1-2024

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Citation

QIN, Vicky Mengqi; VISARIA, Abhijit; and MALHOTRA, Rahul. Impact of a COVID-19 related lockdown on the experience of informal caregiving in Singapore. (2024). *Gerontology*. 70, (1), 102-114.
Available at: https://ink.library.smu.edu.sg/rosa_publications/1

Gerontology

Behavioral Science Section: Research Article

Gerontology
DOI: 10.1159/000534723

Received: February 15, 2023
Accepted: October 18, 2023

Impact of a COVID-19-Related Lockdown on the Experience of Informal Caregiving in Singapore

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Keywords
Family caregivers · Informal caregivers · Lockdown · Caregiving experience · COVID-19

Abstract
Introduction: Lockdowns, while limiting COVID-19 transmission, can affect provision of care by informal caregivers and their caregiving experience. We assessed, among informal caregivers in Singapore, (a) the perceived impact of a 2-month (April to May 2020) nationwide lockdown on their care provision, (b) correlates of different perceptions of the impact of the lockdown on care provision, and (c) association of different perceptions of the impact with negative and positive experiences of caregiving. ***Methods:*** In the August 2020 wave of the Singapore Life Panel (SLP; nationally representative, longitudinal monthly survey of Singapore citizens and permanent residents aged 50–70 years at baseline), 1,094 participants identified as informal caregivers reported whether their care provision became easier, remained the same, or became harder during the lockdown, compared to before the lockdown. We used multinomial logistic regression to assess the association of caregiver, care recipient, and caregiving context characteristics with their perceptions. Linear regression models examined the association of their perceptions with negative and positive experience domains of the modified Caregiver Reaction Assessment. ***Results:*** Just over one-third (36.1%) of the informal caregivers reported that their care provision became harder during the lockdown compared to before the lockdown. However, nearly one-fifth (18.0%) said that it became easier, and the rest (45.9%) said that it remained the same. Care provision was more likely to be perceived as having become harder among caregivers who were male, of Chinese ethnicity, in worse health, whose care recipients had functional limitations, who did not have caregiving support from cohabiting family members before the lockdown, and who had caregiving support from non-cohabiting family members before the lockdown. The perception that care provision became easier was less likely among caregivers who were of higher age, were unemployed, were socially isolated, and whose care recipients had functional limitations. Caregivers who perceived that care provision became harder during the lockdown were worse-off in negative experiences of caregiving. ***Conclusion:*** A nationwide lockdown did not make care provision harder for all informal caregivers. However, informal caregivers for whom it did were more likely to have greater negative experiences of caregiving. The heterogeneity of the impact

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Published by S. Karger AG, Basel

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of lockdowns and the possibility of offering flexibility to non-cohabiting family members who support caregiving should be important considerations when planning for such disruptions.

Introduction

Many countries implemented lockdowns of varying intensities and durations to control the spread of coronavirus disease 2019 (COVID-19) in their populations [1]. In Singapore, the setting of this study, a strict nationwide lockdown, also labelled as "Circuit Breaker," was imposed from April 7, 2020, to June 1, 2020 [2]. During this period, there was a ban on social gatherings, and all individuals were urged to stay at home and maintain safe distancing if they left their residence for urgent reasons, essential services, or exercise. Centre-based care services, such as dementia day care and respite care, were suspended, except for a few designated centres that were permitted to serve clients who did not have any alternative caregiving arrangements [3, 4]. Such lockdowns, while aimed at limiting COVID-19 transmission, inevitably affected the daily lives of people, including informal caregivers.

Informal caregivers, who are usually family members of care recipients, form the primary support system for older adults (and individuals in younger age groups) who need care for health reasons in Singapore [5]. Population-based surveys of primary informal caregivers of older adults in Singapore have reported that such caregivers mostly comprise the child (or child-in-law) (73–77%), followed by the spouse (16–23%) of the older adult [6, 7]. A majority are women and are aged 50 years or older [6–8]. It is also common in Singapore, as in other locations in Asia such as Hong Kong, Malaysia, and Taiwan, to employ migrant domestic workers (MDWs; live-in full-time workers, who are mostly women from neighbouring low-income countries) as an "extra pair of hands" for care provision [8–10]. Informal caregivers perform a range of care roles for their care recipients, including the provision of direct physical assistance, accompanying them for medical appointments, provision of emotional support, coordination with and supervision of other informal and formal caregivers, and coordination with care agencies/service providers [7] – all of which may be affected when lockdowns are imposed. For instance, the lockdown in Singapore is likely to have affected the instrumental and emotional support and care that other family members outside the household were able to provide to care recipients due to movement restrictions and prohibitions on family and other social gatherings. Cancellation or postponement of in-person medical appointments, which were reported in Singapore [11], may have led to increased uncertainty about delays in timely medical care for care recipients. With several jobs rapidly pivoting to work from home [12], employed caregivers in Singapore likely faced abrupt changes in their work and caregiving schedules and the balance between work and caregiving responsibilities, especially as work from home was not common prior to the lockdown. A population-based survey of primary informal caregivers of older adults, in which most participants were interviewed either in 2019 or before the lockdown in 2020, found that workplaces of only 27% of full-time and 31% of part-time employed caregivers allowed flexi-place work arrangements [7]. On the other hand, a proportion of informal caregivers cohabiting with their care recipient may have benefited from a better balance between work and caregiving when they were forced to stay at home during the lockdown.

