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RESEARCH

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# Health-related lifestyle of Spanish informal caregivers: Results from two national health surveys

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## Abstract

**Objective:** We examine the health-related lifestyle behaviors of informal Spanish caregivers while controlling for sociodemographic characteristics.

**Background:** Informal caregiving is an essential, albeit invisible, component of any health care delivery system that results in vast savings for national economies. Nevertheless, it remains unknown whether healthy lifestyle behaviors and the subsequent well-being of informal caregivers may compromise their ability to continue providing their essential service.

**Method:** We compared the health-related lifestyle behaviors between informal caregivers and non-caregivers, applying generalized estimating equations analysis.

**Results:** We observed no significant differences in self-rated health status between caregivers and non-caregivers. Women and men older than 44 years of age with less than 20 hours of care per week were more likely to eat fruit and engage in physical activity. Younger women caregivers (18–44 years) with less than 20 hours of care per week were also more physically active. However, younger men with less than 20 hours of care per week smoked more, and women were more likely to use alcohol. No differences were observed between non-caregivers and caregivers with 20 or more of care per week.

**Conclusions:** Informal caregiving affects women and men equally, being hours of care per week a determinant of caregiver/non-caregiver differences on diet, physical activity, smoking, and drinking.

**Implications:** The results from these nationally representative data suggest both a healthy and unhealthy lifestyle caregiver effect for both women and men. This effect

differs on the different health-related behaviors and is related to the amount of time devoted to care.

**KEYWORDS**
alcohol, care, diet, gender, physical inactivity, smoking

Caring for a dependent or elderly person, a common family responsibility, has been reported to be a major health risk factor, described as "caregiver's burden." Informal caregivers are family members or friends close to the family who assist individuals with impairment or disability with activities of daily living or medical tasks without economic remuneration. The tasks performed by informal caregivers are varied, ranging from helping with personal hygiene to providing psychological and emotional support (Adelman et al., 2014). Three groups of informal caregivers are generally identified in the literature: (a) young adult parents caring for children with chronic illness or disability, (b) middle-aged parents caring for adult children with mental illness, and (c) spouses or middle-age children caring for older people (National Research Council, 2010). The complexities and potential caregiving burden in each group could differ due to psychological meaning, socioeconomic circumstances, social capital, or the expected duration of care. However, from a public health perspective, informal caregivers are up to 5 times more likely to develop health problems than non-caregivers (Fernández et al., 2018). The organization and demand for care are presented as a significant societal challenge in Europe because of its economic implications and its impact on relatives' health. In most of the southern European countries including Spain, the management of care is almost entirely delegated to the family.

In Spain, most informal care for elderly or dependent persons is provided by unemployed women older than 50 years, who are of low socioeconomic status (Fernández et al., 2018) and are more likely to take on the heaviest, most intense and complex caring tasks, spending more time than men in caring and being more prone to caregiver's burden (Calvente et al., 2011). Even in those countries with high gender equality, care provision by women is considered a determinant of gender inequalities in health and well-being among Spanish adults: Informal care negatively affects the health of those who provide the care, placing women at greater risk because of the high workload and the type of tasks they perform (Calvente et al., 2011).

It is possible that the caregiver's burden also has been intensified due to the socioeconomic changes during the past 2 decades (Petrini et al., 2019), especifically among women. The economic recession, which in Spain began in 2008 and extended to 2014, has encouraged women's labor force to compensate for loss of family income due to higher male unemployment (Starr, 2014). Thus, considering inequalities and the unequal distribution of informal care in Spain related to gender, the increase in women's participation in the labor force may lead to additional pressure on many women (Starr, 2014), as they may have less leisure time compared with men due to family and caregiving responsibilities (Cascella-Carbó & García-Orellán, 2020; Henderson & Dialeschki, 1991), as well as less social and family support for these tasks (Rodríguez et al., 2019). However, the women's increased labor force involvement may shift informal caregiving responsibilities to men, resulting in a more equal distribution of caregiving tasks, greater gender equity, and potential improvements in women's health (Palencia et al., 2017). Thus, in the context of an economic recession, in which more women work outside the home, there may be greater involvement in informal caregiving from other family members and enhanced intergenerational and family solidarity (Legazpe & Davia, 2019).

Overall, the explanatory mechanisms between caregiver status and health are not clear. Systematic differences in lifestyle behaviors offer one possible explanation for health differences among informal caregivers and non-caregivers. For example, results from some research indicate that, relative to non-caregivers, caregivers have poorer health-related lifestyles related to smoking and alcohol use (Denham et al., 2019; Reeves et al., 2012). By contrast, other research

indicates potential benefits of caregiving for other lifestyle behaviors, such as physical activity (Jacob et al., 2020; McGuire et al., 2010; Reeves et al., 2012).

The effects of informal caregiving on lifestyle behaviors and subsequent health may vary with the strength of the broader economic context. For example, some evidence indicates that in times of recession and the years that follow, the health of the population improves (Boyce et al., 2018), primarily due to health-related lifestyle behaviors, such as increased physical activity, improved dietary habits, and reduced smoking and alcohol use (Asgeirsdottir et al., 2014; Wahlbeck & McDaid, 2012). Specifically, it has been documented that the benefits of economic recession on health-related lifestyle behaviors may be related to the availability of leisure time and the increased willingness to invest in lifestyle (Colman & Dave, 2013; Ruhm, 2005), as well as the lost wages or reduced discretionary funds that also may result in changes in smoking and alcohol use (McClure et al., 2012; Wahlbeck & McDaid, 2012).

