploma, nonuniversity certificate, university certificate below bachelor's degree), and university degrees (bachelor's degree, university degree above bachelor's degree). Work status was dichotomized into employed and unemployed/retired. Personal income was initially measured at five levels, including less than $20,000, $20,000–$49,999, $50,000–$99,999, $100,000–$149,999, and $150,000 and more, and the last two categories were regrouped into one due to small numbers. Living area of participants was represented by rural and urban areas. The country of birth was characterized as born in Canada or foreign-born.

Two key prepandemic caregiving factors were also included in the data analysis: number of care receivers, and caregiving hours per week provided to the main care receiver. The number of care receivers was categorized as: one care receiver and two care receivers or more. The actual number of caregiving hours per week provided to the main care receiver was recorded and in our analyses we collapsed this variable into two levels due to the skewed distribution:
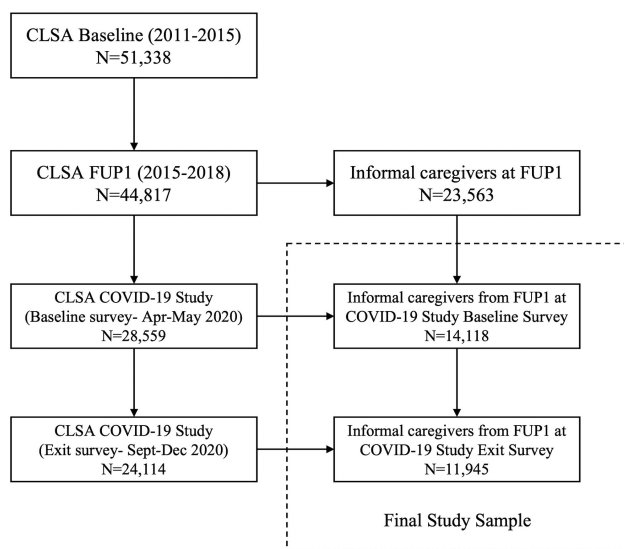
Table 1. Studied Variables and CLSA Sources

	Baseline	FUP1	COVID-B survey	COVID-E survey
Sex			✓	
Age			✓	
Marital status		✓		
Education	✓			
Work status			✓	
Income		✓		
Living area			✓	
Country of birth	✓			
Number of care receivers		✓		
Caregiving hours per week		✓		
Location of care		✓		
Increase caregiving hours			✓	✓
Unable to care			✓	✓
Depressive symptoms		✓	✓	✓
Anxiety			✓	✓

Notes: CLSA = Canadian Longitudinal Study on Aging; COVID-B = COVID-19 Baseline; COVID-E = COVID-19 Exit; FUP1 = Follow-up 1.

fewer than 5 hr per week, and 5 hr or more per week. In addition, when modeling the depressive symptoms during the COVID-19 surveys, prepandemic depressive symptoms measured at FUP1 were included as a covariate to adjust for prepandemic levels. The CLSA did not collect data related to anxiety at either CLSA Baseline or FUP1, so we are not able to control prepandemic anxiety in modeling this outcome during the COVID-19 surveys.

Data Analytic Procedure

SPSS version 26 was used for all data analyses. Demographic and socioeconomic background of participants, caregiving experience, and levels of depressive symptoms and anxiety during the COVID-19 pandemic are shown in Table 2. In addition, bivariate analyses were conducted to examine group differences (sex and location of care) across all variables (see Tables 2 and 3).

The linear mixed models (LMMs; Brown & Prescott, 2015) were applied to perform the multivariable longitudinal analysis of the mental health outcomes among selected participants. The LMM is designed to analyze data with clustered or repeated observations. The LMM is widely used with repeated measures due to its merits in adjusting the random effects from repeated measures on the same subject, and the within-subject and between-subject variability. During the modeling, the two time points of data on depressive symptoms and anxiety were analyzed as dependent variables. LMM also captures the effect of both time-invariant factors (e.g., sex) and the time-variant factors (e.g., caregiving changes in this study). Therefore, the COVID survey time point (Baseline, Exit) was included in the data analysis to model change in mental health. In this study, sex, caregiving changes (increase in caregiving hours and unable to care), and the location of care are focal

variables. Interaction terms between these four variables and the survey time point were incorporated in the analysis to model the effects of the primary independent variables on the change in mental health measures among informal caregivers between COVID-B and COVID-E survey (approximately 6–7 months apart). LMM has the technical function to estimate missing data for different time points on the outcome variables, and listwise deletion was used for independent variables (e.g., demographic factors) with missing cases.

Two models were used to examine associations with the change in mental health outcomes. In Model 1, the survey factors (survey time point and cohorts), demographic and socioeconomic factors, and prepandemic caregiving situation were included, and in Model 2, the caregiving changes during pandemic were added. The Akaike Information Criterion was compared to estimate the model fit, and a lower number indicates a better model fit. In addition, the full model was tested among each subgroup based on sex (female and male), and location of care (same household, another household, and health care institution) to explore the group-specific associations.

Results

Among the included 14,118 participants, the majority were female (56%), aged between 50 and 64 years old (40%), married (73%), educated with university degrees (48%), earning an annual personal income of $50,000–$99,000 (37%), retired (70%), living in urban areas (82%), and born in Canada (85%). Everyone in the sample reported being an informal caregiver before the pandemic (based on CLSA FUP1 data), and 56% of them provided care to one family member or friend, and about four-fifths (78%) spent fewer than 5 hr per week caring for others. Most of the