From a theoretical perspective, the Caregiver Stress Process model provides an overall framework in which we can study the impact of lockdowns on caregivers [13]. In this model, Pearlin et al. [13] described four interlinked, multi-component domains of the stress process: (1) contextual characteristics which influence the extent to which caregivers face stressors in their caregiving, such as demographics and socioeconomic status, caregiving history, social networks, and availability of care service programmes; (2) primary stressors, such as care recipients' health status, and secondary stressors or role strains, such as family conflicts over the caregiving role and work-family conflicts, both of which are intrinsically linked to the experience of stress by caregivers; (3) mediators of the relationship between stressors and outcomes, such as instrumental and emotional social support and caregivers' coping mechanisms, and (4) caregiver outcomes such as their mental and physical health. Lockdowns can be considered as situations or events that adversely affect the contextual variables of the availability of social networks and care service programmes that support informal caregivers and care recipients, intensify role strains for the caregiver, and constrain social support in terms of non-cohabiting family members available to support caregiving tasks. On the other hand, lockdowns may enhance social support from cohabiting family members available to support caregiving tasks, and working from home due to lockdowns can be considered having a protective effect on the secondary stressor of work-family conflict for those caregivers who wish to spend more time with care recipients.

A growing body of literature has examined the impact of COVID-19-related lockdowns on informal caregivers [14–30], mostly assessing psychological outcomes like caregiving burden and psychological distress. Many studies have concluded that, on average, lockdowns had a negative impact on informal caregivers. For example, a study from Greece showed that caregivers of persons with dementia reported a substantial increase in psychological burden (60.5%) and physical burden (39.5%) due to prolonged isolation during lockdowns [14]. Bao et al. [15] showed that anxiety levels and depression scores worsened and physical activity declined among informal caregivers of older adults with dementia or with mild cognitive impairment in China during the time of lockdowns in 2020. These as well as other studies note that an increase in caregiving burden during lockdowns was due to interruptions in caregiving support roles played by others, loss of caregivers' personal time, a deterioration in their physical and mental health, financial difficulties, and challenges in making care recipients understand COVID-19 protocols [16–18]. Previous studies have also reported that multi-tasking caregivers who have less emotional and caregiving support and an increased caregiving workload are more likely to have negative caregiving experiences [10, 31–34].

At the same time, studies have reported that some caregivers were not adversely affected by lockdowns. For example, Altieri and Santangelo [19] reported an increase in depression but no change in anxiety among caregivers in Italy during a lockdown compared to before the lockdown. A Chinese study showed that around 50% of informal caregivers of persons with dementia reported no change in their anxiety level, depression, or caregiving burden after a 12-month lockdown compared to before the COVID-19 pandemic [15]. Studies from Germany and Singapore found that only 19–33% of informal caregivers reported a negative impact of lockdowns on their care provision or self-care activities [17, 20]. Carbone et al. [21] explained that access to support and healthcare networks may have played a key role in providing informal caregivers effective coping strategies against distress resulting from the COVID-19 pandemic.

While insightful, most of the studies examining the impact of lockdowns on informal caregivers are from European or North American countries [14, 17–19, 22–27, 29, 30], focus on caregivers of persons with dementia [14–16, 18, 19, 22–24, 27, 29, 30], and among studies employing quantitative methods, have relatively small non-representative samples [19, 20, 22]. In the current study, using data pertaining to middle-aged and older informal caregivers collected in a nationally representative survey from Singapore, we (1) describe the perceived impact of a nationwide COVID-19-related lockdown on their care provision, (2) identify the correlates of different perceptions of the impact of the lockdown on care provision, and (3) examine the association of different perceptions of the impact with negative and positive experiences of caregiving.

