

## ORIGINAL ARTICLE

# The relationship between perceived social support and depressive symptoms in informal caregivers of community-dwelling older persons in Chile

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## INTRODUCTION

Depressive symptoms are one of the most important causes of disability in the world and a leading contributor to the global burden of disease.<sup>1,2</sup> By 2050, nearly 80% of older persons in the world will live in

emerging and developing economies,<sup>3</sup> and as a result, the role played by informal caregivers will become increasingly relevant. However, informal caregiving has been extensively linked to depression for decades<sup>4</sup> and it remains an important issue with

## Abstract

**AIM:** Depression among caregivers of older persons is a serious concern, but it is often overlooked and neglected in developing countries. The aim of this study was to examine the relationship between perceived social support and depression in informal caregivers of community-dwelling older persons in Chile.

**Methods:** We analyzed cross-sectional secondary data on 377 dyads of community-dwelling older persons and their informal caregivers from a nationwide survey in Chile. The Duke-UNC Functional Social Support Questionnaire (FSSQ) was used to measure caregivers' perceived social support, and the Center for Epidemiologic Studies Depression Scale assessed their depression.

**Results:** In this study, 76.9% of the caregivers perceived a high level of social support, and 46.9% were assessed as having depression. Based on multivariable analysis, factors that decrease the likelihood of being depressed are a high level of social support (odds ratio (OR) = 0.311, 95% confidence interval (CI): 0.167–0.579) and having taken holidays in the past 12 months (OR = 0.513, 95%CI: 0.270–0.975). Factors that increase the likelihood of being depressed are being a female caregiver (OR = 2.296, 95%CI: 1.119–4.707), being uninsured (OR = 4.321, 95%CI: 1.750–10.672), being the partner or spouse of the care recipient (OR = 3.832, 95%CI: 1.546–9.493), and the number of hours of care (OR = 1.053, 95%CI: 1.021–1.085).

**Conclusion:** Higher levels of perceived social support and holidays were associated with lower levels of depression. However, being female, being the care recipient's partner or spouse, being uninsured, and having long care periods had detrimental effects. Interventions to preserve and enhance perceived social support could help improve depressive symptoms in informal caregivers. Additionally, support should be available to caregivers who are women, uninsured, and the care recipient's partner or spouse, as well as those who provide care for long hours, to ensure they have respite from their caregiving role.

regard to the burden of informal caregivers of older persons.<sup>5,6</sup>

Although informal caregivers of older persons have been shown to have poorer mental health than non-caregivers,<sup>7,8</sup> mental health remains largely ignored in Latin America. This neglect is especially distressing given that the burden of mental illness is a growing concern in the region,<sup>9</sup> including in Chile,<sup>10</sup> one of the oldest countries in Latin America.<sup>11</sup> However, there is a fundamental lack of adequate and deep epidemiologic and country-specific research on old age in Chile.<sup>12</sup>

Studies have shown that social support benefits informal caregivers by supporting coping and adjustment to this role and by improving their mental health<sup>5,13–15</sup>; a lack of social support has been associated with poorer mental health among caregivers.<sup>16</sup> Perceived social support also has the capability to diminish the detrimental effects of stress and improve health.<sup>17–19</sup> However, most studies related to perceived social support were conducted outside Chile. To the best of our knowledge, only one Chilean study has addressed perceived social support and depression in caregivers, specifically caregivers of haemodialysis patients.<sup>20</sup> In general (in Chile), studies on social support have been limited to caregivers of persons with schizophrenia and have used burden, not depressive symptoms, as an outcome measure.<sup>21,22</sup>

The importance of this study stems from the reliance on family members to provide care in most developing countries, which usually lack national long-term care programmes. In turn, these caregivers depend on their social networks for support. Currently, Chile lacks a state-sponsored long-term care system that offers state-sponsored support services.<sup>23</sup> Formal social support was previously reported to be little to non-existent,<sup>24</sup> and family remains the main source for social support amid 'scant social investment in older persons...' and the lack of a '...robust social protection system for old age'.<sup>25</sup> This poses a great burden on untrained informal caregivers, who are decreasing in number. As a consequence of this burden, depression threatens the provision of informal care as a first-line defence against institutionalization.<sup>26</sup> Therefore, the authors aim to address the limited evidence regarding caregiver depression and social support in Chile.