Table 2. Background Characteristics of Informal Caregivers and Sex Differences

	All caregivers ($N = 14,118$) ns/% or mean (SD)	Female caregivers ($n = 7,915$) ns/% or mean (SD)	Male caregivers ($n = 6,203$) ns/% or mean (SD)	χ^2 (df)/t test (df)
Sex		—	—	—
Female	7,915/56.06			
Male	6,203/43.94			
Age				16.15 (2)***
50–64 years old	5,630/39.88	3,256/41.14	2,374/38.27	
65–74 years old	5,101/36.13	2,846/35.96	2,255/36.35	
75 years and older	3,387/23.99	1,813/22.91	1,574/25.37	
Marital status				507.05 (1)***
Unmarried	3,880/27.50	2,768/34.99	1,112/17.94	
Married/common-law	10,229/72.50	5,142/65.01	5,087/82.06	
Education				106.56 (2)***
No postsecondary education	2,849/20.20	1,688/21.34	1,161/18.74	
Some postsecondary education	4,474/31.72	2,720/34.39	1,754/28.31	
University degrees	6,783/48.09	3,502/44.27	3,281/52.95	
Work status				33.22 (1)***
Employed	4,077/29.57	2,133/27.59	1,944/32.10	
Unemployed/retired	9,711/70.43	5,599/72.41	4,112/67.90	
Income				992.85 (3)***
Less than $20,000	1,672/12.37	1,331/17.82	341/5.64	
$20,000–$49,999	4,843/35.83	3,048/40.80	1,795/29.69	
$50,000–$99,999	4,954/36.65	2,402/32.15	2,552/42.22	
$100,000 and more	2,047/15.15	690/9.24	1,357/22.45	
Living area				7.45 (1)**
Rural and DA	2,490/17.72	1,456/18.50	1,034/16.73	
Urban area	11,559/82.28	6,413/81.50	5,146/83.27	
Country of birth				18.31 (1)***
Canada	12,026/85.22	6,832/86.35	5,194/83.77	
Foreign born	2,086/14.78	1,080/13.65	1,006/16.23	
Number of care receivers				4.65 (1)*
1 care receiver	7,849/55.65	4,338/54.85	3,511/56.67	
2 care receivers or more	6,256/44.35	3,571/45.15	2,685/43.33	
Caregiving hour/week for main receiver				113.37 (1)***
Fewer than 5 hr	10,648/77.97	5,714/74.62	4,934/82.23	
5 hr or more	3,009/22.03	1,943/25.38	1,066/17.77	
Dwelling location of main receiver				63.35 (2)***
Same household with caregiver	3,263/23.11	1,635/20.66	1,628/26.25	
Out of caregiver's household	9,287/65.78	5,400/68.22	3,887/62.66	

Table 2. Continued

	All caregivers (N = 14,118) ns/% or mean (SD)	Female caregivers (n = 7,915) ns/% or mean (SD)	Male caregivers (n = 6,203) ns/% or mean (SD)	χ^2 (df)/t test (df)
Health care institution	1,568/11.11	880/11.12	688/11.09	
Depressive symptoms (FUP1)	4.94 (4.45)	5.34 (4.72)	4.43 (4.01)	12.30***
COVID-19 Baseline survey				
Depressive symptoms (CES-D 10)	6.16 (5.22)	6.79 (5.50)	5.37 (4.73)	16.24 (13,551)***
Anxiety (GAD-7)	2.81 (3.67)	3.21 (3.92)	2.31 (3.28)	14.22 (12,883)***
Increase caregiving hours				24.70 (1)***
No	10,782/89.34	6,093/88.14	4,689/90.96	
Yes	1,286/10.66	820/11.86	466/9.04	
Unable to provide care				13.43 (1)***
No	9,858/81.69	5,570/80.57	4,288/83.18	
Yes	2,210/18.31	1,343/19.43	867/16.82	
COVID-19 Exit survey				
Depressive symptoms (CES-D 10)	6.29 (5.28)	6.82 (5.54)	5.58 (4.83)	12.99 (11,493)***
Anxiety (GAD-7)	2.68 (3.49)	3.01 (3.68)	2.25 (3.19)	11.56 (10,995)***
Increase caregiving hours				34.47 (1)***
No	10,184/86.25	5,697/84.64	4,487/88.40	
Yes	1,623/13.75	1,034/15.36	589/11.60	
Unable to provide care				17.02 (1)***
No	10,400/88.08	5,857/87.02	4,543/89.50	
Yes	1,407/11.92	874/12.98	533/10.50	

Notes: CES-D 10 = Center for Epidemiological Studies—Depression scale; COVID-19 = coronavirus disease 2019; DA = dissemination area; FUP1 = Follow-up 1; GAD-7 = Generalized Anxiety Disorder scale; *SD* = standard deviation.

*p < .05. **p < .01. ***p < .001.

Table 3. Basic Background of Informal Caregivers and Differences Among Participants Providing Care to Others in Different Locations