In doing so, we contribute to the literature on this topic in several ways. First, we add to the limited evidence from Asian countries, where informal caregiving is central in care provision for older adults and other individuals requiring care for health reasons [35]. Related, our study is based in Singapore, a rapidly ageing Asian country [36], where MDWs are often involved in care provision in addition to family member(s) of care recipients. As mentioned earlier, such a caregiving situation is common in many parts of Asia [9]. In our study, we consider caregiving support from a MDW as a potential factor affecting the perceived impact of the lockdown on care provision. Second, findings from this study may have implications for other countries with limited flexi-work arrangements. Third, we focus on informal caregivers aged 50–70 years, a relatively unique group given the challenges they face in juggling work and caregiving responsibilities, as well as managing their own health and chronic conditions, whose incidence increases with age. Fourth, we present data on a large sample of informal caregivers identified in a nationally representative survey of middle-aged and older Singaporeans. Fifth, we do not limit our analysis to caregiving in the context of persons with dementia or other ailments; instead, we include caregivers providing care to an immediate family member due to his/her health or physical condition, irrespective of the underlying disease. Finally, we consider positive experiences of caregiving as an outcome, in addition to negative experiences of caregiving.

In terms of specific hypotheses, based on the Caregiver Stress Process model, as well as findings reported in previous studies, we hypothesize that: (hypothesis 1) not all informal caregivers will perceive a detrimental impact of the lockdown on their care provision; (hypothesis 2) informal caregivers who are disadvantaged in terms of contextual characteristics and stressors are more likely to perceive a detrimental impact of the lockdown on their care provision, whereas those advantaged, such as those with caregiving support from cohabiting family members, are more likely to perceive a positive impact of the lockdown on their care provision; and (hypothesis 3) those who perceive that their care provision became harder (easier) during to the lockdown are likely to report greater (lesser) extent of negative and lesser (greater) extent of positive caregiving experiences.

Methods

Dataset and Analysis Sample

We used data from the Singapore Life Panel (SLP), collected by the Centre for Research on Successful Ageing (ROSA) at Singapore Management University. The SLP is an internet-based monthly panel survey conducted since 2015 and examines demographics, socioeconomic indicators, health, and wellbeing of a nationally representative sample of Singapore citizens and permanent residents aged 50–70 years (at baseline) and their spouses. While a majority of SLP respondents respond online, those who are unable to understand the survey questions or lack internet access can complete the survey over the phone or physically at centres located around Singapore. The baseline sample consisted of 15,212 respondents. A detailed description (e.g., sampling methods, comparison of the sample characteristics to the Singapore Census of Population, constructs surveyed, response rate, participant recruitment) of the SLP is available elsewhere [37]. For this study, we used data from wave 61 of the SLP, conducted in August 2020, as it was the first wave to capture data on informal caregiving by the participants.

Of the 7,886 respondents participating in wave 61, 1,098 respondents met our definition of being an informal caregiver: provision of 1 h or more of unpaid care per week (help with activities of daily living [ADLs] or instrumental ADLs [IADLs], in using health or social care services, or for other needs) to an immediate family member (i.e., an identified care recipient) due to the care recipient's health or physical condition. After omitting four caregivers with missing data on the variables considered in our analysis, our analysis sample comprised 1,094 informal caregivers aged 50 years and above.

Perceived Impact of the COVID-19 Related Lockdown on Care Provision

Informal caregivers were asked to choose one out of five statements that best described their provision of care to their care recipient, specifically during the lockdown versus before the lockdown. The five options were *"It was much easier for me to provide care," "It was somewhat easier for me to provide care," "I was managing the same as always," "It was somewhat more difficult for me to provide care,"* or *"It was much more difficult for me to provide care."* To facilitate analysis, we constructed a three-level categorical variable for the perceived impact of the lockdown on care provision: became easier (*"It was much easier"* or *"It was somewhat easier"*), remained the same (*"I was managing the same as always"*), and became harder (*"It was somewhat more difficult"* or *"It was much more difficult"*).

Negative and Positive Experiences of Caregiving

Information on negative and positive experiences of caregiving was collected from informal caregivers using the 21-item modified Caregiver Reaction Assessment (mCRA) scale [38]. The modified scale, which has been validated in Singapore [38], assesses four domains of the caregiving experience: (1) disturbed schedule and health (eight items; e.g., "My activities are centred around care for [care recipient];" Cronbach's α = 0.83 in the scale's validation paper, and 0.90 in our analysis sample), (2) financial impact (two items; e.g., "Caring for [care recipient] puts a financial strain on me;" Cronbach's α = 0.85 in the scale's validation paper, and 0.75 in our analysis sample), (3) lack of family support (five items; e.g., "My family works together at caring for [care recipient];" Cronbach's α = 0.82 in the scale's validation paper, and 0.80 in our analysis sample), and (4) self-esteem (six items; e.g., "Caring for [care recipient] is important to me;" Cronbach's α = 0.81 in the scale's validation paper, and 0.82 in our analysis sample) [38, 39]. Each item is scored on a five-point Likert-type response scale, ranging from strongly disagree (score = 1) to strongly agree (score = 5). For each domain, the sum of its item scores is divided by the number of items within the domain to calculate a domain score, ranging from 1 to 5. A higher score on the caregiver esteem domain indicates a more positive experience of caregiving. A higher score on any of the other three domains indicates a greater negative experience of caregiving in that domain.