Although the effects of informal caregiving on lifestyle have not been investigated in the context of economic recession, a recent study described how health inequalities—related to general and mental health and chronic conditions—persisted during the 2006–2012 period (Salvador-Piedrafita et al., 2017). Specifically, self-reported health status inequalities among informal women caregivers (but not among men) were documented, compared with women non-caregivers, during the economic recession (Salvador-Piedrafita et al., 2017). However, the health effects of care are modulated by the weekly hours spent on care, and both men and women are at high risk of health impairment when they spend a high number of hours caring for dependent persons, which may even lead to an attenuation of gender differences on the health of informal caregivers (Masanet et al., 2011). Also, the suggestion of age differences in health and health-related lifestyle is a topic of interest that requires confirmation by further studies. Younger caregivers tend to be more stressed and have less social support (Fredman et al., 2010), which may also affect physical health and health-related lifestyle behaviors; it has even been documented that some risk factors, such as smoking, are associated only with younger caregivers (Reeves et al., 2012).

Therefore, there remains a need to demonstrate how the economic recession may have influenced health and health-related lifestyle differences between caregivers and non-caregivers in the long term, especially among young women who spend more time providing care. Here we compare the self-reported health status and health-related lifestyle behaviors of Spanish informal caregivers and non-caregivers living in Spain during 2014–2017—that is, after the economic recession of 2008, considering gender, age, and number of hours of care as conditional factors of caregivers' health and health-related lifestyles. We hypothesized that (a) considering gender inequalities in care provision, there would be greater differences in health and health-related lifestyles between women caregivers and non-caregivers than among men; (b) the health and health-related lifestyle of informal caregivers will be poorer compared with non-caregivers, especially in those people who devote more hours providing care (those who might have less leisure time); and (c) we would observe worse health and lifestyle outcomes among younger caregivers compared with non-caregivers.

# METHODS

## Data sources and participants

Secondary data from the 2017 Spanish National Health Survey (SNHS) and the 2014 European Health Interview Survey (EHIS) for Spain were combined for this study. The 2014 EHIS for Spain and the 2017 SNHS adult questionnaires included 22,842, and 23,089 people older than 15 years of both sexes, respectively. Data were retrieved from the 2014 and 2017 surveys to compare the self-rated health status and health-related lifestyle of caregivers and non-caregivers

in the aftermath of the economic recession in Spain (2008–2014). For this study, we analyze a sample of 44,755 people (24,194 women and 20,581 men) older than 18 years.

The SNHS and EHIS collect data using personal home interviews to examine a representative national sample of Spain's noninstitutionalized population residing in main family dwellings (households). Both surveys used a complex sample design through a multistage cluster method with a proportional random selection of primary and secondary sampling units (regions, populations, and census sections, respectively), and quotas selected the final sample based on sex and age. The interviews in these surveys were conducted in four 15-day stages to avoid seasonal biases in terms of lifestyle and morbidity. The reference period for each variable explored consisted of 2 weeks and 1 year from the day of data collection. The response rate for each survey was 74.6% (in 2014) and 74.0% (in 2017). More SNHS and EHIS methodology details are published elsewhere (Instituto Nacional de Estadística, 2019).

The analyses in this study used anonymized data belonging to secondary databases from the Spanish Ministry of Health, Consumer Affairs and Social Welfare, and the National Institute of Statistics. Those data could be obtained for restricted, scientific use through a commitment of the principal investigator and the 2016/679 EU Regulation and Spanish RD-Law 5/2018 with the administrators of the data repositories. These regulations view anonymized data as non-human subjects data that pose no risk of harm or discomfort to individuals.

## Measurements

To identify informal caregivers and weekly hours of care, EHIS 2014 and SNHS 2017 used the following questions: "Do you provide care at least once a week for an elderly person or someone who has a chronic health condition? This does not include caregiving as part of your job" and "In total, how many hours per week do you spend caring for this/these person(s)?" Those who responded yes to the first question were classified into intensity of care based on reported number of hours per week spent caring for this/these person(s): (a) those who spent less than 20 hours per week of care and (b) those who spent 20 or more hours per week of care. The cut-point of 20 hours per week of caregiving was set based on previous research suggesting an intensity of care that could impede physical health (Hirst, 2005). Those who responded no to the question related to care were considered non-caregivers.

We identified health-related lifestyle outcomes that were common among the different health surveys. For example, physical activity was obtained from the self-reported frequency of leisure-time physical activity, classifying the population as (a) inactive, (b) occasionally active, (c) several times a month, and (d) several times a week. Fruit intake and vegetable intake were defined as dichotomous variables depending on the weekly consumption frequency (daily or not daily). Tobacco use was assessed by smoking habits (current smoker, ex-smoker, and non-smoker), and alcohol use was classified according to the frequency of consumption during the past 12 months: (a) never or not in the past 12 months, (b) monthly frequency (less than once a month, once a month, 2–3 times a month), (c) weekly frequency (1–2 days a week, 3–4 days a week), and (d) almost daily or daily (5–6 days a week and daily use).

We also identified the self-rated health status using the question: "Within the past 12 months, would you say your health was very good, good, fair, bad, or very bad?" Participant responses were dichotomized to avoid a high degree of disaggregation across the categories (Manor et al., 2000). Individuals reporting "very good" or "good" health were categorized as having "Good self-rated health status." In contrast, individuals reporting "fair," "bad," or "very bad" were classified as having "Poor self-rated health status."

Employment status (working, unemployed, retired, homemaker, or other situations), educational attainment, occupational social class, marital status (married, single, or other situations), place of residence, annual net household income (<€25,000 or ≥ €25,000, cutoff from the

median income of Spanish households according to the latest available data from the Bank of Spain), and the types of income or allowances received by residents not employed in the household (yes, no)—(a) income from work (self-employed or employed); (b) unemployment benefits or subsidies; (c) pension for retirement or widowhood, disability, or incapacity pension; (d) financial benefits for family support; or (e) other regular income or other regular social benefit or allowance—were evaluated. The last level of formal completed studies was used to assign educational attainment (UNESCO Institute for Statistics, 2012): high education (levels 5–8: short-cycle tertiary education, bachelor's level or equivalent, master's level or equivalent, or doctoral level or equivalent), middle education (levels 3–4: upper secondary education or post-secondary nontertiary education), and primary or no education (levels 0–2: early childhood education, primary education or lower secondary education). Occupational social class was determined based on the neo-Weberian classification, the origins of which lie in the occupation of the primary breadwinner as developed by the Working Group on Determinants of the Spanish Society of Epidemiology (Domingo-Salvany et al., 2013): high occupational social class (executives of government and companies, senior civil servants, professionals, technicians, managers, and owner-managers of commerce and personal services, other technicians (non–high-level technicians), artists and athletes, middle occupational social class (middle managers, administrative personnel, military protection, and security services), and low occupational social class (semiskilled and manual workers in class IV–V industry, commerce and services, and unskilled workers). Place of residence was classified according to the number of inhabitants in the municipality, defined by three groups: metropolitan areas (large urban areas, up to 500,000 inhabitants), urban municipalities (medium-sized urban areas, 10,000–500,000 inhabitants), and rural municipalities (<10,000 inhabitants).

