Archives of Gerontology and Geriatrics 61 (2015) 351–362

Contents lists available at ScienceDirect

Archives of Gerontology and Geriatrics

journal homepage: www.elsevier.com/locate/archger

The effect of offspring on depressive disorder among old adults: Evidence from the Korean Longitudinal Study of Aging from 2006 to 2012

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ARTICLE INFO

Article history:
Received 2 February 2015
Received in revised form 19 July 2015
Accepted 1 August 2015
Available online 5 August 2015

Keywords:
Offspring
Depressive disorder
Old adults

ABSTRACT

Objective: To investigate whether having an offspring protects against or increases the risk of depressive disorders.
Methods: Data from the Korean Longitudinal Study of Aging (KLoSA) from 2006 and 2012 was assessed using longitudinal data analysis. We have included 10,149 research subjects at baseline and estimated the prevalence of depressive disorders for those with children.
Results: The number of offspring was from zero to five or more, and the composition of offspring is from zero boys and zero girls to two or more boys and two or more girls. For parents with zero offspring, the estimate for depressive disorder was 0.464 higher (SE: 0.123, *p*-value: 0.000, OR: 1.389; 95% CI: 1.176–1.640) and for parents with five or more offspring, the estimate for depressive disorder was 0.1 higher (SE: 0.104, *p*-value: 0.013, OR: 1.315; 95% CI: 1.150–1.504) compared to parents with two offspring. For parents with zero boys and zero girls, the estimate for depressive disorder was 0.599 higher (SE: 4.750, *p*-value: <0.0001, OR: 1.539; 95% CI: 1.298–1.825), and for parents with two or more boys and two or more girls, the estimate for depressive disorder was 1.328 higher (SE: 3.820, *p*-value: 0.000, OR: 1.328; 95% CI: 1.189–1.482) compared to parents with one boy and one girl.
Conclusions: Our results indicate that there is a large effect of offspring on the prevalence of depressive disorder, with significant positive effects for mothers. Fathers are at lower risk for depressive disorder than mothers, and the graph was U-shaped.

1. Introduction

Depressive disorder is one of the most common health conditions among the elderly population, with estimated prevalence rates between 18.1% and 36.8% among individuals aged 50 and older (Castro-Costa et al., 2007). However, there is considerable variation in the worldwide prevalence rates.

Mental health problems are associated with considerable health care costs care to social security systems (Wang, Wang, Li, & Miller, 2014). As an important indicator of mental health, depressive disorder is closely associated with lower life satisfaction (Tsuboi et al., 2005) and is often accompanied by other mental disorders and physical ailments (Choi & Marks, 2008).

According to the OECD, depressive disorder is an important determinant of disability in developed countries (OECD, 2008). Recent evidence also suggests that it is an important cause of early retirement (Angrist, 2004). Understanding the risk and protective factors for the incidence of depressive disorder is therefore a major concern for public health research.

As the proportion of childless older adults increases, concerns persist regarding the potential disadvantages of childlessness in later life, despite mixed results from empirical studies (Penning and Wu, 2014; Petersen et al., 2015; Zhang & Hayward, 2001). Childless older adults express worries about future aging (Vissing, 2002), and career-minded individuals are warned about possible regrets related to postponing marriage and childbearing (Hewlett, 2002).

There are arguments for and against a positive effect of offspring on mental health. Sociologists emphasize the importance of offspring within the aging parent's social network (Bures, Koropeckyj-Cox, & Loree, 2009). For example, offspring can provide

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http://dx.doi.org/10.1016/j.archger.2015.08.003
0167-4943/

social support and care, so a higher number of offspring might therefore prevent loneliness in old adults. Children also provide parents with a sense of gratitude and meaning in life, which might positively affect mental health (Evenson & Simon, 2005).

On the other hand, offspring can also be a source of strain, increased economic cost, and physical pain. When children are young, the role of parents is physically and mentally demanding, and the larger share of responsibility in these years is mostly borne by mothers (Borglin, Hentzel, & Bohman, 2015). For these reasons, mothers can be particularly vulnerable to mental diseases, and raising offspring also is associated with both direct and opportunity costs.

The purpose of the present study was to investigate whether offspring are a risk factor or a protective factor for depressive disorder.

2. Methods

2.1. Study sample and design

The study data were from the Korean Longitudinal Study of Aging (KLoSA), a nationwide survey of community-dwelling people aged 45 years and older in 2006, using multistage stratified cluster sampling. This study uses a sample from the first through fourth waves of data from the KLoSA, which is being conducted by the Korea Labor Institute to collect the basic data needed to devise and implement effective social and economic policies that address emerging trends related to population aging. KLoSA is a National public database (website: http://www.kli.re.kr/klosa/en/about/introduce.jsp). It will be repeated every even-numbered year. This original KLoSA study population included South Korean adults aged 45 years or older who lived in 15 large administrative areas.