Correlates of the Perceived Impact of Lockdown on Care Provision

Informed by the Caregiver Stress Process model, we considered variables related to the caregiver, their care recipient, and the caregiving context as potential correlates of the perceived impact of lockdown on care provision. Caregiver variables were age group (age in years was recoded to form a 4-category ordinal variable: 50–59/60–64/65–69/70+), gender (male/female), ethnicity (Chinese/Malay/Indian/Others), employment status (employed/unemployed), education (no formal or primary/secondary/post-secondary), wealth status (total monthly expenditure, categorized into five quintiles from 1 [lowest] to 5 [highest]), self-rated health (five response options in the survey were recoded to form a binary categorical variable: excellent, very good or good/fair or poor), duration of care provision to the care recipient (in years), hours of care provided per week to the care recipient (in hours), care recipient's relationship to the caregiver (spouse/parent or grandparent/others), and social isolation (yes/no). Social isolation was assessed using the Berkman-Syme Social Network Index (SNI) [40], which measures frequency and closeness of four dimensions of social relationships: marital status (married [scored as 1]/single or separated or divorced or widowed [scored as 0]), number of close friends or relatives (more than six [scored as 1]/six or less [scored as 0]), participation in religious activities (attend at least once a month [scored as 1]/less than once a month [scored as 0]), participation in community activities (attend at least once a month [scored as 1]/less than once a month [scored as 0]) [40–42]. A total SNI score, ranging from zero to 4, was calculated by adding the score for each dimension (Cronbach's α = 0.59 in our analysis sample). We adopted the process followed by previous studies to create a dichotomous social isolation variable, based on the total SNI score: "yes" (total score of 0, 1, 2, or 3) and "no" (total score of 4) [41, 42].

Care recipient variables were gender (male/female), and ADL and IADL limitation status (categorized into three groups: no ADL and IADL limitation/limitation in either ADLs or IADLs/limitation in both ADLs and IADLs). Caregiving context variables that measured social support from the perspective of the Caregiver Stress Process model included caregiving support from cohabiting family members before the lockdown (yes/no), caregiving support from non-cohabiting family members before the lockdown (yes/no), and caregiving support from a MDW before the lockdown (yes/no).

Statistical Analysis

First, descriptive analysis was conducted on the caregiver, care-recipient, and caregiving context variables, and the perceived impact of lockdown on care provision. Second, we assessed the association of the caregiver, care recipient, and caregiving context variables (i.e., independent variables) with the perceived impact of lockdown on care provision as the outcome variable. We used multinomial logistic regression since the outcome variable had three categories: "became easier," "remained the same," and "became harder", with "remained the same" as the reference category. All independent variables were considered simultaneously in the same regression model. Third, scores for each mCRA domain were reported and compared across the three-categories of the perceived impact of lockdown on care provision using one-way analysis of variance (ANOVA) test followed by Tukey post hoc test. Fourth, linear regression models were used to examine the association of the perceived impact of lockdown on care provision as the independent variable (with "remained the same" as the reference category) with each of the mCRA domains as outcomes. A separate linear regression model was constructed for each domain, simultaneously controlling for the various caregiver, care recipient, and caregiving context variables described above. Statistical significance was established through 95% confidence intervals and/or p values ($p <$ 0.05 [two-tailed p values]). All statistical analyses were performed using Stata 17.0.

Results

Table 1 provides the distribution of the perceived impact of lockdown on care provision and the caregiver, care recipient, and caregiving context variables. Just over one-third (36.1%) of the informal caregivers reported that care provision became harder during the lockdown, compared to before the lockdown. However, nearly one-fifth (18.0%) reported that it became easier, and the rest (45.9%) reported that it remained the same. A majority of caregivers were female (57.4%), Chinese (81.7%), had excellent or very good or good self-rated health (66.5%), employed (58.8%), had secondary or post-secondary education (84.2%), and socially isolated (65.3%). They had cared for their care recipient, on average, for 11.6 years and provided an average of 26.6 h of care per week to their care recipient. A majority of the care recipients were female (67.3%) and just over half (53.9%) had both ADL and IADL limitations. Just over half (51.9%) of the care recipients were a parent or grandparent of the caregiver. Before the lockdown, 85.1%, 78.7%, and 34.0% caregivers had caregiving support from cohabiting family members, non-cohabiting family members, and a MDW, respectively.