## Statistical analysis

Prevalence (%) and 95% confidence interval (CI) were computed for health status and health-related lifestyle behaviors and reported by the level of care provision. Prevalence was age-adjusted to guarantee the comparability of groups (i.e., non-caregivers, caregivers who spent less than 20 hours per week of care, and caregivers who spent 20 or more hours per week of care) among women and men by a direct method of standardization using weights from the European Standard Population (Pace et al., 2013). Subsequently, multivariate logistic regression models were used to estimate the association of caregiving status with self-rated health status and health-related lifestyle behaviors among women and men, while also adjusting for within-survey year clustering using generalized estimating equations. Each health and health-related lifestyle variable was separately included in regression models. Odds ratios (OR) and 95% CIs were calculated through an analysis adjusted by age (continuous), educational attainment, occupational social class, employment status, marital status, annual household net income, and survey year. Additional adjustments for the place of residence did not influence the estimates; therefore, this variable was not included in the models. Analyses were also stratified into two age groups, 18 to 44 years of age and older than 44 years of age, to assess further whether health indicators were similar across age groups. All analyses were conducted using SPSS version 24.0 (IBM Corp., Armonk, NY).

## Results

The prevalence of providing more than 20 hours of informal caregiving each week is not evenly distributed in the population. The age-adjusted prevalence estimates indicated that individuals providing high levels of care were disproportionately lower status across all indicators of

Family Relations Interdisciplinary Journal of Applied Family Science

**TABLE 1** Age-adjusted prevalence (% and 95% confidence interval) from the European Standard Population of sociodemographic factors of women and men residents in Spain aged 18 or older by the level of care provision

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | Non-caregivers | <20 hours/week | ≥20 hours/week | | Non-caregivers | <20 hours/week | ≥20 hours/week | |
| **Total (*n*, %)**[a] | **21,085 (87.1%)** | **1573 (6.5%)** | **1536 (6.3%)** | ***p*** | **18,642 (90.6%)** | **1195 (5.8%)** | **744 (3.6%)** | ***p*** |
| Age (mean)[b] | 55 ± 9 | 50 ± 12 | 57 ± 13 | <0.001 | 52 ± 18 | 51 ± 13 | 57 ± 15 | <0.001 |
| Educational attainment | | | | | | | | |
| Primary or less | 30.9 [30.2, 31.6] | 20.6 [18.4, 22.9] | 32.9 [30.3, 35.5] | <0.001 | 28.2 [27.5, 29] | 19.8 [17.4, 22.4] | 30 [26.4, 33.8] | <0.001 |
| Middle | 46.9 [46.1, 47.6] | 53.2 [50.4, 55.9] | 49 [46.2, 51.7] | | 53.8 [53, 54.6] | 56.4 [53.3, 59.5] | 56 [52, 59.9] | |
| High | 22.2 [21.6, 22.8] | 26.2 [23.9, 28.7] | 18.2 [16.1, 20.4] | | 17.9 [17.3, 18.5] | 23.7 [21.1, 26.5] | 14 [11.4, 16.9] | |
| Occupational social class | | | | | | | | |
| High | 19.2 [18.6, 19.8] | 24.3 [21.9, 26.7] | 15.9 [13.9, 18.1] | <0.001 | 18.9 [18.3, 19.5] | 24.6 [22, 27.4] | 12.1 [9.6, 14.9] | <0.001 |
| Middle | 19.8 [19.2, 20.5] | 21.3 [19.1, 23.6] | 16.3 [14.3, 18.5] | | 18.8 [18.1, 19.4] | 19.1 [16.7, 21.7] | 16.7 [13.8, 19.8] | |
| Low | 60.9 [60.2, 61.7] | 54.5 [51.7, 57.3] | 67.8 [65.1, 70.4] | | 62.4 [61.6, 63.1] | 56.2 [53.1, 59.4] | 71.2 [67.5, 74.8] | |
| Employment status | | | | | | | | |
| Working | 46 [45.2, 46.7] | 46 [43.3, 48.8] | 30.6 [28, 33.2] | <0.001 | 51.8 [51, 52.6] | 50.6 [47.5, 53.8] | 30.6 [27.1, 34.4] | <0.001 |
| Unemployed | 12.4 [11.9, 12.9] | 13.7 [11.9, 15.7] | 15.7 [13.8, 17.8] | | 11.8 [11.3, 12.3] | 11 [9.2, 13.2] | 16.6 [13.8, 19.8] | |
| Retired | 27.1 [26.5, 27.8] | 26.5 [24.1, 29] | 35.6 [32.9, 38.3] | | 29.3 [28.6, 30.1] | 32.3 [29.4, 35.3] | 42.7 [38.8, 46.7] | |
| Homemaker | 9.9 [9.4, 10.3] | 9.2 [7.7, 10.9] | 13.9 [12.1, 16] | | 1.8 [1.6, 2] | 1.2 [0.7, 2.1] | 2.7 [1.6, 4.2] | |
| Other | 4.6 [4.3, 4.9] | 4.6 [3.5, 5.8] | 4.1 [3.1, 5.3] | | 5.3 [5, 5.7] | 4.9 [3.6, 6.4] | 7.5 [5.6, 9.8] | |
| Marital status | | | | | | | | |
| Single | 24 [23.4, 24.7] | 23 [20.8, 25.4] | 27.5 [25.1, 30.1] | <0.001 | 29.3 [28.5, 30] | 31.9 [29, 34.8] | 40.6 [36.8, 44.6] | <0.001 |
| Married | 51 [50.2, 51.7] | 57.9 [55.2, 60.6] | 56.8 [54.1, 59.6] | | 60 [59.2, 60.8] | 60.9 [57.8, 63.9] | 50 [46, 54] | |
| Other | 25 [24.4, 25.7] | 19.1 [17, 21.3] | 15.6 [13.7, 17.7] | | 10.8 [10.3, 11.3] | 7.2 [5.8, 9] | 9.4 [7.3, 12] | |
| Place of residence | | | | | | | | |
| Metropolitan area | 12.5 [12, 13] | 12.4 [10.6, 14.3] | 13.3 [11.5, 15.3] | 0.600 | 11.9 [11.3, 12.4] | 11.5 [9.6, 13.6] | 14.2 [11.6, 17.1] | 0.466 |
| Urban area | 66.4 [65.7, 67.1] | 67 [64.4, 69.6] | 64.3 [61.6, 66.9] | | 63.7 [63, 64.5] | 64.4 [61.4, 67.4] | 60.9 [57.1, 64] | |
| Rural area | 21.1 [20.5, 21.7] | 20.6 [18.4, 22.9] | 22.4 [20.2, 24.8] | | 24.4 [23.7, 25.1] | 24.1 [21.4, 26.8] | 24.9 [21.5, 28.4] | |