Based on independent care recipient predictors of caregiver depression identified in the literature, we

adjusted our model to include younger age, lower education, and dependence in completing activities of daily living (ADL) and instrumental activities of daily living (IADL).<sup>27</sup> Likewise, based on independent caregiver predictors of depression in the literature, we adjusted our model to include being a partner or spouse and the number of hours of caregiving.<sup>7</sup> Some have argued that the association between caregiving for older persons and depression relates to the lifestyle restrictions, such as personal life, social life, and employment, as well as increasingly difficult caregiving tasks.<sup>27</sup> As such, we hypothesize that in the absence of a long-term care system, there may be a beneficial relationship between perceived social support and depression in caregivers of older persons. Among main caregivers in Chile, this relationship has not been previously examined with nationally representative data from a nationwide survey.

## METHODS

We conducted an analysis of the National Survey on the Dependency of Older Persons, a secondary nationwide survey in Chile created from a dual-target (caregiver and older person) multistage probabilistic sample. The survey's sampling framework was taken from the last valid population and housing census in Chile, which occurred in 2002 and aimed to collect epidemiological data from persons aged 60 and over. Stratification was based on rural and urban settings (according to population size) and location (subjects from all regions were included). Units of analysis were, in descending order, cities, blocks, and houses. Houses were randomly selected. One person aged 60 and over was selected per house, but if there were multiple persons aged 80 and over, all were selected to account for the increased prevalence of dependency in older age groups. Details on the survey were published in a report by the National Agency for Elderly People of Chile.<sup>28</sup>

The original survey consisted of 4766 respondents aged 60 and over and their informal caregivers, if any. Ninety-one percent of respondents completed the survey themselves, whereas the remaining 9% were surrogates for an older person with some degree of cognitive impairment as determined by the short version of the Mini-Mental State Examination (MMSE) (i.e. a score  $\leq 12$  points). The surrogates

could not have cognitive impairment, and they required a Pfeffer Functional Activities Questionnaire score  $\geq 6$  points to participate. The survey was administered by 126 adults, aged 18 and over, who had previous experience with complex surveys and preferably had some tertiary education. To minimize possible bias, the surveyors were trained on all the items of the survey and on using a personal digital assistant to enter the responses. The personal digital assistant provided real-time validation of the entered data to avoid measurement errors. Data collection took place from November 2009 to January 2010.

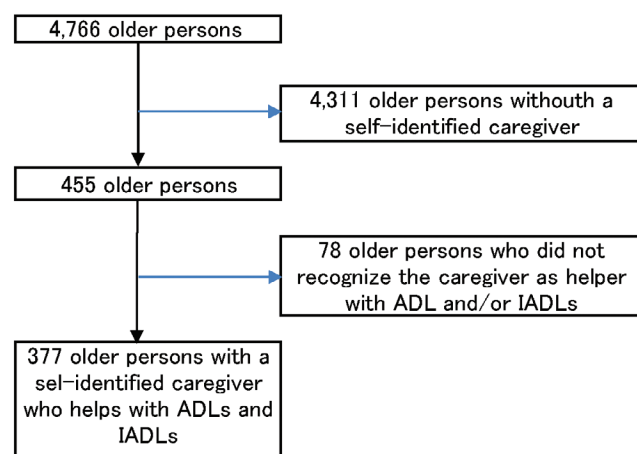
### Subjects

The sample for this study consisted of 377 dyads of older persons and their informal caregivers (Fig. 1).

For this study, older persons are those aged 60 and older who live in the community and acknowledge receiving assistance from a main caregiver. Main caregivers are those who identified themselves as main caregivers and were independently recognized by the older person as a provider of care related to ADL and/or IADL. This operational definition was set to avoid misclassification of the caregivers based on legal or economic definitions of the role of the main caregiver.

### Measurements

Depressive symptoms, the outcome, were measured with the Center for Epidemiological Studies Depression Scale (CESD). CESD is an extensively used tool



**Figure 1** Flow chart of older person and informal caregiver dyads. ADLs, activities of daily living; IADLs, instrumental activities of daily living.

for measuring the degree of depressive symptoms in the general population.<sup>29</sup> This scale has been translated into Spanish and validated in Chile.<sup>30</sup> An official report by the National Agency for Elderly People of Chile provided descriptive data on the caregivers in the analyzed data.<sup>28</sup> However, this report included information from all self-identified main caregivers, including those whom care recipients did not recognize as being involved in the provision of care related to ADL and/or IADL. The CESD's 20 items were rated on a 4-point scale, with a range of 0 (experienced rarely or none of the time) to 3 (experienced most or all of the time). The total score range was 0–60 points, with 16 points or higher indicating some degree of depressive symptoms.