The association of the caregiver, care recipient, and caregiving context variables with the perceived impact of lockdown on care provision is presented in Table 2. Compared to caregivers who perceived that care provision remained the same during the lockdown compared to before the lockdown, those perceiving that it became easier were more likely to be younger, employed, not socially isolated, and whose care recipient did not have ADL and IADL limitations. Those who perceived that it became harder during the lockdown were more likely to be male, of Chinese ethnicity, with fair or poor self-rated health, providing fewer hours of care per week, and whose care recipients had both ADL and IADL limitations. Furthermore, caregivers without caregiving support from cohabiting family members before the lockdown and caregivers with caregiving support from non-cohabiting family members before the lockdown also perceived care provision to have become harder.

Across the three categories of the perceived impact of lockdown on care provision, caregivers who reported that care provision became harder during the lockdown had the highest average scores in the three mCRA domains indicative of a negative caregiving experience, i.e., disturbed schedule and poor health, lack of finances, and lack of family support (Table 3). This relationship was maintained in the multiple linear regression analyses, with caregivers who perceived that care provision became harder during the lockdown (vs. remained the same) being worse off in all the three domains representing negative experiences of caregiving (Table 4). There was no significant difference in the esteem domain score between caregivers with different perceptions of the impact of the lockdown on care provision, in either the unadjusted or the adjusted analyses.

Discussion

We assessed the perceived impact of a COVID-19-related lockdown on caregiving among middle-aged and older informal caregivers, its correlates, and its association with positive and negative caregiving experiences in Singapore. Our findings largely supported our hypotheses. As hypothesized (hypothesis 1), we found that not all informal caregivers perceived that their care provision became harder during the lockdown.

We observed that caregivers aged 65 years and older, compared to those aged 50–59 years, were less likely to perceive that their care provision during the lockdown

Table 1. Distribution of caregiver, care recipient, and caregiving context variables by the perceived impact of the lockdown on care provision

	Total (*N* = 1,094)	Perceived impact of the lockdown on care provision		
		became easier (*N* = 197; 18.0%)	remained the same (*N* = 502; 45.9%)	became harder (*N* = 395; 36.1%)
Caregiver variables				
Age				
50–59 years	33.5	36.0	30.5	36.0
60–64 years	31.1	35.0	29.3	31.4
65–69 years	19.2	15.7	20.5	19.2
70+ years	16.3	13.2	19.7	13.4
Gender – female	57.4	55.3	62.6	51.9
Ethnicity				
Chinese	81.7	77.7	79.7	86.3
Malay	7.5	9.1	9.6	4.1
Indian	7.0	7.6	6.8	7.1
Others	3.8	5.6	4.0	2.5
Employment status – employed	58.8	67.0	54.0	60.8
Education				
No formal or primary	15.8	16.8	18.1	12.4
Secondary	37.1	40.1	36.5	36.5
Post-secondary	47.1	43.2	45.4	51.1
Wealth status				
1 (lowest)	12.7	14.2	14.1	10.1
2	16.2	15.7	15.7	17.0
3	19.7	20.8	19.9	18.7
4	22.2	21.3	21.3	23.8
5 (highest)	29.3	27.9	28.9	30.4
Self-rated health status				
Excellent or very good or good	66.5	71.6	68.7	61.3
Fair or poor	33.5	28.4	31.3	38.7
Duration of care provision to the care recipient, years	11.6 (12.1)	12.3 (13.1)	12.0 (12.1)	10.7 (11.5)
Hours of care provided per week to the care recipient	26.6 (30.8)	28.0 (31.5)	28.8 (32.7)	23.0 (27.5)
Social isolation – yes	65.3	54.8	67.5	67.6
Care recipient variables				
Gender – female	67.3	59.9	66.5	71.9
ADL and IADL limitation status				
No ADL or IADL limitation	16.1	25.9	17.3	9.6
Limitation in either ADLs or IADLs	30.0	31.0	31.3	27.9
Limitation in ADLs and IADLs	53.9	43.2	51.4	62.5
Caregiving context variables				
Care recipient is the caregiver's				
Spouse	24.0	28.9	26.9	18.0
Parent/grandparent	51.9	42.6	48.4	61.0
Others	24.0	28.4	24.7	21.0
Caregiving support from cohabiting family members before the lockdown – yes	85.1	87.8	86.5	82.0
Caregiving support from non-cohabiting family members before the lockdown – yes	78.7	80.7	75.9	81.3
Caregiving support from a migrant domestic worker before the lockdown – yes	34.0	45.2	32.3	30.6

Values are mean (SD) or %. ADL, Activity of Daily Living; IADL, Instrumental Activity of Daily Living; SD, standard deviation.