	All caregivers (N = 14,118) ns/% or mean (SD)	Same household (a) (n = 3,263) ns/% or mean (SD)	Another household (b) (n = 9,287) ns/% or mean (SD)	Health care institution (c) (n = 1,568) ns/% or mean (SD)	χ^2 (df)/F (df)
Sex					63.35 (2)***
Female	7,915/56.06	1,635/50.11	5,400/58.15	880/56.12	
Male	6,203/43.94	1,628/49.89	3,887/41.85	688/43.88	
Age					172.21 (4)***
50–64 years old	5,630/39.88	1,101/33.74	3,952/42.55	577/36.80	
65–74 years old	5,101/36.13	1,125/34.48	3,331/35.87	645/41.14	
75 years and older	3,387/23.99	1,037/31.78	2,004/21.58	346/22.07	
Marital status					539.37 (2)***
Unmarried	3,880/27.50	383/11.74	3,046/32.82	451/28.80	
Married/common-law	10,229/72.50	2,879/88.26	6,239/67.18	1,115/71.20	
Education					16.10 (4)**
No postsecondary education	2,849/20.20	715/21.93	1,856/20.00	278/17.74	
Some postsecondary education	4,474/31.72	978/30.00	2,999/32.32	497/31.72	
University degrees	6,783/48.09	1,567/48.07	4,424/47.68	792/50.54	
Work status					20.77 (2)***
Employed	4,077/29.57	868/27.25	2,799/30.84	410/26.83	
Unemployed/retired	9,711/70.43	2,317/72.75	6,276/69.16	1,118/73.17	
Income					21.38 (6)**
Less than $20,000	1,672/12.37	437/14.08	1,053/11.83	182/12.06	
$20,000–$49,999	4,843/35.83	1,158/37.32	3,147/35.34	538/35.65	
$50,000–$99,999	4,954/36.65	1,064/34.29	3,344/37.56	546/36.18	
$100,000 and more	2,047/15.15	444/14.31	1,360/15.27	243/16.10	
Living area					12.67 (2)**
Rural and DA	2,490/17.72	613/18.91	1,647/17.81	230/14.74	
Urban area	11,559/82.28	2,629/81.09	7,600/82.19	1,330/85.26	
Country of birth					40.91 (2)***
Canada	12,026/85.22	2,671/81.88	7,979/85.96	1,376/87.76	
Foreign born	2,086/14.78	591/18.12	1,303/14.04	192/12.24	
Number of care receivers					283.43 (2)***
1 care receiver	7,849/55.65	2,221/68.13	4,742/51.12	886/56.51	
2 care receivers or more	6,256/44.35	1,039/31.87	4,535/48.88	682/43.49	
Caregiving hour/week for main receiver					1,015.91 (2)***
Fewer than 5 hr	10,648/77.97	1,807/58.31	7,716/85.51	1,125/73.29	
5 hr or more	3,009/22.03	1,292/41.69	1,307/14.49	410/26.71	
Depressive symptoms (FUP1)	4.94 (4.45)	5.42 (4.71)	4.78 (4.32)	4.91 (4.55)	24.24 (2)***; a > b, c

Table 3. Continued

	All caregivers (N = 14,118) ns/% or mean (SD)	Same household (a) (n = 3,263) ns/% or mean (SD)	Another household (b) (n = 9,287) ns/% or mean (SD)	Health care institution (c) (n = 1,568) ns/% or mean (SD)	χ^2 (df)/F (df)
COVID-19 survey Baseline					
Depressive symptoms (CES-D 10)	6.16 (5.22)	6.44 (5.38)	6.10 (5.18)	5.95 (5.11)	6.23 (2)**; a > b, c
Anxiety (GAD-7)	2.81 (3.67)	2.89 (3.70)	2.80 (3.68)	2.69 (3.58)	1.44 (2)
Increase caregiving hours					76.31 (2)***
No	10,782/89.34	2,339/85.21	7,176/90.09	1,267/93.30	
Yes	1,286/10.66	406/14.79	789/9.91	91/6.70	
Unable to provide care					108.30 (2)***
No	9,858/81.69	2,413/87.91	6,414/80.53	1,031/75.92	
Yes	2,210/18.31	332/12.09	1,551/19.47	327/24.08	
COVID-19 survey Exit					
Depressive symptoms (CES-D 10)	6.29 (5.28)	6.69 (5.49)	6.15 (5.20)	6.23 (5.27)	10.39 (2)***; a > b, c
Anxiety (GAD-7)	2.68 (3.49)	2.91 (3.70)	2.60 (3.42)	2.64 (3.47)	7.48 (2)**; a > b
Increase caregiving hours					47.70 (2)***
No	10,184/86.25	2,241/82.57	6,762/86.95	1,181/89.74	
Yes	1,623/13.75	473/17.43	1,015/13.05	135/10.26	
Unable to provide care					30.73 (2)***
No	10,400/88.08	2,461/90.68	6,821/87.71	1,118/84.95	
Yes	1,407/11.92	253/9.32	956/12.29	198/15.05	

Notes: CES-D 10 = Center for Epidemiological Studies—Depression scale; COVID-19 = coronavirus disease 2019; DA = dissemination area; FUP1 = Follow-up 1; GAD-7 = Generalized Anxiety Disorder scale; SD = standard deviation.

*p < .05. **p < .01. ***p < .001.

participants provided caregiving in another private household (66%), about 23% in the same household, and the remaining 11% to institutionalized residents.

Table 2 illustrates group differences between male and female participants. Females reported significantly higher depressive symptoms than males at FUP1 ($t = 12.30$, $p < .001$), and for both COVID-B survey ($t = 7.35$, $p < .001$) and COVID-E survey ($t = 4.98$, $p < .001$) periods. A similar pattern is observed for the anxiety score when comparing female to male participants ($t = 9.91$, $p < .001$ for COVID-B survey and $t = 8.33$, $p < .001$ for COVID-E survey). At the COVID-B survey, a significantly higher proportion of female participants increased their caregiving hours (12% vs 9%, respectively), and felt that they were unable to provide care to others (19% vs 17%, respectively) compared to males. This situation remained at the COVID-E survey, where a slightly higher proportion of female participants reported caregiving changes during the pandemic (15% vs 12% for increase caregiving hours, and 13% vs 11% for unable to care). Statistically significant differences were also found between male and female participants regarding demographic and socioeconomic characteristics and prepandemic caregiving situation (see Table 2).

The group differences based on the location of care are shown in Table 3. Participants providing in-home care reported significantly higher depressive symptoms at FUP1 ($F = 24.24$, $p < .001$), and for both the COVID-B survey ($F = 6.23$, $p < .01$) and COVID-E survey ($F = 10.39$, $p < .001$) than those who provided care to someone in another household or health care institution. At the COVID-B survey, the anxiety scores among participants were not significantly different based on the location of care. During the COVID-E survey, participants living with the care receiver in the same household reported significantly higher anxiety scores than those whose care receivers live in another household ($F = 7.48$, $p < .01$). Additionally, at both the COVID-B and COVID-E survey, participants providing care at home reported increased caregiving hours (15% for COVID-B survey, and 17% for COVID-E survey) than those providing care outside of the home or in a long-term care institution. Also, significantly higher proportions of participants supporting someone in a health care institution expressed inability to provide care (24% at COVID-B survey, and 15% at COVID-E survey).