Caregivers' perceived social support, the primary exposure of interest, was measured with the FSSQ.<sup>31</sup> The 11 items were rated on a scale of 1 (much less than desired) to 5 (as much as desired), with total score ranging from 0 to 55. A score of 32 or higher indicates a high degree of perceived social support (coded as 1) according to the validated Spanish version of the questionnaire.<sup>32</sup>

Because of the subjective nature of perceived social support, we also asked binary questions regarding social support received by the caregiver in the bivariate analysis. The questions were 'Have you taken holidays in the past 12 months?', 'Have you received training on care?', and 'Do you receive community support?'

### Covariates

Covariates were collected to identify potential confounding factors for depression. They have been divided into three categories: (i) caregiver characteristics; (ii) caregiving characteristics; and (iii) care recipient characteristics. Caregiver characteristics included age, gender (female or male), years of education, marital status (married, divorced, widowed, or single), and health insurance status (insured or uninsured). Caregiving characteristics included setting (rural or urban), hours of care, relation with the care recipient (partner or spouse, child, or other), and their co-residential status (yes or no). Care recipient characteristics included independence in ADL as measured by the Katz Index of Activities of Daily Living (Katz Index), independence in IADL as measured by the Lawton–Brody Instrumental Activities of Daily Living

Scale (Lawton–Brody Scale), and cognitive impairment as measured by the short version of the MMSE.

The Katz Index's six items were rated dichotomously as 0 (with help) or 1 (without help). The total score range was 0–6, with higher scores indicating more independence in ADL.<sup>33</sup> The Lawton–Brody Scale's items were rated on a 3-point scale: 3 points (without help), 2 points (with help), and 1 point (cannot do it). The total score range was 0–24, with higher scores indicating more independence in IADL.<sup>34</sup> The MMSE evaluated care recipients' understanding of space–time location, short-term memory, and concentration.<sup>35</sup> The high score on the short version of the MMSE is 19 points, and a score <13 points is considered to indicate cognitive impairment.

### Data analyses

To detect correlations, we used Pearson's and Spearman's correlation coefficients; correlations with  $\rho \geq 0.7$  were considered strong. To examine the bivariate relationship between each explanatory variable and the primary outcome of depression, we used the  $\chi^2$  test for categorical variables and the *t*-test for continuous ones.

Explanatory variables entered into the final binary logistic regression analysis had a relationship strength in the bivariate analyses that was within 0.25 of significance. However, care recipient characteristics (Katz Index score (ADL), Lawton–Brody Scale score (IADL) and cognitive impairment) were forced into the model. Observations with missing data were excluded from the multivariable analysis. Odds ratios (OR) with 95% confidence intervals (CI) were reported as statistically significant. Data was analyzed using SPSS version 22 (IBM SPSS Statistics for Windows, IBM Corp., Armonk, NY).

Written consent to analyze this secondary data was obtained from National Agency for Elderly People of Chile, who originally collected the data. As such, the agency was responsible for obtaining respondents' consent and any ethical considerations, including review by an appropriate ethics committee.<sup>28</sup>

## RESULTS

Caregivers in this sample had a mean age of 51.73 years. Most of them were women (85.1%), and they had an average of 8.22 years of education. The mean amount of care was 15.64 h. Nearly half of the

caregivers (43.8%) were the children of care recipients, and around one-fourth (23.3%) were the partners or spouses. An extensive summary of descriptive characteristics of caregivers is in Table 1.

Depressive symptoms were observed in nearly half of the caregivers (46.9%). More than three-fourths (76.9%) perceived themselves as having a higher level of social support. Measures of received social support showed that nearly one-fourth (22.0%) had taken holidays in the past 12 months. Few had received care training (7.4%) or community support (5.3%). Cronbach's  $\alpha$  was 0.857 for CESD and 0.894 for the FSSQ. Details of the main outcome and exposure can be found in Table 2.