Table 2. Association of caregiver, care recipient, and caregiving context variables with perceived impact of lockdown on care provision (*n* = 1,094)

	Became easier	Became harder
Caregiver variables		
Age (ref: 50–59 years)		
60–64 years	0.91 (0.60, 1.40)	0.90 (0.64, 1.28)
65–69 years	**0.53 (0.31, 0.93)***	0.79 (0.52, 1.21)
70+ years	**0.49 (0.27, 0.90)***	0.66 (0.41, 1.06)
Gender (ref: female)		
Male	1.35 (0.94, 1.95)	**1.56 (1.16, 2.09)****
Ethnicity (ref: Chinese)		
Malay	0.93 (0.49, 1.75)	**0.43 (0.24, 0.76)****
Indian	1.12 (0.58, 2.17)	1.03 (0.60, 1.79)
Others	1.21 (0.55, 2.67)	0.60 (0.27, 1.30)
Employment status (ref: unemployed)		
Employed	**1.61 (1.09, 2.38)***	1.02 (0.76, 1.39)
Education (ref: no formal)		
Secondary	1.24 (0.74, 2.10)	1.30 (0.83, 2.03)
Post-secondary	1.07 (0.62, 1.87)	1.41 (0.88, 2.24)
Wealth status (ref: 1 [lowest])		
2	0.97 (0.51, 1.83)	1.24 (0.72, 2.13)
3	0.98 (0.53, 1.80)	0.93 (0.55, 1.57)
4	0.85 (0.46, 1.58)	1.02 (0.60, 1.72)
5 (highest)	0.78 (0.42, 1.45)	0.81 (0.47, 1.38)
Self-rated health status (ref: fair or poor)		
Excellent, very good, or good	1.03 (0.70, 1.52)	**0.68 (0.50, 0.91)****
Duration of care provision to the care recipient, years	1.00 (0.99, 1.01)	0.99 (0.98, 1.01)
Hours of care provided per week to the care recipient	1.00 (1.00, 1.01)	**0.99 (0.99, 0.998)****
Social isolation (ref: no)		
Yes	**0.61 (0.42, 0.87)****	1.04 (0.77, 1.41)
Care recipient variables		
Gender (ref: male)		
Female	0.69 (0.47, 1.00)	1.00 (0.73, 1.37)
ADL and IADL limitation status (ref: no ADL or IADL limitation)		
Limitation in either ADLs or IADLs	0.71 (0.44, 1.16)	1.43 (0.89, 2.28)
Limitation in both ADLs and IADLs	**0.61 (0.38, 0.99)***	**2.14 (1.35, 3.40)****
Caregiving context variables		
Relationship with care recipient (ref: spouse)		
Parent or grandparent	0.88 (0.54, 1.44)	1.29 (0.86, 1.96)
Others	1.24 (0.78, 1.98)	1.20 (0.79, 1.83)
Caregiving support from cohabiting family members before the lockdown (ref: no)		
Yes	0.96 (0.55, 1.69)	**0.59 (0.40, 0.89)***
Caregiving support from non-cohabiting family members before the lockdown (ref: no)		
Yes	1.21 (0.75, 1.96)	**1.49 (1.02, 2.19)***
Caregiving support from a migrant domestic worker before the lockdown (ref: no)		
Yes	1.40 (0.94, 2.08)	0.91 (0.65, 1.28)

Values are given as adjusted odds ratio (95% confidence interval). Reference: remained the same. ADL, Activity of Daily Living; IADL, Instrumental Activity of Daily Living; ref, reference. Results from multi-nomial logistic regression models as described in the text. Adjusted odds ratio (95% confidence interval) estimates in boldface do not include the value 1 in the 95% confidence interval. **p* value <0.05, ***p* value <0.01.

Table 3. Distribution of modified Caregiver Reaction Assessment domain scores by perceived impact of the lockdown on care provision

Modified Caregiver Reaction Assessment domain scores	Overall	Perceived impact of the lockdown on care provision			*p* value
		became easier	remained the same	became harder	
Disturbed schedule and poor health (*n* = 1,088)					
Mean (SD)	2.72 (0.84)	2.78 (0.85)	2.63 (0.84)	2.80 (0.84)	<0.01
Posthoc Tukey's pairwise comparisons					
Became easier versus remained the same					0.09
Became easier versus became harder					0.96
Remained the same versus became harder					<0.01
Lack of finances (*n* = 1,080)					
Mean (SD)	2.59 (0.98)	2.55 (0.99)	2.47 (0.94)	2.78 (1.01)	<0.01
Post hoc Tukey's pairwise comparisons					
Became easier versus remained the same					0.56
Became easier versus became harder					0.02
Remained the same versus became harder					<0.01
Lack of family support (*n* = 1,079)					
Mean (SD)	2.22 (0.78)	2.22 (0.77)	2.15 (0.75)	2.32 (0.80)	<0.01
Post hoc Tukey's pairwise comparisons					
Became easier versus remained the same					0.48
Became easier versus became harder					0.37
Remained the same versus became harder					<0.01
Esteem (*n* = 1,083)					
Mean (SD)	3.70 (0.69)	3.74 (0.72)	3.69 (0.69)	3.71 (0.67)	0.68
Post hoc Tukey's pairwise comparisons					
Became easier versus remained the same					0.66
Became easier versus became harder					0.87
Remained the same versus became harder					0.90

SD, standard deviation.