The results of the longitudinal analyses of depressive symptoms and anxiety from COVID-B to COVID-E survey periods are shown in Table 4 (only final Model 2 results are described). Participants reported significantly higher depressive symptoms at the COVID-E survey compared to the COVID-B survey (estimate = 0.27, $p < .05$), but not anxiety score. Also, female participants reported a higher level of depressive symptoms than males at the COVID-B survey (estimate = 0.80, $p < .001$), but a smaller number of depressive symptoms from the COVID-B to COVID-E survey period than males (estimate = −0.20, $p < .05$). There was a similar finding for anxiety, where female participants

had a higher level of anxiety at the COVID-B survey (estimate = 0.72, $p < .001$), but a lower increase rate over time compared to males (estimate = −0.14, $p < .05$). Overall, based on the main effect for sex, and its interaction effects with survey time point, female caregivers tended to report higher levels of depressive symptoms and anxiety than male caregivers during the period of COVID-19 study.

Compared to participants who did not report an increase in caregiving hours, those spending more time on caregiving than the prepandemic period reported higher number of depressive symptoms (estimate = 0.72, $p < .001$), and anxiety scores (estimate = 0.80, $p < .001$). However, we did not find evidence to support the interaction between increased caregiving hours and the survey time point. The inability to provide care during the pandemic was also positively related to higher depressive symptom level (estimate = 0.59, $p < .001$), and anxiety (estimate = 0.62, $p < .001$), although a longitudinal effect was not supported. Also, participants who provided care to someone in a health care institution reported lower levels of depressive symptoms than those who lived with their care receivers in the same household (estimate = −0.37, $p < .05$). Participants providing care to someone in another household or health care institution (compared to the caregiver's household) reported lower anxiety scores (estimate = −0.28, $p < .01$ for another household, and estimate = −0.36, $p < .01$ for health care institutes). However, the longitudinal effect of the location of care was not supported in the full model. Figures 2 and 3 show plotted interactions between survey time point and sex, location of care, increasing caregiving hours, and unable to care.

Most of the demographic and socioeconomic covariates and prepandemic caregiving intensity indicators were found to be associated with depressive symptoms and/or anxiety. Compared to participants aged 50–64 years old, those who were aged between 65 and 74 years old (estimate = −0.43, $p < .001$ for depressive symptoms; estimate = −0.48, $p < .001$ for anxiety) and 75 years and older (estimate = −0.62, $p < .001$ for depressive symptoms; estimate = −0.81, $p < .001$ for anxiety) reported significantly lower levels of depressive symptoms and anxiety. Unmarried participants reported higher depressive symptoms than those who were married (estimate = 0.36, $p < .001$), but not anxiety. Compared to participants with university degrees, those with some postsecondary education (diploma/certificate; estimate = −0.29, $p < .01$) or no postsecondary education (estimate = −0.39, $p < .001$) reported lower levels of depressive symptoms. Employed participants experienced a higher level of depressive symptoms (estimate = 0.24, $p < .05$) and anxiety (estimate = 0.32, $p < .001$) compared to those not in the labor market. Participants with lower levels of income (less than $20,000: estimate = 0.37, $p < .05$ for depressive symptoms, estimate = 0.72, $p < .001$ for anxiety; $20,000–$49,000: estimate = 0.26, $p < .05$ for depressive symptoms, estimate = 0.24, $p < .05$ for anxiety; $50,000–$99,999: estimate = 0.34, $p < .01$ for depressive

Table 4. Linear Mixed Model for Levels of Depressive Symptoms and Anxiety Among Informal Caregivers During COVID-19 Pandemic

	Depressive symptoms		Anxiety	
	Model 1 Estimate [95% CI]	Model 2 Estimate [95% CI]	Model 1 Estimate [95% CI]	Model 2 Estimate [95% CI]
COVID Survey time point (Baseline)				
Exit	0.41*** [0.22, 0.59]	0.27* [0.06, 0.47]	0.09 [−0.05, 0.23]	−0.03 [−0.18, 0.12]
CLSA cohort (Tracking)				
Comprehensive	0.27** [0.11, 0.42]	0.28*** [0.12, 0.44]	−0.04 [−0.17, 0.08]	−0.05 [−0.18, 0.07]
Sex (Male)				
Female	0.81*** [0.65, 0.98]	0.80*** [0.63, 0.98]	0.78*** [0.65, 0.91]	0.72*** [0.58, 0.85]
Sex × Survey time point (Male)				
Female	−0.16 [−0.32, 0.01]	−0.20* [−0.37, −0.03]	−0.14* [−0.26, −0.02]	−0.14* [−0.26, −0.01]
Age (50–64 years old)				
65–74 years old	−0.49*** [−0.67, −0.31]	−0.43*** [−0.61, −0.25]	−0.55*** [−0.70, −0.41]	−0.48*** [−0.63, −0.34]
75 years and older	−0.69*** [−0.91, −0.48]	−0.62*** [−0.84, −0.40]	−0.89*** [−1.06, −0.72]	−0.81*** [−0.98, −0.63]
Marital status (Married/common-law)				
Unmarried	0.31*** [0.15, 0.48]	0.36*** [0.19, 0.53]	0.08 [−0.05, 0.21]	0.12 [−0.01, 0.26]
Education (University degrees)				
No postsecondary education	−0.37*** [−0.57, −0.18]	−0.39*** [−0.59, −0.19]	−0.06 [−0.21, 0.10]	−0.05 [−0.21, 0.47]
Some postsecondary education	−0.30*** [−0.47, −0.14]	−0.29* [−0.46, −0.12]	0.02 [−0.11, 0.16]	0.04 [−0.09, 0.18]
Work status (Unemployed/retired)				
Employed	0.25** [0.07, 0.43]	0.24* [0.05, 0.42]	0.34*** [0.19, 0.48]	0.32*** [0.18, 0.47]
Income ($100,000 and more)				
Less than $20,000	0.31* [0.01, 0.60]	0.37* [0.06, 0.67]	0.69*** [0.45, 0.93]	0.72*** [0.47, 0.96]
$20,000–$49,999	0.20 [−0.04, 0.44]	0.26* [0.02, 0.50]	0.22* [0.03, 0.41]	0.24* [0.04, 0.43]
$50,000–$99,999	0.29* [0.07, 0.51]	0.34* [0.12, 0.57]	0.16 [−0.02, 0.33]	0.17 [−0.01, 0.35]
Living area (Urban area)				
Rural and DA	−0.41*** [−0.60, −0.22]	−0.41*** [−0.61, −0.22]	−0.39*** [−0.54, −0.23]	−0.37*** [−0.53, −0.22]
Country of birth (Foreign-born)				
Canada	−0.26* [−0.46, −0.06]	−0.28* [−0.48, −0.08]	−0.31*** [−0.48, −0.15]	−0.31*** [−0.47, −0.15]
Number of care receivers (1 care receiver)				
2 care receivers or more	0.11 [−0.03, 0.25]	0.05 [−0.10, 0.19]	0.29*** [0.18, 0.41]	0.25** [0.14, 0.37]
Caregiving hour/week for main receiver (Fewer than 5 hr)				
5 hr or more	0.17 [−0.01, 0.35]	0.11 [−0.06, 0.29]	0.28*** [0.14, 0.42]	0.19* [0.04, 0.33]
Dwelling location of main receiver (Same household with caregiver)				
Out of caregiver's household	−0.14 [−0.35, 0.06]	−0.20 [−0.41, 0.01]	−0.23** [−0.39, −0.07]	−0.28** [−0.45, −0.11]
Health care institution	−0.31* [−0.60, −0.02]	−0.37* [−0.68, −0.07]	−0.29* [−0.52, −0.06]	−0.36** [−0.60, −0.12]
Dwelling location of main receiver × Survey time point (Same household with caregiver)				
Out of caregiver's household	−0.19 [−0.38, 0.01]	−0.14 [−0.35, 0.07]	−0.19** [−0.34, −0.05]	−0.14 [0.29, 0.02]
Health care institution	−0.02 [−0.31, 0.27]	0.04 [−0.27, 0.34]	−0.01 [−0.23, 0.20]	0.06 [−0.17, 0.29]