In the first baseline survey in 2006, 10,254 individuals in 6171 households (1.7 per household) were interviewed using the Computer-Assisted Personal Interviewing method. The second survey in 2008 followed up with 8688 subjects who represented 86.6% of the original panel. The third survey in 2010 followed up with 7920 subjects who represented 80.3% of the original panel. The fourth survey in 2012 followed up with 7486 subjects who represented 76.2% of the original panel. Of these participants, we excluded 73, 93, 58, 108, and 120 subjects with no information of depressive disorder in 2006, 2008, 2010, and 2012, respectively Figs. 1 and 2.

2.2. Offspring-related variables

The proportion of cohabitation was the total number of offspring divided by number of offspring living in together and divided into five categories: 0, ≤24.9, 25.0–49.9, 50.0–74.9, and ≥75.0. The average offspring ages were divided into four categories: Q1 (≤27.5), Q2 (27.6–36.0), Q3 (36.1–44.0), and Q4 (≥44.0). The number of grandchildren was divided into six categories: 0, 1–2, 3–4, 5–6, 7–8, and ≥9.

2.3. Control variables

Age groups were divided into seven categories: ≤49, 50–54, 55–59, 60–64, 65–69, 70–74, and ≥75. Education status was divided into five categories: lack of schooling, elementary school, middle school, high school, and ≥college. Previous year income status was divided into two categories: Yes or No. The number of interaction with friends was divided into five categories: every day, 1–2 times a week, 1–2 times a month, 3–6 times a year, and Never. Economic activity status was divided into two categories: employed and unemployed. Self-rated health was also included as a covariate in our analyses.

2.4. Depressive disorder—CESD 10

The 10-item version of the CES-D scale based on the work of Andresen et al. was generated from the 20-item original version by item–total correlations and eliminating redundant items (Andresen, Malmgren, Carter, & Patrick, 1994).

The CESD-10 showed good predictive accuracy when compared to the full-length 20-item version of the CES-D. The brief CES-D scale consists of 10 items assessing 3 factors: depressed affect (blues, depressed, fear, lonely), somatic retardation (bothered, sleep, get going, attention), and positive affect (happy, hopeful). The time frame for assessing depressive symptoms was 7 days prior to the interview. Cutoff score of depressive disorder for logistic regression analysis was set to achieve a score of 4 or more (Irwin, Artin, & Oxman, 1999).

2.5. Analytical approach and statistics

Analyses of variance (ANOVAs) and a generalized linear mixed model as continuous variable of CESD-10 and generalized linear mixed model with binary distribution of outcome variable were used to investigate the impact of offspring on depressive disorder. For all analyses, the criterion for significance was $P < 0.05$, two-tailed. All analyses were conducted using the SAS statistical software package version 9.2 (SAS Institute Inc., Cary, NC, USA).

3. Results

Table 1 lists the general characteristics of the covariates and variables included in this study at baseline, respectively. There were 10,149 research samples at baseline. For the number of offspring, the prevalence of depressive disorder of subjects with zero at baseline was 4.220 (SD: 2.998, [Father Mean: 3.813, SD: 2.829; Mother Mean: 4.604, SD: 3.110]), the prevalence of depressive disorder of parents with one offspring at baseline was 2.821 (SD: 2.749, [Father Mean: 2.388, SD: 2.500; Mother Mean: 3.137, SD: 2.879]), the prevalence of depressive disorder of parents with two offspring at baseline was 2.467 (SD: 2.408, [Father Mean: 2.176, SD: 2.212; Mother Mean: 2.737, SD: 2.548]), and the prevalence of depressive disorder of parents with five offspring at baseline was 3.910 (SD: 2.833, [Father Mean: 3.407, SD: 2.718; Mother Mean: 4.183, SD: 2.858]) (Table 1).

According to our study, 2088 subjects felt depressive disorder newly in 2008, 1161 subjects felt depressive disorder newly in 2010 and 1005 subjects felt depressive disorder newly in 2012 (Table 2).

Table 3 shows the adjusted effect of number of offspring on depressive disorder according to the parents' survey responses. For subjects with zero offspring, the estimate for depressive disorder was 0.464 points higher (SE: 0.123, p-value: 0.000, OR: 1.389; 95% CI 1.176–1.640) compared to parents with two offspring, and for parents with five or more offspring, the estimate for depressive disorder was 0.1 higher (SE: 0.104, p-value: 0.013, OR: 1.315; 95CI: 1.150–1.504) compared to parents with two offspring. For female subjects with zero offspring, the estimate for depressive disorder was 0.717 higher (SE: 0.190, p-value: 0.000, OR: 1.677; 95% CI: 1.306–2.154) compared to mothers with two offspring. For mothers with five or more offspring, the estimate for depressive disorder was 0.0.333 points higher (SE: 0.135, p-value: 0.014, OR: 1.443; 95% CI: 1.220–1.706) compared to mothers with two offspring.

Table 4 shows the adjusted effect of offspring composition on depressive disorder prevalence. For subjects with zero boys and zero girls, the estimate for depressive disorder was 0.599 points higher (SE: 4.750, p-value: <0.0001) compared to parents with one boy and one girl. For parents with two or more boys and two or