Table 4. Association of perceived impact of the lockdown on care provision with modified Caregiver Reaction Assessment domain scores

Perceived impact of the lockdown on care provision (ref.: remained the same)	Modified Caregiver Reaction Assessment domain scores			
	disturbed schedule and poor health (*n* = 1,088)	lack of finances (*n* = 1,080)	lack of family support (*n* = 1,079)	esteem (*n* = 1,083)
Became easier	**0.17 (0.05, 0.29)***	0.09 (–0.07, 0.24)	0.05 (–0.07, 0.17)	0.06 (–0.05, 0.18)
Became harder	**0.21 (0.12, 0.31)***	**0.28 (0.16, 0.41)***	**0.16 (0.06, 0.26)***	0.02 (–0.07, 0.11)
R^2	0.287	0.158	0.151	0.090

Values are β-coefficient (95% confidence interval). Results are from multiple linear regression models, as described in the text. Estimates in boldface do not include the value 0 in the 95% confidence interval. **p* value <0.01.

became easier. This may be due to older caregivers experiencing more age-related physical changes that exacerbate their physical strain while caregiving and therefore their caregiving burden [43, 44]. In a similar vein, it was not surprising that caregivers with fair or poor self-rated health were more likely to perceive that their care provision became harder during the lockdown.

While some studies report that female caregivers have greater caregiving burden than male caregivers [45, 46], we observed that males were more likely to perceive that their care provision became harder during the lockdown. In the Asian context, males are often expected to provide financial support to the family, while females have a disproportional share of household caregiving responsibilities [47]. It is possible that with the reduction in informal and formal support from outside their households during the lockdown, male caregivers found it more difficult to perform a role that they had not expected to undertake.

We observed that Malay caregivers compared to Chinese caregivers were less likely to report that their care provision became harder during the lockdown. Previous studies of informal caregivers in Singapore have also reported that Malay caregivers have a higher positive perception of caregiving or report a lower caregiver burden compared to Chinese caregivers [48, 49] and have attributed it to differences in cultural and religious beliefs across ethnicities [48].

Employed caregivers were more likely to perceive that their care provision became easier during the lockdown in our study. This is contrary to what the Caregiver Stress Process model suggests: lockdowns could have exacerbated secondary stressors such as work-family conflicts for employed caregivers. However, flexi-place arrangements, that allowed employed caregivers to work from home, were common in Singapore during the lockdown [2]. These may have benefited employed caregivers by not only saving their time and resources from commuting and being able to engage in caregiving more flexibly, but also by improving their relationship with their care recipients [50].

We also found support for hypothesis 2 that informal caregivers who were disadvantaged in terms of contextual characteristics and stressors were more likely to perceive that their care provision became harder during the lockdown. Our finding that caregivers whose care recipients have limitations in ADLs and IADLs were less likely to perceive that their care provision became easier, as well as more likely to perceive that it became harder during the lockdown is not surprising, and is consistent with previous studies on the predictors of caregiving burden [19, 49, 51]. We also observed that socially isolated caregivers were less likely to perceive that their care provision became easier during the lockdown. Previous studies have also shown that caregiver social isolation and care-recipient health status were key predictors of caregiver burden, both before and during the pandemic [16, 18, 26].

We found that the perception that care provision became harder during the lockdown was more likely among caregivers with caregiving support from non-cohabiting family members before the lockdown and less likely among caregivers with caregiving support from cohabiting family members before the lockdown. This highlights the role of a caregiving network, comprising family members within and outside the household, as an important source of support for caregivers. With movement restrictions imposed by the lockdown, non-cohabiting family members were no longer able to provide caregiving support to the caregiver, which would have resulted in greater caregiving responsibilities for the caregiver. For caregivers who were already receiving caregiving support from cohabiting family members, such family members would have been available more readily and for greater durations during the lockdown, resulting in greater sharing of caregiving responsibilities and the perception that caregiving had not become harder [20].

In support of hypothesis 3, we found that caregivers who perceived that their care provision became harder during the lockdown were more likely to have negative experiences of caregiving, i.e., disturbed schedule and poor health, lack of finances, and lack of family support. This substantiates as well as adds to the findings from the existing literature that lockdowns can worsen physical and psychological wellbeing of caregivers [17, 19]. However, we did not find evidence for an association between the perceived impact of the lockdown on care provision and caregiver esteem. It is possible that short-term fluctuations in care provision, such as those during a 2-month lockdown, do not impact constructs like caregiver esteem, which may be driven by the longer-term, even lifelong, relationship between the caregiver and the care recipient.