### Bivariate analysis

Among those factors associated with being depressed in our bivariate analyses, we found that the perceived social support, having taken holidays in the past 12 months, the carer's age, the carer's gender, the carer's years of education, being insured, the number of hours of care, relation to the care recipient, co-residence, Katz Index score, and Lawton–Brody Scale score were associated within a statistical significance of  $P < 0.25$  (Table 3). This *P*-value was used as the criterion for considering variables in the subsequent multivariable model. Cognitive impairment, despite not being statistically significant in the bivariate analysis, was included to adjust for care recipients' characteristics.

### Multivariable analysis

The final model for the dichotomous outcome of caregiver depression consisted of 11 explanatory elements (Table 4). No multicollinearity was detected among the predictors.

A higher level of perceived social support, as opposed to a lower one, decreased the likelihood of a caregiver being depressed (OR = 0.31, 95%CI: 0.17–0.58). Also, beneficial was having taken holidays in the past 12 months (OR = 0.51, 95%CI: 0.27–0.98).

Detrimental factors that increased the likelihood to being depressed were being female (OR = 2.38, 95%CI 1.14–4.99), being uninsured (OR = 4.63, 95%CI 1.84–11.66), being the partner of the care recipient, as opposed to other (OR = 3.83, 95%CI 1.55–9.49), and each additional hour of care (OR = 1.05, 95%CI: 1.02–1.09). With these additional hours, the average

**Table 1** Basic characteristics of the caregivers (N = 377)

Item	
Caregiver characteristics	
Age (years)	
Mean	51.7
Median (range)	50 (15–87)
Gender, <i>n</i> (%)	
Male (ref)	56 (14.9)
Female	321 (85.1)
Education (years)	
Mean	8.2
Median (range)	8 (0–17)
Marital status, <i>n</i> (%)	
Married	212 (56.2)
Divorced	28 (7.4)
Widowed	21 (5.6)
Single	116 (30.8)
Health insurance, <i>n</i> (%)	
Uninsured	32 (8.5)
National	320 (84.9)
Private	9 (2.4)
Other	8 (2.1)
Caregiving characteristics	
Setting, <i>n</i> (%)	
Rural	127 (33.7)
Urban	250 (66.3)
Hours of care	
Mean	15.6
Median (range)	14 (1–24)
Relation to the care recipient, <i>n</i> (%)	
Partner or spouse	88 (23.3)
Child	165 (43.8)
Stepchild	4 (1.1)
Parent/parents-in-law	2 (0.5)
Sibling/sibling-in-law	16 (4.2)
Child-in-law	26 (6.9)
Grandchild	27 (7.2)
Other relative	25 (6.6)
Non-relative	18 (4.8)
Private care	6 (1.6)
Co-residence, <i>n</i> (%)	
No	54 (14.3)
Yes	320 (84.9)
Care recipient characteristics	
Katz Index score (ADL)	
Mean	3.4
Median (range)	4 (0–5)
Lawton–Brody Scale score (IADL)	
Mean	13.8
Median (range)	14 (2–24)
Cognitive impairment, <i>n</i> (%)	179 (47.5)
Outcome: depression of caregiver (CESD score)	
Mean	16.8
Median (range)	15 (0–50)
Exposure: perceived social support (FSSQ)	
Mean	39.3
Median (range)	41 (11–55)
Received social support, <i>n</i> (%)	

**Table 1** Continued

Item	
Has taken a holidays in the past 12 months	83 (22.0)
Has received care training	28 (7.4)
Receives community support	20 (5.3)

ADL, activities of daily living; CESD, Center for Epidemiologic Studies Depression Scale; FSSQ, Duke-UNC Functional Social Support Questionnaire; IADL, instrumental activities of daily living.