Table 4. Continued

	Depressive symptoms		Anxiety	
	Model 1 Estimate [95% CI]	Model 2 Estimate [95% CI]	Model 1 Estimate [95% CI]	Model 2 Estimate [95% CI]
Depressive symptoms at FUP1	0.58*** [0.56, 0.60]	0.58*** [0.56, 0.59]		—
Increase caregiving hours (No)				
Yes		0.72*** [0.48, 0.96]		0.80*** [0.62, 0.98]
Increase caregiving hours × Survey time point (No)				
Yes		0.16 [−0.13, 0.45]		0.02 [−0.20, 0.24]
Unable to provide care (No)				
Yes		0.59*** [0.40, 0.78]		0.62*** [0.47, 0.76]
Unable to provide care × Survey time point (No)				
Yes		0.13 [−0.15, 0.40]		−0.06 [−0.27, 0.14]
AIC	135,742.12	126,663.37	118,186.12.51	110,634.54

Notes: AIC = Akaike Information Criterion; CI = confidence interval; CLSA = Canadian Longitudinal Study on Aging; COVID-19 = coronavirus disease 2019; DA = dissemination area; FUP1 = Follow-up 1. Reference group is listed in (—).

*p < .05. **p < .01. ***p < .001.

symptoms) experienced greater depressive symptoms and anxiety compared to those in the highest income group ($100,000 and more). In addition, lower levels of depressive symptoms and anxiety were also associated with living in a rural area (compared to an urban area, estimate = −0.41, $p < .001$ for depressive symptoms; estimate = −0.37, $p < .001$ for anxiety) and being born in Canada (compared to foreign-born, estimate = −0.28, $p < .01$ for depressive symptoms; estimate = −0.31, $p < .001$ for anxiety).

Prepandemic caregiving intensity is also predictive of mental health during the pandemic, where it is observed that having two or more care receivers (estimate = 0.25, $p < .001$) and five or more caregiving hours weekly (estimate = 0.19, $p < .05$) are associated with higher anxiety. The prepandemic level of depressive symptoms is positively associated with depressive symptoms during the COVID-19 study (estimate = 0.58, $p < .001$). For detailed associations between studied factors and mental health indicators, refer to Table 4. We also conducted LMM analyses for depressive symptoms and anxiety within subgroups, including sex (female and male) and location of care (same household, another household, and health care institutes). Refer to the Supplementary Tables 1 and 2 and document for detailed results.

Discussion

This is the first study that we are aware of that examines the mental health of informal caregivers during the pandemic using national longitudinal data. These results extend research conducted at the early stages of the pandemic demonstrating that informal caregivers experience greater mental challenges compared to the prepandemic period (Altieri & Santangelo, 2021; Beach et al., 2021; G. Cohen et al., 2020; S. A. Cohen et al., 2021; Park, 2021; Raina et al., 2021; Reilly et al., 2021). Our findings further show that female caregivers (compared to males) are at greater risk of depressive symptoms and anxiety during the pandemic. These results are consistent with research supporting the SPM, which elucidates linkages between caregiving stressors among women and mental health (Lilly et al., 2010; Pearlin & Bierman, 2013; Schulz et al, 2016).