Limitations

We are mindful of the limitations of this study. First, data on the perceived impact of the lockdown on care provision were collected from informal caregivers about 3 months after the lockdown had ended. While the interval of 3 months is short, likely limiting recall errors, it may not be congruent with prospectively collected data.

Information on negative and positive experiences of caregiving was also cross-sectional in nature, thus providing a limited insight into the change in such experiences from before to after the lockdown. Second, our cross-sectional data on care recipients' health status did not allow us to assess differences between caregivers of care recipients with specific chronic diseases or caregivers whose care recipients' health changed over time, factors that have been shown in previous studies to influence the experience of caregiving [52, 53]. Future studies, based on prospective data, which are collected before, during, and after similar lockdowns and with more detailed information on the care recipients' health are recommended. Third, while all respondents were informal caregivers, the survey did not collect information on whether the caregiver was a primary caregiver of the care recipient or on the quality of the relationship between the caregiver and the care recipient. It is possible that the detrimental impact of the lockdown on care provision may be underestimated among caregivers who were not the primary caregiver. Future studies should assess if the impact of lockdowns on care provision varies by the nature of caregiving (whether the caregiver is a primary or secondary caregiver) and the quality of the relationship between the caregiver and the care recipient. Fourth, we did not have data on what aspects of caregivers' experiences changed during the lockdown. For example, virtual contact with family and friends may have increased for some caregivers, and routines and daily activities may have been adapted to meet restrictions imposed during the lockdown, and, in turn, have impacted the caregiving experience for the caregiver. Finally, this study is limited to Singapore citizens and permanent residents and is in the context of an intensive 2-month lockdown. The findings may not be fully generalizable to other countries, where different measures and/or restrictions of different intensities or durations were adopted. Although the SLP is an ongoing monthly panel survey, asking questions that help address the various limitations detailed above in an upcoming wave of the SLP will likely not be beneficial, given the time that has elapsed since the lockdown (April–May 2020). However, if a similar lockdown is warranted in the future, then collection of such variables before, or as close to the start, during, and after the lockdown should be strongly considered. It will also be helpful to conduct qualitative research with caregivers purposively sampled based on their perception of the impact of lockdowns on care provision to gain a nuanced understanding of the underlying drivers for their perceptions.

Conclusion

A nationwide COVID-19-related lockdown did not make care provision harder for all informal caregivers. However, those for whom it did were more likely to have greater negative experiences of caregiving. The variability in the perceived impact of the lockdown on care provision highlights that caregiver subgroups, comprising older caregivers, male caregivers, non-employed caregivers, and caregivers in worse health are likely more vulnerable within an already at-risk population group and would benefit from greater support if lockdowns are imposed in future.

Our study indicates that caregivers benefit from support from others both within and outside their household and that caregiving during a lockdown becomes harder in the absence of such support. Therefore, our research implies that if there is adequate preparation time available before the imposition of movement restrictions such as those during a lockdown, caregivers should be allowed to make alternative arrangements like the moving-in of non-cohabiting caregivers or the temporary relocation of their care recipient to a household where more than one caregiver is available. Some subgroups of caregivers, such as those where care recipients have functional limitations, are especially vulnerable and need to be prioritized in terms of continued provision of formal caregiving support for their care recipients. Our results also suggest that flexi-place work arrangements available to employed caregivers may have made their caregiving easier during the lockdown compared to before the lockdown when such arrangements were infrequently available. Such arrangements that permit work from home are likely to benefit employed caregivers at all times and should become a permanent aspect of employment arrangements wherever feasible. Overall, the heterogeneity of the impact of lockdowns, contingent on the caregiver, care recipient, and caregiving context characteristics, and possible flexibility for non-cohabiting family members who support caregiving provided by informal caregivers, should be considered while planning for future similar disruptions.

Statement of Ethics

Ethics approval for the Singapore Life Panel was obtained from the Singapore Management University Institutional Review Board (Reference No. IRB-20-080-A052[720]). All participants provided written informed consent before the baseline survey.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

This research was supported by the Ngee Ann Kongsi, and by the Ministry of Education, Singapore, under its Academic Research Fund Tier 3 programme (Award Reference No. MOE2019-T3-1-006).

Author Contributions

V.M.Q., R.M., and A.V. contributed to the conceptualization and design of the study. V.M.Q. conducted the data analyses, interpreted the data, and prepared the first draft of the manuscript. R.M. and A.V. contributed to data analysis and its interpretation. All authors substantially revised the manuscript and contributed to the final version of the manuscript.

Data Availability Statement

The data used in this study are available from the Singapore Management University but restrictions apply to the availability of these data, which were used under licence for the current study, and so are not publicly available. Data are, however, available from the authors upon reasonable request and with permission of the Singapore Management University. Further enquiries can be directed to the corresponding author.

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