RESEARCH ARTICLE

Effects of Offspring-Related Characteristics on Depressive Disorder among Cancer Patients and Survivors

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Abstract

Objective: To investigate the influence of offspring-related characteristics on the prevalence of depressive disorders among cancer patients and those who survived cancer for at least 45 years. Materials and Methods: Data were obtained from the Korean Longitudinal Study of Aging (KLoSA). To investigate the association between offspring and depressive disorder among cancer patients and survivors, we analyzed data from 292 cancer patients and survivors drawn from a total subject pool of 16,613 individuals at baseline. Results: According to our results, the odds ratio (OR) for subjects with five or more offspring developing depressive disorder was -0.794 (p-value: 0.039, SE: 0.329) compared with that of those with two offspring. In addition, the adjusted effect of the number of male and female offspring on the presence of depressive disorder showed that the OR for those with three or more female offspring for developing depressive disorder was -0.958 lower (SE: 0.305, p-value: 0.012) than it was for those with no female offspring. Conclusions: This article provides evidence for an association between offspring-related characteristics and depressive disorders among cancer patients and survivors. Therefore, offspring may be important contributors to the emotional status of cancer patients and survivors. Further study should precisely need to measure depressive disorders because of self-reported data.

Keywords: Offspring - cancer - depressive disorder - Korea

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Introduction

During the past 20 years, the number of cancer survivors has increased, primarily due to improvements in detection and treatment based on technological advances such as surgery, radiotherapy, and chemotherapy (Maddams et al., 2009).

Because of these changes in treatment techniques and epidemiology, patients with cancer are surviving for a longer time, which has left more time for psychosocial sequelae, including those involving preexisting psychosocial problems, to develop.

Depression is the most prevalent psychosocial problem experienced by cancer patients (Maneeton et al., 2012; Chen et al., 2013), and it is the most common reason for an oncologist to refer a patient to a mental health professional (Katz et al., 2004; Nazlican et al., 2012). The rates of depression among patients with cancer vary between 20% and 30% at any one time (Katz et al., 2004). In addition, depression may result from loneliness as well as from cancer itself. Therefore, sociologists emphasize the important role played by offspring within the social network of aging parents (Bures et al., 2009). Indeed, offspring can provide care as well as social support, and a greater number of offspring may therefore prevent loneliness in old age. Offspring also express gratitude and provide parents with an experience of the meaning of life, which may positively affect mental health (Evenson and Simon, 2005)

Many studies have examined topics such as the association between social support and mental health (Julian, 1992; Dalgard et al., 1995; Sahin et al., 2013) However, less is known about the specific dimensions of social support and social networks (Oxman et al., 1992) among cancer patients and survivors.

Zunzunegui et al. (2001) assessed the associations of the emotional and instrumental support provided by children and the living arrangements of parents with cancer with the physical and mental health of older people in Spain and found that depressive symptoms were associated with low levels of emotional support. Additionally, intensive research on social support and psychological well-being conducted in China generally found that social support, especially from relatives, had a positive impact on older people's psychological well-being (Krause and Liang, 1993).

Silverstein et al. (2006) investigated how multigenerational living arrangements and

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intergenerational transfers of financial, instrumental, and emotional support influenced the psychological well-being of older parents living in rural areas in China. Stronger emotional ties with children improved well-being, as the strength of such ties to the child with whom the parent is closest was inversely related to depression.

Therefore, the purpose of this study was to investigate the influence of the offspring-related characteristics of social networks on depressive disorder among cancer patients and those who have survived this disease for at least 45 years.

Materials and Methods

Study sample and design

Data were obtained from the Korean Longitudinal Study of Aging (KLoSA), which used a multistage stratified cluster sampling design to produce nationally representative longitudinal data on Koreans aged 45 years or older to trace their characteristics over time as a basis for the Korea Labor Institute's development of socioeconomic policies for these rapidly growing populations. Our study used a sample drawn from the first to the fourth waves of

Table 1. General Characteristics of Participants at Baseline (2008)