(Continues)

**TABLE 1** (Continued)

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | Non-caregivers | <20 hours/week | ≥20 hours/week | | Non-caregivers | <20 hours/week | ≥20 hours/week | |
| **Total (*n*, %)[a]** | **21,085 (87.1%)** | **1573 (6.5%)** | **1536 (6.3%)** | ***p*** | **18,642 (90.6%)** | **1195 (5.8%)** | **744 (3.6%)** | ***p*** |
| Annual net income | | | | | | | | |
| <€25,000 | 84.1 [83.3, 84.8] | 79.9 [76.4, 83] | 85 [81.2, 88.3] | 0.031 | 77 [76.2, 77.9] | 69.1 [65.2, 72.7] | 81.2 [76.1, 85.3] | <0.001 |
| ≥€25,000 | 15.9 [15.2, 16.7] | 20.1 [16.9, 23.4] | 15 [11.7, 18.8] | | 23 [22.1, 23.8] | 30.9 [27.3, 34.8] | 18.8 [14.3, 23.5] | |
| Income from work (self-employed or employed) | | | | | | | | |
| Yes | 55.2 [54.3, 56.2] | 58.8 [55.2, 62.5] | 52.5 [47.9, 56.9] | 0.076 | 63.3 [62.4, 64.2] | 66.8 [63.4, 70.3] | 53.5 [48.2, 59] | <0.001 |
| No | 44.8 [43.8, 45.7] | 41.2 [37.5, 44.8] | 47.5 [43.1, 52.1] | | 36.7 [35.8, 37.6] | 33.2 [29.8, 36.8] | 46.5 [41.3, 52.1] | |
| Unemployment benefits and/or subsidies | | | | | | | | |
| Yes | 8.3 [7.8, 8.8] | 10.3 [8.3, 12.8] | 11.4 [8.7, 14.5] | 0.014 | 8.6 [8.1, 9.1] | 8.4 [6.5, 10.6] | 9.1 [6.4, 12.6] | 0.924 |
| No | 91.7 [91.2, 92.2] | 89.7 [87.4, 91.9] | 88.6 [85.5, 91.3] | | 91.4 [90.9, 91.9] | 91.6 [89.4, 93.5] | 90.9 [87.4, 93.6] | |
| Pension for retirement or widowhood | | | | | | | | |
| Yes | 38.8 [37.9, 39.8] | 33.1 [29.7, 36.7] | 40.2 [35.9, 44.7] | 0.008 | 33 [32.1, 33.8] | 35.3 [31.9, 39] | 44.8 [39.5, 50.2] | <0.001 |
| No | 61.2 [60.2, 62.1] | 66.9 [63.3, 70.3] | 59.8 [55.3, 64.1] | | 67 [66.2, 67.9] | 64.7 [61.2, 68.2] | 55.2 [49.8, 60.5] | |
| Disability or incapacity pension | | | | | | | | |
| Yes | 3.7 [3.3, 4] | 5.2 [3.7, 7] | 9.6 [7.3, 12.6] | <0.001 | 4.3 [3.9, 4.6] | 4.2 [2.8, 5.8] | 14.4 [10.9, 18.4] | <0.001 |
| No | 96.3 [96, 96.7] | 94.8 [93, 96.3] | 90.4 [87.6, 92.9] | | 95.7 [95.4, 96.1] | 95.8 [94.2, 97.2] | 85.6 [81.6, 89.1] | |
| Financial benefits for family support | | | | | | | | |
| Yes | 2.1 [1.8, 2.3] | 2.2 [1.3, 3.4] | 4 [2.5, 6] | 0.017 | 0.7 [0.5, 0.8] | 0 | 3.1 [1.6, 5.3] | <0.001 |
| No | 97.9 [97.7, 98.2] | 97.8 [96.6, 98.7] | 96 [94, 97.5] | | 99.3 [99.2, 99.5] | 100 | 96.9 [94.7, 98.4] | |
| Other regular income or other regular social benefit or allowance | | | | | | | | |
| Yes | 4.9 [4.5, 5.3] | 7.1 [5.3, 9.1] | 6.6 [4.7, 9.3] | 0.013 | 3 [2.7, 3.3] | 3.7 [2.5, 5.3] | 8.2 [5.6, 11.6] | <0.001 |
| No | 95.1 [94.7, 95.5] | 92.9 [90.9, 94.7] | 93.4 [91, 95.4] | | 97 [96.7, 97.3] | 96.3 [94.7, 97.5] | 91.8 [88.4, 94.4] | |

*Note*:

[a]The percentage refers to the total sample of women and men.