amount of care provided by Chilean caregivers was 16 h (OR = 2.25).<sup>16</sup>

## DISCUSSION

The present study's main findings indicate that depressive symptoms are relatively prevalent among caregivers and that higher social support can help prevent depressive symptoms. A previous study of caregivers of patients attending haemodialysis in Chile reported that 43.8% had depression according to the CESD (95%CI: 36.42–51.53),<sup>20</sup> which is similar to the 46.9% found in our study. In other countries where the CESD was used with the same cut-off score of 16, the prevalence of depression seemed to be lower. In Japan, a study showed that the prevalence was 34.2% among informal caregivers of community-dwelling elderly persons who used the long-term care insurance system.<sup>36</sup> In Canada, the prevalence was 21% among informal caregivers of demented elders in the community,<sup>37</sup> despite dementia supposedly placing a higher strain on caregivers compared to caregivers of people without dementia. In Spain, a sample of caregivers of disabled older persons reports a prevalence of 36.9% for both sexes, although disability may pose a higher burden for caregivers compared to caregivers of people without disabilities.<sup>38</sup> In the USA, among caregivers of impaired elderly the prevalence of depression was 35.2%.<sup>39</sup> It can be argued that the prevalence of depression among caregivers in Chile is high, especially given the prevalence of depressive symptoms in the general population was estimated to be 17.2% based on nationally representative data for 2009–2010,<sup>40</sup> for which depression was assessed with the Short Form of the Composite International Diagnostic Interview.<sup>41</sup>

The results of the present study show the importance of addressing caregivers' depressive symptoms

**Table 2** Main outcome and exposure (N = 377)

Item	n (%)
Outcome: depression of caregiver (CESD)	
Not depressed (<16)	200 (53.1)
Depressed ( $\geq$ 16)	177 (46.9)
Exposure: perceived social support (FSSQ)	
Lower (<32)	87 (23.1)
Higher ( $\geq$ 32)	290 (76.9)

CESD, Center for Epidemiologic Studies Depression Scale; FSSQ, Duke-UNC Functional Social Support Questionnaire.

in a country where the increasing number of older persons require more informal caregivers for whom depression poses a serious burden.<sup>42</sup> This also applies to other countries in the region and developing countries in general, where most older persons will live in the near future.<sup>3</sup> In addition, this study highlights a neglected topic in the literature of the region: social support and depression of informal caregivers. Given the lack of long-term care services and evidence-based policies in developing countries when compared to developed countries, this subject is of the utmost importance.<sup>43</sup>

Our main exposure, perceived social support, appears to act as a preventive against the likelihood of having depressive symptoms. This beneficial effect has been documented before.<sup>5,14,18,19</sup> Previously, a study using the FSSQ found a correlation between depression among caregivers and lower social support.<sup>44</sup> Although this was observed in our bivariate analyses, it was statistically insignificant in our multivariable analysis. It must be noted that there were fewer adjusting variables in this study. Additionally, as in this study, previous studies have found that compared to the effects of received social support, those of perceived social support relate more strongly to depressive symptoms.<sup>14,19,45</sup> This may reflect the importance of the quality of the social support rather than the quantity or the perception of availability over actual reception.<sup>5,14</sup>

With regard to the covariates in the present study, female caregivers were nearly 2.4 times more likely to be depressed than male caregivers. Previous studies have shown the detrimental effects of being a female caregiver and the partner of the care recipient.<sup>27,46,48</sup> Livingston *et al.* explained that the higher prevalence of depression in female caregivers negates the idea that women adapt more 'naturally' to the role of caregiver. However, women generally

have a higher likelihood of being depressed.<sup>19</sup> This is consistent with nationally representative data on the general population in Chile, where the prevalence of depression in women is three times that in men (25.7% vs 8.5%).<sup>40</sup> Therefore, this relationship may be the result of gender rather than differences among caregivers.

Spouse caregivers have been found to have a higher risk for depression.<sup>48</sup> It has been argued that the closer the bond, the more stressful the caregiving role, which could explain this heightened risk. The proximity between dyads could also explain the beneficial effect of being a caregiver who is not the recipient's partner or spouse or even the recipient's child. In this study, partners and spouses were at a higher risk for depression than children and others (alternative analysis not included). This higher risk for spouses than for children has been found before.<sup>47</sup> Partners and spouses experience the detrimental effects of proximity. Nonetheless, the present study found that co-residence of the dyad was not statistically significant, as commonly found in the literature. This could be explained by the fact that the vast majority of dyads lived together (84.9%). This asymmetry may statistically hinder any significant finding.