		Total			CESD-10 Score			P-value
		N	%	%*	Mean	Weighted mean	SD	
Number of offspring	0	9	3.08	3.3	0.56	0.51	21.01	<.0001
	1	25	8.56	10.07	0.52	0.51	21.2	
	2	77	26.37	30.55	0.53	0.49	20.76	
	3	91	31.16	30.14	0.4	0.35	18.13	
	4	45	15.41	13.05	0.53	0.54	17.78	
	≥5	45	15.41	12.88	0.53	0.5	17.72	
Proportion cohabiting (%)	≤24.9	169	57.88	52.06	0.54	0.53	18.2	<.0001
	25.0–74.9	87	29.79	29.39	0.47	0.45	19.04	
	≥75.0	36	12.33	18.55	0.31	0.3	21.76	
Average age of offspring	Q1	127	43.49	54.04	0.43	0.41	21.09	
	Q2	96	32.88	28.98	0.48	0.47	18.05	
	Q3	69	23.63	16.98	0.61	0.61	15.95	
Number of boys	0	46	15.75	17.58	0.5	0.47	20.43	<.0001
	1	111	38.01	40.5	0.43	0.41	19.54	
	2	94	32.19	30.1	0.54	0.51	18.63	
	≥3	41	14.04	11.81	0.51	0.51	17.79	
Number of girls	0	65	22.26	24.53	0.54	0.5	20.27	<.0001
	1	90	30.82	31.54	0.5	0.48	19.48	
	2	83	28.42	26.86	0.45	0.43	18.56	
	≥3	54	18.49	17.07	0.48	0.42	18.32	
Age	≤59	100	34.25	45.06	0.41	0.38	21.48	<.0001
	60–69	106	36.3	33.34	0.48	0.49	18.45	
	≥70	86	29.45	21.61	0.59	0.58	16.29	
Gender	Male	128	43.84	44.68	0.41	0.37	18.75	<.0001
	Female	164	56.16	55.32	0.55	0.54	19.03	
Residential region	Urban	198	67.81	70.06	0.47	0.44	19.39	<.0001
	Rural	94	32.19	29.94	0.52	0.51	18.58	
Education	≤Elementary school	157	53.77	48.63	0.61	0.61	17.8	<.0001
	Middle school	36	12.33	14.45	0.39	0.39	20.5	
	High school	69	23.63	25.59	0.33	0.32	18.72	
	≥College	30	10.27	11.33	0.33	0.22	17.01	
Marital status	Single	57	19.52	17.92	0.68	0.7	17.01	<.0001
	Married	235	80.48	82.08	0.44	0.41	19.07	
Economic activity	Yes	76	26.03	31.85	0.28	0.26	18.62	
	No	216	73.97	68.15	0.56	0.56	18.31	
Income	Yes	45	15.41	20.24	0.36	0.31	20.6	
	No	247	84.59	79.76	0.51	0.5	18.64	
Smoking status	Smoker	202	69.18	69.26	0.52	0.49	19.22	<.0001
	Former smoker	60	20.55	21.28	0.4	0.39	19.15	
	Never smoked	30	10.27	9.46	0.43	0.39	18.23	
Alcohol use	Drinker	83	28.42	30.37	0.37	0.3	18.3	<.0001
	Former drinker	41	14.04	15.69	0.59	0.61	20.01	
	Never drank	168	57.53	53.94	0.52	0.51	18.61	
Chronic disease	Yes	139	47.6	47.41	0.46	0.45	19.08	<.0001
	No	153	52.4	52.59	0.52	0.48	19.24	
Restrictions in daily life	Yes	117	40.07	38.65	0.67	0.67	17.72	<.0001
	No	175	59.9	61.4	0.37	0.33	18.25	
Total		292	100	100	0.49	0.46	19.14	

KLoSA; this biennial survey involved multistage stratified sampling based on the geographical areas and housing types throughout the nation.

In the first baseline survey, in 2006, 10,254 individuals in 6,171 households (1.7 per household) were interviewed using the Computer-assisted Personal Interviewing method; this study identified 292 individuals with cancer. The second survey, in 2008, followed up with 8,688 subjects, who represented 86.6% of the original panel. The third survey, in 2010, followed up with 7,920 subjects, who represented 80.3% of the original panel, and the fourth survey, in 2012, followed up with 7,486 subjects, who represented 76.2% of the original panel.