[b]Unadjusted values of mean age are reported. *p* values are from chi-square test (categorical variables) and analysis of variance (continuous variables).

Family Relations
Interdisciplinary Journal of Applied Family Science

**TABLE 2** Age-adjusted prevalence (% and 95% confidence interval) from the European Standard Population of health indicators of women and men residents in Spain aged 18 or older by the level of care provision

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | Non-caregivers | <20 hours/week | ≥20 hours/week | *p* | Non-caregivers | <20 hours/week | ≥20 hours/week | *p* |
| Self-rated health | | | | | | | | |
| Good | 66 [65.3, 66.7] | 67.5 [64.9, 70.1] | 62.9 [60.1, 65.5] | 0.038 | 72.9 [72.2, 73.6] | 75 [72.2, 77.7] | 67.2 [63.5, 71] | 0.003 |
| Poor | 34 [33.3, 0.347] | 32.5 [30, 35.2] | 37.1 [34.4, 39.8] | | 27.1 [26.4, 27.8] | 25 [22.3, 27.8] | 32.8 [29.2, 36.7] | |
| Physical activity | | | | | | | | |
| Totally inactive | 41.7 [41, 42.5] | 32.1 [29.6, 34.8] | 43.3 [40.5, 46] | <0.001 | 32.9 [32.2, 33.7] | 24.7 [22.1, 27.5] | 37.5 [33.8, 41.5] | <0.001 |
| Occasionally | 39.5 [38.7, 40.2] | 43.8 [41.1, 46.6] | 40.5 [37.8, 43.3] | | 38.1 [37.3, 38.8] | 43.9 [40.9, 47.1] | 41.4 [37.5, 45.4] | |
| Several times a month | 9.2 [8.8, 9.6] | 12.6 [10.9, 14.5] | 8.8 [7.3, 10.4] | | 14.4 [13.9, 15] | 15.9 [13.7, 18.3] | 10.5 [8.3, 13.2] | |
| Several times a week | 9.6 [9.2, 10.1] | 11.4 [9.8, 13.3] | 7.5 [6.1, 9] | | 14.6 [14, 15.1] | 15.4 [13.2, 17.8] | 10.6 [8.4, 13.3] | |
| Fruit intake | | | | | | | | |
| Daily | 68.6 [67.9, 69.3] | 72.5 [69.9, 74.8] | 71.4 [68.8, 73.9] | 0.003 | 59.4 [58.6, 60.2] | 66.8 [63.9, 69.8] | 56.8 [52.8, 60.7] | <0.001 |
| Nondaily | 31.4 [30.7, 32.1] | 27.5 [25.1, 30] | 28.6 [26.1, 31.2] | | 40.6 [39.8, 41.4] | 33.2 [30.3, 36.2] | 43.2 [39.3, 47.2] | |
| Vegetable intake | | | | | | | | |
| Daily | 47.7 [47, 48.5] | 57.2 [54.4, 59.9] | 49.4 [46.6, 52.2] | <0.001 | 36.3 [35.6, 37.1] | 42.3 [39.2, 45.4] | 41.4 [37.5, 45.4] | <0.001 |
| Nondaily | 52.3 [51.5, 53] | 42.8 [40.1, 45.6] | 50.6 [47.7, 53.3] | | 63.7 [62.9, 64.4] | 57.7 [54.6, 60.8] | 58.6 [54.6, 62.5] | |
| Tobacco use | | | | | | | | |
| Smoker | 22 [21.4, 22.6] | 24.1 [21.8, 26.5] | 28.5 [26.1, 31.1] | <0.001 | 29.4 [28.6, 30.1] | 30.2 [27.5, 33.2] | 35.1 [31.4, 39] | 0.039 |
| Ex-smoker | 19.4 [18.8, 20] | 23.8 [21.5, 26.2] | 17.7 [15.7, 19.9] | | 34.6 [33.8, 35.3] | 34.8 [31.9, 37.9] | 32.9 [29.3, 36.8] | |
| Nonsmoker | 58.6 [57.9, 59.3] | 52 [49.3, 54.8] | 53.8 [50.9, 56.5] | | 36.1 [35.3, 36.9] | 34.9 [32, 38] | 32 [28.3, 35.8] | |
| Alcohol use | | | | | | | | |
| Almost daily | 7.9 [7.5, 8.3] | 12.2 [10.5, 14.1] | 10.1 [8.5, 11.8] | <0.001 | 27.1 [26.4, 27.8] | 31.6 [28.8, 34.6] | 30.9 [27.3, 34.7] | <0.001 |
| Weekly use | 16.5 [16, 17.1] | 20.4 [18.3, 22.7] | 14.3 [12.5, 16.4] | | 24.5 [23.8, 25.2] | 24.5 [21.8, 27.3] | 19.4 [16.4, 22.7] | |
| Monthly use | 33 [32.3, 33.7] | 34 [31.4, 36.6] | 33.4 [30.8, 36] | | 26.9 [26.2, 27.6] | 24 [21.4, 26.8] | 22 [18.7, 25.4] | |
| Never or hardly ever | 42.6 [41.9, 43.3] | 33.4 [30.9, 36] | 42.2 [39.4, 44.9] | | 21.5 [20.8, 22.1] | 19.9 [17.5, 22.5] | 27.7 [24.3, 31.4] | |
| Risk factors[a] | | | | | | | | |
| 0 | 19.4 [18.8, 20] | 24.8 [22.5, 27.2] | 18.4 [16.4, 20.7] | 0.001 | 11.5 [11, 12] | 13.7 [0.117, 16] | 10.8 [8.6, 13.6] | <0.001 |