Our analyses support *Hypothesis 1* that female caregivers experienced worse overall mental health than male caregivers during the pandemic, although male caregivers reported a greater attenuation in both depressive symptoms and anxiety than their female counterparts. Female caregivers are typically expected to take more familial and household responsibilities, often coupled with multiple-role demands (Wister, Li, et al., 2021). This caregiver context increases COVID-19 exposure risk and strain (Gausman & Langer, 2020), which can also be stress-inducing. During the pandemic, it has been reported that females have been more likely to miss work, take unpaid leave, quit their job due to familial reasons, including caregiving, and are less likely to receive economic stimulus employment support (Alon et al., 2020; Ranji et al., 2021;
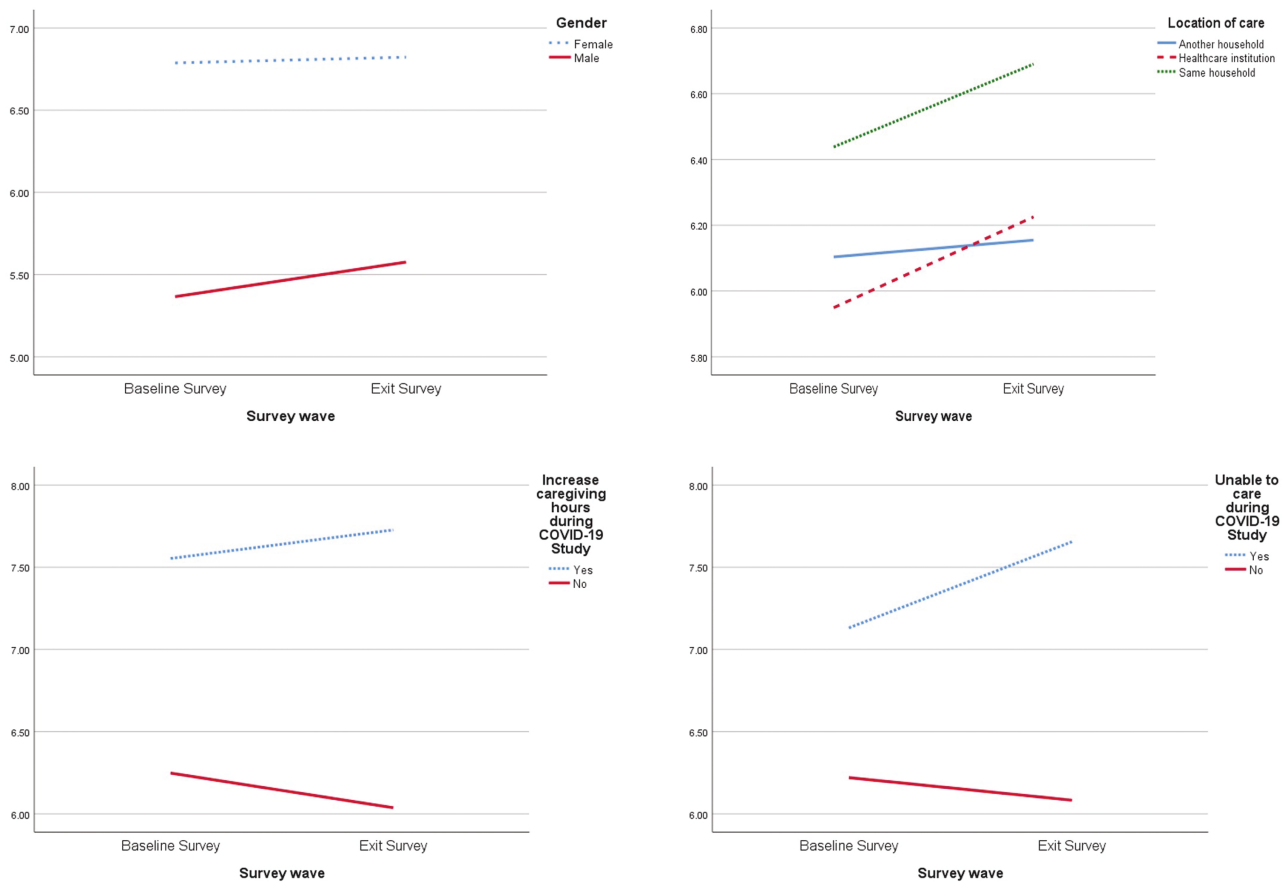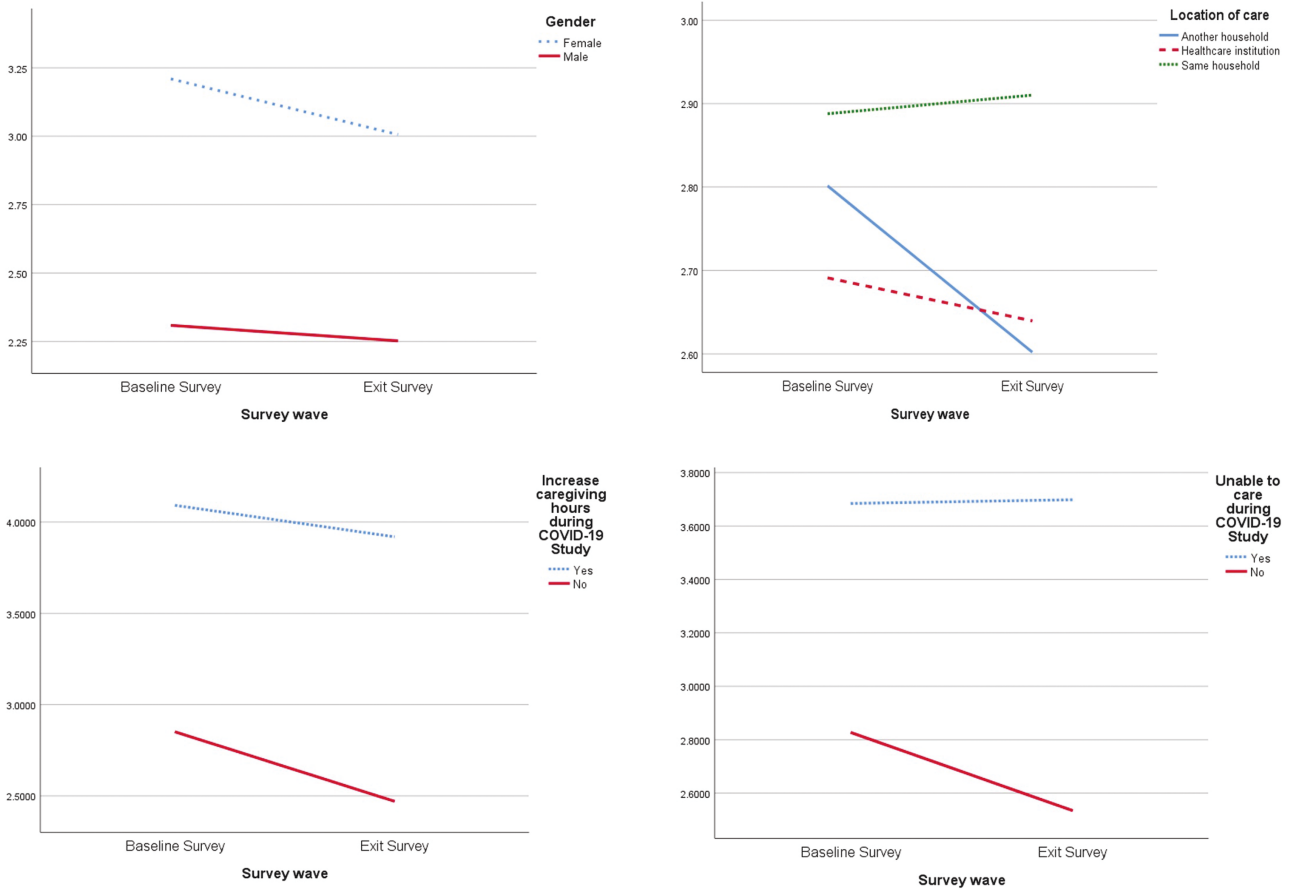
Figure 2. Depressive symptoms during the coronavirus disease 2019 (COVID-19) Study (Baseline and Exit surveys). Full color version is available within the online issue.