The original samples consisted of a total of 16,613 individuals from 6,314 households (wave 3), 16,255 individuals from 6,207 households (wave 4), 15,625 individuals from 6,207 households (wave 5), 14,696 individuals from 6,034 households (wave 6), and 14,604 individuals from 5,735 households to (wave 7, in 2012).

To investigate the association between offspring-related variables and depressive disorder among cancer patients and survivors, we extracted 292 study subjects from the baseline sample who had cancer or who had survived this disease.

Independent variables

Number of offspring, our independent variable of interest, was divided into five categories: 0, 1, 2, 3, 4, and 5 or more.

Control variables

Socioeconomic and demographic factors: Age groups were divided into three categories: ≤59, 60-69, and ≥70 years. Educational level was categorized into four groups: elementary school or lower, middle school, high school, and college or higher. Marital status was divided into two groups: single and married, and single included separation by death or divorce. Employment status was divided into two categories, employed and unemployed, and income status was divided into two categories, yes or no.

Health status and behavioral factors

Smoking status was categorized into three groups: current smoker, former smoker, and never smoked. Alcohol use was also divided into three groups: current drinker, former drinker, and never drank. The presence of chronic diseases and daily-life restrictions were also included as covariates in our analyses, and year was treated as a dummy variable.

Offspring-related factors

The proportion of cohabitating offspring constituted the number of offspring living with their parent divided by the total number of offspring; this variable was divided into three categories: ≤24.9%, 25.0-74.9%, and ≥75.0. The average age of offspring was divided into three categories by the SAS Rank function.

Dependent variables

Depressive disorder: The 10-item version of the Center for Epidemiologic Studies Depression (CES-D) scale based on the work of Andresen et al. was generated from the 20-item original version using item-total correlations and eliminating redundant items (Andresen et al., 1994).

Table 2. Association between Number of Offspring and Depressive Disorder

	CESD-10 Score		
	Estimate	SE	P-value
Number of offspring			
0	0.731	0.565	0.228
1	-0.891	0.335	0.026
2	ref		
3	-0.418	0.219	0.089
4	-0.73	0.316	0.046
≥5	-0.794	0.329	0.039
Proportion cohabiting (%)			
≤24.9	-0.009	0.31	0.978
25.0–74.9	-0.271	0.309	0.383
≥75.0	ref		
Average age of offspring			
Q1	-0.791	0.391	0.046
Q2	-0.568	0.295	0.057
Q3	ref		
Age			
≤59	ref		
60–69	0.28	0.292	0.342
≥70	0.391	0.421	0.355
Gender			
Male	-0.426	0.273	0.12
Female	ref		
Residential region			
Urban	0.828	0.205	0.027
Rural	ref		
Education			
≤Elementary school	1.091	0.311	0.001
Middle school	0.736	0.338	0.03
High school	0.36	0.305	0.239
≥College	ref		
Marital status			
Single	ref		
Married	-0.35	0.237	0.161
Economic activity			
Yes	-0.546	0.232	0.023
No	ref		
Income			
Yes	0.139	0.26	0.598
No	ref		
Smoking status			
Smoker	-0.779	0.315	0.02
Former smoker	-0.352	0.321	0.283
Never	ref		
Alcohol use			
Drinker	-0.376	0.251	0.141
Former drinker	0.038	0.249	0.88
Never drank	ref		
Chronic disease			
Yes	-0.88	0.211	<.0001
No	ref		
Restrictions in daily life			
Yes	0.893	0.19	<.0001
No	ref		
Year			
2008	4.098	0.257	<.0001
2009	3.834	0.253	<.0001
2010	4.365	0.245	<.0001
2011	ref		

Table 3. Association between Number of Male and Female Offspring and Depressive Disorder