**TABLE 2** (Continued)

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | **Non-caregivers** | **<20 hours/week** | **≥20 hours/week** | ***p*** | **Non-caregivers** | **<20 hours/week** | **≥20 hours/week** | ***p*** |
| 1 | 32.1 [31.4, 32.8] | 33.4 [30.8, 36] | 31.2 [28.7, 33.9] | | 27.1 [26.4, 27.8] | 31.9 [29.1, 34.9] | 24.5 [21.1, 28] | |
| 2 | 27.8 [27.1, 28.4] | 24.6 [22.2, 27] | 28.8 [26.3, 31.4] | | 30.2 [29.5, 31] | 26.7 [23.9, 29.5] | 29.9 [26.4, 33.7] | |
| 3 | 15.6 [15, 16.1] | 12.9 [11.1, 14.8] | 15.1 [13.1, 17.1] | | 20.6 [20, 21.3] | 19.6 [17.1, 22.2] | 21.7 [18.4, 25] | |
| 4 | 4.8 [4.4, 5.1] | 3.9 [3, 5.1] | 5.5 [4.3, 6.9] | | 8.5 [8.1, 9] | 7 [5.5, 8.7] | 9.9 [7.7, 12.5] | |
| 5 | 0.4 [0.3, 0.5] | 0.4 [0.2, 0.9] | 0.9 [0.5, 1.5] | | 2 [1.8, 2.2] | 1.1 [0.5, 1.8] | 3.2 [2, 4.8] | |

*Note*: [a]Risk factors are inactive, nondaily fruit intake, nondaily vegetables intake, current smoking and alcohol use almost daily or daily. *p* values are from chi-square test.

Family Relations Interdisciplinary Journal of Applied Family Science

**TABLE 3** Multivariable logistic regressions models with a generalized estimating equation estimating differences in health-related lifestyle behaviors by the level of care provision and gender

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | <20 hours/week vs. non-caregivers | | ≥20 hours/week vs. non-caregivers | | <20 hours/week vs. non-caregivers | | ≥20 hours/week vs. non-caregivers | |
| | B | OR [95% CI] | B | OR [95% CI] | B | OR [95% CI] | B | OR [95% CI] |
| Poor self-rated health | −0.043 | 0.96 [0.80, 1.15] | −0.009 | 0.99 [0.81, 1.22] | 0.076 | 1.08 [0.90, 1.29] | −0.004 | 1.00 [0.78, 1.28] |
| Physical inactivity | −0.320 | 0.73 [0.63, 0.84]*** | −0.001 | 1.00 [0.83, 1.20] | −0.074 | 0.93 [0.81, 1.06] | 0.221 | 1.25 [1.02, 1.52]* |
| Nondaily fruit intake | −0.302 | 0.74 [0.61, 0.89]** | −0.166 | 0.85 [0.68, 1.06] | −0.312 | 0.73 [0.62, 0.86]*** | −0.082 | 0.92 [0.73, 1.17] |
| Nondaily vegetable intake | −0.237 | 0.79 [0.67, 0.93]** | −0.055 | 0.95 [0.78, 1.15] | −0.256 | 0.77 [0.67, 0.90]** | −0.209 | 0.81 [0.65, 1.01] |
| Tobacco use | | | | | | | | |
| Smoker (vs. nonsmoker) | 0.367 | 1.44 [1.17, 1.78]** | 0.537 | 1.71 [1.33, 2.20]*** | 0.255 | 1.29 [1.07, 1.56]** | 0.327 | 1.39 [1.02, 1.88]* |
| Ex-smoker (vs. nonsmoker) | 0.467 | 1.60 [1.31, 1.95]*** | 0.363 | 1.44 [1.12, 1.86]** | 0.128 | 1.14 [0.95, 1.37] | 0.277 | 1.32 [1.00, 1.74] |
| Alcohol use | 0.368 | 1.44 [1.26, 1.66]*** | 0.268 | 1.31 [1.09, 1.57]** | 0.212 | 1.24 [1.08, 1.41]** | 0.116 | 1.12 [0.91, 1.38] |
| Sum of risk factors[a] | −0.279 | 0.76 [0.65, 0.88]*** | 0.047 | 1.05 [0.88, 1.25] | −0.166 | 0.85 [0.74, 0.97]* | 0.059 | 1.06 [0.87, 1.29] |

*Note*: CI = confidence interval.

*$p < .05$. **$p < .01$. ***$p < .001$. [a]Risk factors are physical inactivity, nondaily fruit intake, nondaily vegetable intake, smoker, and alcohol use almost daily or daily. Control variables are age, occupational social class, educational attainment, marital status, employment status, annual net income, and survey year. The reference group is non-caregivers and the reverse category for dichotomous lifestyle outcomes. Poor self-rated health, nondaily fruit intake, and nondaily vegetable intake are dummy variables (yes or no). Tobacco use has also been established as a variable dummy to compare smoker versus nonsmoker and ex-smoker versus non-smoker. Physical inactivity (from more to less physical activity frequency) alcohol use (from less to more frequency) and sum of risk factors (from 0 to 5) are presented as ordinal variables.