The lack of a significant association between diminished physical capabilities and depression has been shown before. Livingston *et al.* argued that this may be due to the maintenance or reinforcement of the psychological benefits of a close relationship when the care recipient has diminished functional capabilities.<sup>46</sup> In our study, functional capabilities are reflected in the Katz Index and Lawton-Brody Scale scores. However, there is conflicting evidence regarding caregiver depression and care recipients' impairment. Others authors have found that greater functional impairment relates to higher levels of depression.<sup>27,48</sup> Meshefedjian *et al.* argued that increased physical burden may reduce the mental health of the caregivers. However, they suggest the possibility of bias because depressed caregivers may be more likely to report the disability of their care recipient.

The literature has previously reported that longer hours of care have a detrimental effect on caregivers.<sup>27</sup> Longer hours of care may decrease caregivers' physical and mental health because caregiving is a very physically and mentally demanding job. This may explain why having taken holidays appears to have had beneficial effect for

**Table 3** Bivariate analysis of sociodemographic characteristics and depression

Item	Total <i>n</i> (%)	Depression <sup>†</sup>		<i>P</i> -value
		Not depressed <i>n</i> (%)	Depressed <i>n</i> (%)	
<b>Caregiver characteristics</b>				
Caregivers	377 (100)	200 (53.1)	177 (46.9)	
Age	51.7 ± 15.4	50.2 ± 15.7	53.5 ± 15	0.042
Gender				0.213
Male	56 (14.9)	34 (17)	22 (12.4)	
Female	321 (85.1)	166 (83)	155 (87.6)	
Education (years)	8.2 ± 4.2	8.3 ± 4.5	6.7 ± 4.2	0.000
Marital status				0.431
Single	116 (30.8)	67 (33.5)	49 (27.7)	
Married	212 (56.2)	105 (52.5)	107 (60.5)	
Divorced	28 (7.4)	17 (8.5)	11 (6.2)	
Widowed	21 (5.6)	11 (5.5)	10 (5.6)	
Medical insurance				0.003
Yes	337 (91.3)	187 (95.4)	150 (86.7)	
No	32 (8.7)	9 (4.6)	23 (13.3)	
<b>Caregiving characteristics</b>				
Setting				0.723
Rural	127 (33.7)	69 (34.5)	58 (32.8)	
Urban	250 (66.3)	131 (65.5)	119 (67.2)	
Hours of care	15.6 ± 8.3	13.6 ± 8.2	17.9 ± 7.8	0.000
Relation to the care recipient				0.000
Partner or spouse	88 (23.3)	33 (16.5)	55 (31.1)	
Child	169 (44.8)	87 (43.5)	82 (46.3)	
Other	120 (31.8)	80 (40)	40 (22.6)	
Co-residence				0.012
No	54 (14.4)	37 (18.8)	17 (9.6)	
Yes	320 (85.6)	160 (81.2)	160 (90.4)	
<b>Care recipient characteristics</b>				
Katz Index score (ADL)	3.4 ± 1.7	3.5 ± 1.6	3.25 ± 1.8	0.140
Lawton–Brody Scale score (IADL)	13.8 ± 4.9	14.1 ± 4.9	13.5 ± 4.9	0.160
Cognitive impairment				0.592
No	143 (44.4)	74 (43)	69 (46)	
Yes	179 (55.6)	98 (57)	81 (54)	
<b>Perceived social support (FSSQ)</b>				
Lower (<32)	87 (23.1)	30 (15)	57 (32.2)	0.000
Higher (≥32)	290 (76.9)	170 (85)	120 (67.8)	
<b>Received social support</b>				
Has taken holidays in the past 12 months				0.006
No	294 (78)	145 (72.5)	149 (84.2)	
Yes	83 (22)	55 (27.5)	28 (15.8)	
Has received care training				0.737
No	349 (92.6)	186 (93)	163 (92.1)	
Yes	28 (7.4)	14 (7)	14 (7.9)	
Receives community support				0.271
No	357 (94.7)	187 (93.5)	170 (96)	
Yes	20 (5.3)	13 (6.5)	7 (4)	

Data are presented as *n* (%) or mean ± SD. <sup>†</sup>A Center for Epidemiologic Studies Depression Scale score ≥16 indicates depression. ADL, activities of daily living; FSSQ, Duke-UNC Functional Social Support Questionnaire; IADL, instrumental activities of daily living.

caregivers in this study: holidays provided relief effects.