	CESD-10 Score		
	Estimate	SE	P-value
Number of male offspring			
0	ref		
1	0.343	0.252	0.203
2	0.392	0.285	0.198
≥3	0.215	0.366	0.57
Number of female offspring			
0	ref		
1	-0.244	0.243	0.342
2	-0.243	0.263	0.38
≥3	-0.958	0.305	0.012
Proportion cohabiting (%)			
≤24.9	0.117	0.304	0.701
25.0–74.9	-0.165	0.309	0.595
≥75.0	ref		
Average age of offspring			
Q1	-0.43	0.384	0.265
Q2	-0.498	0.296	0.096
Q3	ref		
Age			
≤59	ref		
60–69	0.359	0.29	0.219
≥70	0.451	0.412	0.278
Gender			
Male	-0.37	0.271	0.174
Female	ref		
Residential region			
Urban	0.922	0.204	0.02
Rural	ref		
Education			
≤Elementary school	1.099	0.311	0.001
Middle school	0.793	0.338	0.02
High school	0.368	0.306	0.229
≥College	ref		
Marital status			
Single	ref		
Married	-0.419	0.239	0.1
Economic activity			
Yes	-0.59	0.232	0.014
No	ref		
Income			
Yes	0.118	0.261	0.655
No	ref		
Smoking status			
Smoker	-0.827	0.31	0.013
Former smoker	-0.402	0.322	0.223
Never smoked	ref		
Alcohol use			
Drinker	-0.262	0.253	0.307
Former drinker	0.023	0.249	0.926
Never drank	ref		
Chronic disease			
Yes	-0.858	0.211	<.0001
No	ref		
Restrictions in daily life			
Yes	0.972	0.188	<.0001
No	ref		
Year			
2008	4.161	0.257	<.0001
2009	3.891	0.253	<.0001
2010	4.373	0.245	<.0001
2011	ref		

This instrument has proven to be a useful indicator of depression among older adults.

The CESD-10 scale has shown good predictive accuracy when compared with its full-length 20-item version. The brief CES-D scale consists of 10 items assessing three factors; depressed affect (feeling blue, depressed, fear, loneliness), psychomotor retardation (irritability, sleep difficulties, decreased energy, and problems with attention), and positive affect (happy, hopeful). The time frame for assessing depressive disorder was 7 days prior to the interview. We treated depressive disorder as a continuous measure.

Analytical approach and statistics

Analysis of variance (ANOVA) and mixed models were used to investigate the association between offspring and depressive disorder in cancer patients and survivors. The criterion for statistical significance was $p \leq 0.05$, two-tailed, for all analyses. All analyses were conducted using the SAS statistical software package, version 9.2 (SAS Institute Inc., Cary, NC, USA).

Results

Table 1 presents the general characteristics of the 292 research participants at the 2008 baseline measurement.

The baseline weighted prevalence of having no offspring was 3.3% (n=9, weighted mean: 0.51), and the baseline weighted prevalence of having five or more offspring was 12.88% (n=45, weighted mean: 0.50) among cancer patients and survivors.

Table 2 shows the adjusted effects between number of offspring and depressive disorder for 4 years. The OR for subjects with five or more offspring developing a depressive disorder was -0.794 (p-value: 0.039, SE: 0.329) compared with those with two offspring. However, there was no significant difference in the ORs of developing a depressive disorder between those with no offspring and those with two offspring (estimate: 0.731, p-value: 0.228, SE: 0.565) compared with those with two offspring. Table 3 shows the adjusted effect between the number of male and female offspring and the ORs for developing a depressive disorder. Our results show that the estimate was -0.958 lower (SE: 0.305, p-value: 0.012) than for those with zero female offspring.

Discussion

The primary objective of this study was to estimate the influence of offspring-related characteristics on the development of depressive disorder by cancer patients and those who had survived cancer for at least 45 years using a nationally representative sample.

Our main results indicated that parents suffering from, or with a history of, cancer who have more offspring are less likely than those with no offspring to develop a depressive disorder. In addition, such parents with three or more female offspring were less likely to suffer from a depressive disorder than were such parents with no female offspring.

These associations were independent of other

offspring-related variables (proportion of children cohabiting with parents, number of male offspring, number of female offspring, and average age of offspring), sociodemographic variables (age, gender, residential region, education, marital status, economic activity, income), health-risk behavior (smoking status and alcohol use), health status (restrictions on daily activities, and presence of chronic diseases), and year.

Cancer patients are faced with a multitude of physical, psychological, and practical challenges (Sanders et al., 2010; Liao et al., 2011), and they commonly experience impairment in the ability to perform the activities of daily living and a reduced quality of life (Miller and Massie, 2006; Ellis, 2012).