Richardson & Denniss, 2020). This finding resonates with the SPM highlighting the importance of background characteristics, especially gendered aspects of care, in shaping the caregiving experience and outcomes (Pearlin et al., 1990). Furthermore, this disadvantaged caregiving context of women during the COVID-19 pandemic is consistent with previous studies conducted during past pandemics (e.g., severe acute respiratory syndrome or Ebola), demonstrating that women tend to experience higher risk of mental health disorders than men (Connor et al., 2020).

Interestingly, we also found that, although male caregivers reported lower levels of depressive symptoms and anxiety at COVID-B survey, the level of depressive symptoms and anxiety increased at a higher rate among male caregivers from COVID-B to COVID-E surveys. Cohen and associates (2021) suggest that this pattern is indicative of greater resilience among female caregivers during the pandemic based on prior experience and better coping processes, although this requires future research. In addition, sex differences were also identified from the supplementary data analyses based on female and male caregivers separately. For instance, the association between foreign-born status (compared to born in Canada) and poorer mental health was only identified among female caregivers. This finding reflects the fact that female caregivers from

immigration and ethnocultural communities are more likely to experience adverse mental health outcomes, likely due to higher caregiving intensity or barriers to access to formal and informal services (Stewart et al., 2006).

Our findings also support the *Hypothesis 2* that increases in caregiving hours during the pandemic were associated with worse mental health outcomes, although the longitudinal effect was not supported. The COVID-19 pandemic has dramatically altered the contexts and direct provision of informal care as the result of fear of infection, physical distancing, stay-at-home policies, separation from family, as well as barriers that have restricted the typical functioning of community and health care systems that directly support informal caregivers. Some informal caregivers shouldered more caregiving tasks than others to cover the care gap. In our study, approximately 11% of informal caregivers at the COVID-B survey, and 14% of informal caregivers at the COVID-E survey had increased their caregiving hours. This finding parallels previous studies (Cohen et al., 2021; Merck KGaA, 2021). Increased caregiving intensity has been shown to augment primary and secondary stressors, including role overload and captivity, family conflict, and economic problems (Li & Lee, 2020; Pearlin et al., 1990). During the pandemic, Anderson and Parmar (2020) reported that informal caregivers expressed

Figure 3. Anxiety during the coronavirus disease 2019 (COVID-19) Study (Baseline and Exit surveys). Full color version is available within the online issue.

feelings of "alone behind closed doors" and "on my own" due to reduced availability of formal services (homecare or respite), and less help from other family members or friends (p. 12). Giebel et al. (2020) also identified magnified workload and strain due to COVID-19, resulting in feelings of stress, fear, and uncertainty pertaining to long-term caregiving sustainability among informal caregivers who needed to work from home while caring for their family members with dementia. These caregiving shifts likely exacerbated adversity and risk factors associated with mental health. Our findings that higher intensity of caregiving demands during the pandemic was associated with depressive symptoms and anxiety provide additional evidence of pandemic adversity.

In the present study, we also support the *Hypothesis 3* that the inability to provide care was also associated with worse mental health among informal caregivers, although no longitudinal effect was detected during the period of the pandemic under study. Prepandemic research has similarly found that care barriers lead to multiple and complex emotional and psychological reactions, including loss of control, uncertainty, and/or guilt (Lai, 2007; Unson et al., 2016). These reactions are likely amplified during the pandemic, a time of uncertainty, fear, frustration, and feelings

of loss. For instance, Dhavale et al. (2020) found that informal caregivers to family members receiving palliative care expressed feelings of hopelessness and guilt directly due to pandemic restrictions. Also, a study in the UK found that some informal caregivers of persons with dementia discontinued paid care services due to fear of contracting COVID-19 but concurrently assumed a greater burden of care (Giebel et al., 2020). The feeling of inability to provide care to care recipients may reflect intrapsychic strains, including loss of self, limited competence, and restricted efficacy, which all will lead to worse psychological outcomes (Pearlin et al., 1990).