Among this study's strong points is the large, nationally representative data set, which in its original form included an expansion factor, enabling the figures to be extrapolated to represent the entire nation. In contrast, previous studies in Chile on caregiver

experiences used limited samples. This study was also able to employ a wide set of relevant factors related to depression in caregivers, which have been previously documented in the literature. Another strength is the restricted definition of caregiver instead of self-identification. Our definition allowed us to identify those caregivers who actually assist

**Table 4** Logistic regression of social support and depression† (n = 315)

Variables in the equation	Exp (B)	95%CI	
		Lower	Upper
Perceived social support (ref = lower social support)			
Higher social support	0.311	0.167	0.579
Has taken holidays in the past 12 months	0.513	0.270	0.975
Carer's age (years)	0.982	0.959	1.005
Carer's gender (ref = male)			
Female	2.381	1.136	4.988
Education (years)	0.943	0.879	1.010
Health insurance type (ref = insured)			
Uninsured	4.629	1.838	11.656
Relation to care recipient (ref = other)			
Partner or spouse	3.832	1.546	9.493
Child	1.387	0.762	2.523
Hours of care	1.052	1.017	1.087
Co-residence (ref = no)	0.939	0.828	1.064
Katz Index score (ADL)	0.966	0.902	1.034
Lawton–Brody Scale score (IADL)	0.996	0.806	1.230
Cognitively impaired care recipient (ref = no)			
Yes	0.765	0.431	1.357
Constant	2.467		
Hosmer–Lemeshow test			
Step	$\chi^2$	d.f.	P-value
1	2.125	8	0.977

† A Center for Epidemiologic Studies Depression Scale score  $\geq 16$  indicates depression. ADL, activities of daily living; CI, confidence interval; IADL, instrumental activities of daily living.

with ADL and IADL. Nonetheless, our definition could not identify caregivers who do not identify as such,<sup>49</sup> which is a limitation of the original data collection.

The main limitation of this study was its cross-sectional design, which precluded us from determining causality based on the associations. It prevented us from establishing if caregivers were depressed because of lower perceived social support or if perceived social support was lower because they were depressed. We tried to address this by including objective elements of received social support, which improved the fitness of the multivariable model while providing statistically significant findings.

Another limitation of this study was the absence of information regarding the economic resources of caregivers, care recipients, and households. It has been previously reported that economic health probably mitigates the stresses of caregiving.<sup>27</sup> We argue that a closer surrogate to caregiver income could be their years of education, which was close to significant in this study. However, the fact that primary education in Chile is mandatory and free for those without resources may preclude this assumption. Another factor that may indicate caregiver wealth is

having private health insurance, which is generally more expensive system for the provision of health services. However, in this study, only 2.4% of caregivers had private health insurance. A much larger proportion (84.9%) was enrolled in the national insurance system, which often serves poorer segments of the population. Their use of national insurance may be explained by their inability to have a paid job because of their caregiving duties, which therefore limits their access to more expensive insurance.

Based on our findings, we believe that the beneficial effects of social support should be further explored. In particular, future studies should consider the effects of activities involving social interactions, such as volunteer programmes and intergenerational programmes, as well as the provision of government-sponsored long-term care programmes to complement informal support,<sup>50</sup> such as cash transfers, in-kind benefits, and respite care for caregivers. Additionally, research should examine ways to alleviate caregiver burden, which is especially important given that nearly half of caregivers have depression. Although the level of perceived social support was high among survey respondents (76.9%), this could decrease as more people become primary informal caregivers. Also, the effects of the declining marriage rate should be considered, as it will result in more single elderly individuals. Likewise, the declining birth rates means that older persons will not have children to turn to for caregiving. This is all occurring in the context of changing household structure: multiple generations are increasingly less likely to share a household. Because children and partners or spouses account for most of the caregiving force, the social support for caregivers will be certainly reduced.

These demographic trends point to the necessity for a long-term care system that will enable caregivers to have respite and alleviate caregiver burden. This is particularly important for female caregivers, who appear to most vulnerable to the detrimental effects of caregiving. In this study, taking holidays was shown to be beneficial for caregivers. Therefore, how respite affects caregivers should be further explored, as should respite care programmes that enable caregivers to take needed breaks. Policies that address providing support for depressed female caregivers should also be explored. Future studies should examine the spousal obligation to provide



care, which this study found to have a detrimental effect on caregivers. Finally, measures to address depression among uninsured caregivers, particularly in a country with universal health care, should be explored.

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