**TABLE 4** Multivariable logistic regressions models with a generalized estimating differences in health-related lifestyle behaviors by the level of care provision, gender, and age group

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | <20 hours/week vs. non-caregivers | | ≥20 hours/week vs. non-caregivers | | <20 hours/week vs. non-caregivers | | ≥20 hours/week vs. non-caregivers | |
| | B | OR (95% CI) | B | OR (95% CI) | B | OR (95% CI) | B | OR (95% CI) |
| 18–44 years old | | | | | | | | |
| Poor self-rated health | 0.190 | 1.21 [0.85, 1.72] | −0.102 | 0.90 [0.53, 1.54] | 0.208 | 1.23 [0.81, 1.88] | 0.203 | 1.23 [0.66, 2.27] |
| Physical inactivity | −0.315 | 0.73 [0.56, 0.94]* | −0.076 | 0.93 [0.60, 1.44] | −0.046 | 0.95 [0.72, 1.27] | 0.198 | 1.22 [0.79, 1.88] |
| Nondaily fruit intake | −0.252 | 0.78 [0.57, 1.06] | −0.066 | 0.94 [0.59, 1.50] | −0.205 | 0.81 [0.59, 1.12] | 0.224 | 1.25 [0.76, 2.08] |
| Nondaily vegetable intake | −0.258 | 0.77 [0.57, 1.05] | 0.110 | 1.16 [0.70, 1.78] | −0.311 | 0.73 [0.53, 1.00] | −0.424 | 0.65 [0.39, 1.10] |
| Tobacco use | | | | | | | | |
| Smoker (vs. nonsmoker) | 0.248 | 1.28 [0.91, 1.81] | 0.331 | 1.39 [0.84, 2.32] | 0.390 | 1.48 [1.04, 2.10]* | −0.015 | 0.99 [0.55, 1.77] |
| Ex-smoker (vs. nonsmoker) | 0.406 | 1.50 [1.03, 2.20]* | −0.193 | 0.82 [0.43, 1.60] | 0.110 | 1.12 [0.71, 1.76] | −0.231 | 0.79 [0.38, 1.65] |
| Alcohol use | 0.189 | 1.21 [0.92, 1.59] | 0.286 | 1.33 [0.88, 2.02] | 0.152 | 1.16 [0.87, 1.55] | 0.037 | 1.04 [0.63, 1.70] |
| Sum of risk factors[a] | −0.226 | 0.80 [0.61, 1.05] | 0.160 | 1.17 [0.76, 1.81] | −0.055 | 0.95 [0.72, 1.25] | 0.065 | 1.07 [0.69.1.65] |
| 45 years old and older | | | | | | | | |
| Poor self-rated health | −0.184 | 0.83 [0.68, 1.03] | −0.045 | 0.96 [0.76, 1.20] | −0.020 | 0.98 [0.80, 1.20] | −0.072 | 0.93 [0.72, 1.21] |
| Physical inactivity | −0.192 | 0.82 [0.68, 0.99]* | 0.157 | 1.17 [0.95, 1.45] | −0.164 | 0.85 [0.72, 0.99]* | 0.197 | 1.22 [0.97, 1.53] |
| Nondaily fruit intake | −0.308 | 0.74 [0.58, 0.94]* | −0.158 | 0.85 [0.66, 1.11] | −0.362 | 0.70 [0.57, 0.85]*** | −0.184 | 0.83 [0.63, 1.10] |
| Nondaily vegetables intake | −0.155 | 0.86 [0.70, 1.04] | −0.020 | 0.98 [0.79, 1.21] | −0.173 | 0.84 [0.71, 1.00] | −0.135 | 0.87 [0.68, 1.12] |
| Tobacco use | | | | | | | | |
| Smoker (vs. nonsmoker) | 0.885 | 0.89 [0.68, 1.16] | 0.119 | 1.13 [0.82, 1.55] | −0.054 | 0.95 [0.75, 1.20] | 0.326 | 1.39 [0.96, 1.99] |
| Ex-smoker (vs. nonsmoker) | 0.054 | 1.06 [0.83, 1.35] | 0.080 | 1.08 [0.81, 1.45] | −0.043 | 0.96 [0.78, 1.18] | 0.284 | 1.33 [0.98, 1.81] |
| Alcohol use | 0.236 | 1.27 [1.08, 1.49]** | 0.112 | 1.12 [0.91, 1.37] | 0.128 | 1.14 [0.98, 1.32] | 0.078 | 1.08 [0.87, 1.35] |
| Sum of risk factors[a] | −0.251 | 0.78 [0.65, 0.93]** | 0.088 | 1.09 [0.90, 1.33] | −0.248 | 0.78 [0.67, 0.91]** | 0.031 | 1.03 [0.83, 1.29] |

*Note*: CI = confidence interval; OR = odds ratio

[a]Risk factors are physical inactivity, nondaily fruit intake, nondaily vegetable intake, smoker, and alcohol use almost daily or daily. Control variables are age, occupational social class, educational attainment, marital status, employment status, annual net income, and survey year. The reference group is non-caregivers, and the reverse category for dichotomous lifestyle outcomes. Poor self-rated health, nondaily fruit intake and nondaily vegetable intake are dummy variables (yes or no). Tobacco use has been established as a dummy variable to compare smoker versus nonsmoker and ex-smoker and nonsmoker. Physical inactivity (from more to less physical activity frequency) alcohol use (from less to more frequency), and sum of risk factors (from 0 to 5) are presented as ordinal variables.

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

socioeconomic status (i.e., educational attainment, occupational social class, employment status, and annual net income; Table 1). In addition, relative to men, women were overrepresented in the poor self-rated health status and physical inactivity across all three levels of caregiving (Table 2). However, men consumed less fruit and vegetables, smoked more, and consumed alcohol more frequently than women of the same caregiving status.

Overall, the results only support the first hypothesis of our work concerning smoking and alcohol use: Among caregivers, we observed a higher likelihood of current tobacco and alcohol use compared with non-caregivers—in particular, differences observed among women caregivers, compared with women non-caregivers, was more marked than among men (for smoking: caregiver <20 hours per week: OR = 1.44, $p = .001$ among caregivers <20 hours per week and OR = 1.71, $p < .001$ among caregivers ≥20 hours per week; for drinking: OR = 1.44, $p < .001$ among caregivers <20 hours per week and OR = 1.31, $p = .004$ among caregivers ≥20 hours per week; Table 3). However, we found no significant differences in self-rated health status between caregivers and non-caregivers for either women or men, and a healthy lifestyle was observed among women and men who were caregivers (Table 3). Thus, women and men who participated in less than 20 hours per week of caregiving had a higher probability of fruit and vegetable intake and a lower probability for the sum of risk factors than non-caregivers. Women who participated in caregiving for less than 20 hours per week were less likely than non-caregivers to be more physically inactive.