Suffering from cancer involves issues related not only to treatment and survival but also to quality of life. An important aspect of quality of life is loneliness which is a subjective negative experience associated with the perceived inadequacy of one's network of relationships (Fokkema et al., 2011; Chen et al., 2014). Loneliness including depression (Russell et al., 1980; Cacioppo et al., 2002; Cacioppo et al., 2006) is a risk factor for many health-related problems. Depression reduces one's quality of life and adversely affects compliance with medical treatment, resulting in decreased survival (Somerset et al., 2004). Although the exact mechanism by which this process operates remains unknown, Greer, et al. has suggested that the emotional impact of a cancer diagnosis, the side effects of treatment, and the disability associated with the disease may be relevant in this regard (Greer and Silberfarb, 1982). Many cancer patients and survivors experience psychological problems, including depression (Krebber et al., 2014). The prevention of depression is a major way to improve the quality of life of cancer patients. Thus, it is necessary to identify the factors associated with depression.

In addition, social support is one of the protective factors for depressive symptoms (Barrera et al., 2004), and a social network can include not only a spouse or a cohabiting child but it can also extend to other family members, friends, relatives, and society (Heo et al., 2014). Family members play a key role in bridging structural and functional support. However, the relationship between offspring and loneliness and/or depression in cancer patients remains still unknown.

In this study we investigated the independent effect of number of offspring and depressive disorder in a population diagnosed with cancer. We found that cancer patients with four or more offspring are less likely than those with two offspring to develop a depressive disorder. It is more likely to provide more social support and prevent loneliness among cancer patients and survivors. Although some studies have found that offspring negatively affect mental health in that they can constitute an economic burden and increase physical pain, most of these studies focused on newborns and younger children rather than on adult offspring (Ross and Huber, 1985; Ross et al., 1990; Mirowsky and Ross, 2001). This study included subjects at least 45 years of age, and most of their offspring were adults to minimize this negative effect. In addition, in this study, we analyzed longitudinal panel data during 4 years and created models to estimate the independent effect of each variable, adjusting for changes in time. The participants may be representative of the overall cancer patients and survivors who are at least 45 years of age.

Nevertheless, this study has a number of limitations. Depressive symptoms were also measured with the CESD-10 scale, a simple and useful instrument with high sensitivity and reasonable specificity for assessing recent depressive mood. Indeed, many studies have used the CESD-10 scale to assess depression. However, this is a self-report measure of subjective moods experienced relatively close to the day of assessment. Thus, responses can be biased by events that occurred the week before measurement. Moreover, despite its high sensitivity, its positive predictive value is low. As it cannot assess essential depressive symptoms and their duration, it cannot be used as a diagnostic tool. In addition, we could not assess the reason for having no children, and this status may have been attributable to never having married, fertilization problems, or child loss, situations that are associated with depressive symptoms. Indeed, married women are generally healthier than unmarried women. (Waldron et al., 1997).

In conclusion, this article provides evidence for a relationship between number of offspring and depressive disorder among cancer patients and survivors. Therefore, offspring may be an important contributor to the psychological status of cancer patients and survivors. Future investigations should precisely measure the depressive symptoms of cancer patients and survivors..

References

Andresen EM, Malmgren JA, Carter WB, Patrick DL (1994). Screening for depression in well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *Am J Prev Med*, **10**, 77-84.

Barrera M, Fleming CF, Khan FS (2004). The role of emotional social support in the psychological adjustment of siblings of children with cancer. *Child Care Health Dev*, **30**, 103-11.

Bures RM, Koropeckyj-Cox T, Loree M (2009). Childlessness, parenthood, and depressive symptoms among middle-aged and older adults. *J Family Issues*, **30**, 670-87.

Cacioppo, PhD JT, Hawkley LC, et al (2002). Loneliness and Health: Potential Mechanisms. *Psychosomatic Medicine*, **64**, 407-17.

Cacioppo JT, Hughes ME, Waite LJ, et al (2006). Loneliness as a specific risk factor for depressive symptoms: Cross-sectional and longitudinal analyses. *Psychology Aging*, **21**, 140-51.

Chen S, Conwell Y, Chiu HFK (2014). Loneliness and aging in China-a public health problem in need of solutions. *Int Psychogeriatrics*, **26**, 1771-2.