Our findings also partially support *Hypothesis 4* that the location of care was associated with both depressive symptoms and anxiety, although the association with changes of depressive symptoms and anxiety over time was not established. This study confirms that coresidence with care receivers is a risk factor for mental distress during the pandemic. Location of care as a mental health risk is equivocal in other research in which similar findings were found in one study (Anderson & Parmar, 2020), but not in others (Beach et al., 2021). Since the outbreak of pandemic, in-home caregiving compared to other types became a full-time and often continuous role for many

individuals (Anderson & Parmar, 2020) due to limited access to health care or respite services or changes in employment status (e.g., being temporarily laid off), resulting in being overextended (Fitzpatrick et al., 2020). Also, in-home caregivers found it hard to attend in-person social activities, because they could not leave their care receivers at home without the necessary respite services (Lightfoot et al., 2021). Furthermore, some care receivers who required regular treatment or therapy to manage their own health conditions had to cancel appointments, adding further adversity (Matsuoka & Sumida, 2021). As a result, in-home caregivers, who usually assume the primary caregiver role, often require more time and energy on caring tasks, or learning new knowledge and skills to manage the role.

Additionally, participants in our study who were younger, unmarried, employed, earning lower personal income, an immigrant, and living in an urban area reported higher levels of depressive symptoms and/or anxiety during the pandemic. These findings are consistent with other COVID-19 pandemic studies (Beach et al., 2021; Park 2021; Raina et al., 2021), as well as previous caregiving literature (Li & Lee, 2020; Pinquart & Sörensen, 2003b). Also, the supplementary analyses based on sex and location of care indicate that the intersectionality of being female and immigration characteristics, as well as being female and higher caregiving intensity, unmarried status, and out-of-home caregiving were all related to adverse mental health outcomes. It is likely that these supplementary risk factors add to the accumulation of stress and poor mental health outcomes during the pandemic (Wade et al., 2021). An additional area for further study is employment status, given some evidence that unemployment was associated with depression at the start of the pandemic in one Italian study (Mazza et al., 2020).

Implications

The findings of this study contribute to the growing body of literature demonstrating mental challenges experienced by informal caregivers both prepandemic and peripandemic. This is the first longitudinal study to demonstrate multiple worsening mental health among informal caregivers experiencing different caregiving contexts during the pandemic. This research points to the need for innovative community and health intervention programs that support informal caregivers during heightened levels of risk and adversity, particularly those who are female and providing intensive in-home caregiving. Targeted and tailored programs within public health and social systems, nongovernmental associations (e.g., Alzheimer's' Society), and other community service groups may be an effective means to address mental health challenges of caregivers (Bertuzzi et al., 2021). Some examples include: online support groups, counseling services to reduce depressive symptoms and anxiety, and financial aid, all of which can foster caregiver support and

resilience. Additionally, it may be necessary to utilize innovative avenues for social connection and emotional support for caregivers and care receivers who may be separated during a pandemic, such as through video, phone, or other technologies (Wister, Fyffe, et al., 2021). The family workload distribution during the pandemic also reflects the long-existing experience of unequal gender roles in familial and household responsibility. Further actions at global, national, and regional levels to address these systemic issues (e.g., financial aid, workplace support, and community resources) are obvious areas for program development.

Study Limitations

First, because it was necessary to identify caregivers in the CLSA based on CLSA prepandemic data, caregiving status or the location of care may have changed prior to the start of the COVID study, which may increase the bias in estimates. For instance, some family members assumed caregiving roles after the onset of the pandemic due to limited care services (Rodrigues et al., 2021). Therefore, generalization of the findings yielded from this study should be made with care. Future studies should collect caregiving duration information to distinguish caregivers who stop caregiving when the pandemic began, those who start caregiving after the onset of the pandemic, and those who continue caregiving regardless impacts of the pandemic. Second, additional measures of caregiving during the pandemic, for instance, greater granulation in caregiving intensity, may increase the strength of effects. Also, inclusion of different types of support, and caregiver–receiver relationship would also be valuable information. For instance, the design and delivery of community services and healthy public policy-making should be guided by future studies on caregiving experiences during the pandemic. Third, this study was conducted based on the data collected in Canada during the first 9 months of the pandemic (April to December 2020), making findings specific to that context. Therefore, interpretation of results should be made with caution when applying the findings to other countries or different stages of the COVID-19 pandemic. Fourth, although the CLSA is a large national cohort study, there was a high nonresponse rate during the COVID-19 surveys. LMM uses the restricted maximum likelihood estimation to handle missing data, which tends to result in unbiased estimates of variance and covariance (West, 2009). However, considering the special situation caused by the pandemic, we expect that less healthy or older-old participants likely refused the invitation to take part in the COVID-19 surveys, infusing a degree of bias.

Conclusion

This study revealed that during the pandemic informal caregivers who are female, providing more care, feeling unable to provide care, and living with their care receivers

experience higher levels of depressive symptoms and anxiety. Informal caregivers are the backbone of the community and health care systems to the extent that their contribution to public health is essential during a pandemic. Further study is needed to examine caregiving patterns and consequences, as well as development and implementation of appropriate public health policy and support services aimed at fostering better health and well-being during the current and future pandemics.

Supplementary Material

Supplementary data are available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

Conflict of Interest

The authors have declared that no competing interests exist. The opinions expressed in this manuscript are the authors' own and do not reflect the views of the Canadian Longitudinal Study on Aging.

Author Contributions

A. Wister, L. Li, and B. Mitchell led the project conceptualization, data management and analysis, results interpretation, design, analysis, interpretation, and drafting of the manuscript. C. Wolfson, S. Kirkland, L. E. Griffith, J. McMillan, and P. Raina designed the CLSA COVID-19 study and contributed to the revision of the manuscript. The members of the CLSA team have contributed to the collection of the data across Canada.

Data Availability

Data are available from the Canadian Longitudinal Study on Aging (www.clsa-elcv.ca) for researchers who meet the criteria for access to deidentified CLSA data.

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