For the second hypothesis, caregivers—both women and men—with more hours of caregiving per week did not report worse eating habits than non-caregivers, although we observed higher physical inactivity among men (OR = 1.25, $p = .028$). Regardless of the number of hours of care, caregivers of both sexes were more likely to smoke and use alcohol than non-caregivers (except for men with 20 or more hours of caregiving in relation to alcohol use; Table 3).

After conducting the analyses by age group (Table 4), according to the third hypothesis of this study, young women caregivers (18–44 years) with less than 20 hours of care per week presented a lower likelihood of physical inactivity than non-caregivers. We also observed a lower likelihood of nondaily fruit intake, physical inactivity, and sum of risk factors in women and men caregivers older than 44 years with less than 20 hours of care per week than non-caregivers. However, young men (18–44 years) with less than 20 hours of care per week were more likely to smoke—and women were more likely to be ex-smokers—than non-caregivers. Women older than 44 years with less than 20 hours of care were also more likely to drink alcohol than non-caregivers. By age group, no differences were observed between non-caregivers and caregivers with 20 or more hours of care per week.

## DISCUSSION

Our results do not support the initial hypothesis: We found that the self-reported health status of informal caregivers essentially did not differ from that of non-caregivers in Spain. Also, the main findings related to lifestyle highlighted both positive and negative results: Caregivers showed more favorable physical activity and fruit and vegetable intake; however, they indicated a higher likelihood of smoking and drinking.

Previous studies have shown a decrease in self-rated health status differences between caregivers and non-caregivers in the period 2006–2012, although they did find significant differences, mainly in women (Salvador-Piedrafita et al., 2017). However, we observed no significant differences between caregivers and non-caregivers. Recent studies have shown that the economic downturn might have led to a considerable change in care availability, mainly due to an increase in the number of informal caregivers not living with the care recipient (Costa-Font et al., 2016). This might have had a significant impact on health because caregivers who share housing with care recipients are usually more prone to take on the heaviest, most intense and complex care tasks,

spending more time on them and being more affected in their health and daily lives (Kaschowitz & Brandt, 2017). The emergence of the Spanish Dependency Law in 2006, which provides significant financial support to some families, might have also influenced caregivers' burden in some cases (del Pozo-Rubio & Escribano-Sotos, 2012) and, therefore, influenced their self-rated health status, as household income and financial strain are also factors associated with caregiver burden (Tough et al., 2020). Still, according to our results, the influence of social determinants persists, but the financial provisions made possible by the Spanish Dependency Law of 2006 may be useful to equalize health among caregivers and non-carergivers.

On the other hand, some studies have described unhealthy behaviors in informal caregivers, highlighting the increased likelihood of alcohol use and smoking compared with non-caregivers (Denham et al., 2019; Reeves et al., 2012). Like these previous studies, we found higher frequency of alcohol use and smoking among informal Spanish caregivers than non-caregivers. Also, our results showed an interaction of sex, age, and time devoted to care in these behaviors. In particular, we found a higher probability, compared with non-caregivers, of smoking among younger male caregivers with fewer hours of care per week and more frequent alcohol consumption among women caregivers aged 45 and over with fewer hours of care per week. However, women and men caregivers aged 45 and over with fewer hours of care also showed higher fruit intake, physical activity, and a lower likelihood for the sum of risk factors. These lifestyle outcomes suggest that caregiving may have both adverse and protective effects (McGuire et al., 2010; Reeves et al., 2012). It has been suggested that healthier people are initially self-selected to take on the role of caregiver, and people with poorer health are less likely to take on caregiving responsibilities (McGuire et al., 2010). In addition, caregiving often includes moderate-level activities, such as gardening and housework (Gottschalk et al., 2020). Collectively, and contrary to our hypotheses, the results do not suggest any greater adverse effects of caregiving in women compared with men. Likewise, caregivers with more hours of care per week did not indicate having a poorer health-related lifestyle than non-caregivers.

## Strengths and limitations

To our knowledge, this is the first study to analyze health-related lifestyle outcomes after the economic recession in informal Spanish caregivers through representative samples of the population living in Spain. Regarding the main limitations, the data come from two cross-sectional studies; therefore, we cannot establish causality in the relationship of the variables analyzed. Furthermore, self-report measurements imply limits and bias despite that these methods characterize most large-scale studies. Because the nature of caregiving differs substantially for children and adults, another important limitation is that in this work, we were not able to identify specific caregiver groups (according to who is cared for) due to the limitations of the health surveys employed. Moreover, the results must be interpreted with caution because the National Health Survey of Spain does not contain information on all possible individual circumstances and characteristics that may also affect the relationship between care provision and health-related lifestyle behaviors. However, we have employed two waves capturing health-related lifestyle factors in a large and representative sample of the Spanish population with the same methodological design. We have also classified caregivers according to their weekly care workload, a significant lifestyle determinant in informal caregivers.

## Implications

The Personal Autonomy and Dependent Care Law 39/2006 came into effect in Spain during 2007 to support households in which informal caregiving situations exist. However, our results

have shown that a marked socioeconomic imbalance persists in dependent persons' informal care in Spain. Thus, the support of informal caregivers remains a priority, especially considering those disadvantaged with the highest number of hours of care per week, as we stated.

In sum, our results are encouraging: We observed no significant differences in the self-reported health status of caregivers and non-caregivers. Despite greater smoking prevalence and alcohol use in some caregiver groups, we also observed a higher prevalence of active lifestyles and a healthier daily fruit and vegetables intake among caregivers, which might indicate a healthy caregiver effect. Future studies using objective measures should consider the type of daily physical tasks performed and the degree of physical fitness. Moreover, the study of the mechanisms underlying these outcomes, considering psychological factors and socioeconomic status, could lead to a better understanding of informal caregivers' health and health-related lifestyle.

## Author note

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