Chen SC, Huang BS, Lin CY (2013). Depression and predictors in Taiwanese survivors with oral cancer. *Asian Pac J Cancer Prev*, **14**, 4571-6.

Dalgard OS, Bjork S, Tambs K (1995). Social support, negative life events and mental health. *Br J Psychiatry*, **166**, 29-34.

Ellis J (2012). The impact of lung cancer on patients and carers. *Chron Respir Dis*, **9**, 39-47.

Evenson RJ, Simon RW (2005). Clarifying the relationship between parenthood and depression. *J Health Social Behavior*, **46**, 341-58.

Fokkema T, De Jong Gierveld J, Dykstra PA (2011). Cross-national differences in older adult loneliness. *J Psychol*,

146, 201-28.
Greer S, Silberfarb PM (1982). Psychological concomitants of cancer: current state of research. *Psychol Medicine*, **12**, 563-73.
Heo S, Lennie TA, Moser DK, Kennedy RL (2014). Types of social support and their relationships to physical and depressive symptoms and health-related quality of life in patients with heart failure. *Heart Lung: J Acute Critical Care*, **43**, 299-305.
Julian T MP, McKelvey MW (1992). Components of men's well-being at mid-life. *Issues Ment Health Nurs*, **13**, 285-99.
Katz MR, Kopek N, Waldron J, et al (2004). Screening for depression in head and neck cancer. *Psychooncology*, **13**, 269-80.
Krause N, Liang J (1993). Stress, social support, and psychological distress among the Chinese elderly. *J Gerontol*, **48**, 282-91.
Krebber AMH, Buffart LM, Kleijn G, et al (2014). Prevalence of depression in cancer patients: a meta-analysis of diagnostic interviews and self-report instruments. *Psycho-Oncology*, **23**, 121-30.
Liao YC, Liao WY, Shun SC, et al (2011). Symptoms, psychological distress, and supportive care needs in lung cancer patients. *Support Care Cancer*, **19**, 1743-51.
Maddams J, Brewster D, Gavin A, et al (2009). Cancer prevalence in the United Kingdom: estimates for 2008. *Br J Cancer*, **101**, 541-7.
Maneeton B, Maneeton N, Mahathep P (2012). Prevalence of depression and its correlations: a cross-sectional study in Thai cancer patients. *Asian Pac J Cancer Prev*, **13**, 2039-43.
Miller K, Massie MJ (2006). Depression and anxiety. *Cancer J*, **12**, 388-97.
Mirowsky J, Ross CE (2001). Age and the Effect of Economic Hardship on Depression. *J Health Social Behavior*, **42**, 132-50.
Nazlican E, Akbaba M, Okyay RA (2012). Evaluation of depression in newly diagnosed breast cancer cases in Hatay province of Turkey in 2011. *Asian Pac J Cancer Prev*, **13**, 2557-61.
Oxman TE, Berkman LF, Kasl S, et al (1992). Social support and depressive symptoms in the elderly. *Am J Epidemiol*, **135**, 356-68.
Ross CE, Huber J (1985). Hardship and depression. *J Health and Social Behavior*, **26**, 312-27.
Ross CE, Mirowsky J, Goldsteen K (1990). The impact of the family on health: the decade in review. *J Marriage and Family*, **52**, 1059-78.
Russell D, Peplau LA, Cutrona CE (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *J Personality and Social Psychology*, **39**, 472-80.
Sahin ZA, Tan M, Polat H (2013). Hopelessness, depression and social support with end of life Turkish cancer patients. *Asian Pac J Cancer Prev*, **14**, 2823-8.
Sanders SL, Bantum EO, Owen JE, et al (2010). Supportive care needs in patients with lung cancer. *Psychooncology*, **19**, 480-9.
Silverstein M, Cong Z, Li S (2006). Intergenerational transfers and living arrangements of older people in rural China: consequences for psychological well-being. *J Gerontol B Psychol Sci Soc Sci*, **61**, 256-66.
Somerset W, Stout SC, Miller AH, Musselman D (2004). Breast cancer and depression. *Oncology*, **18**, 1021-34.
Waldron I, Weiss CC, Hughes ME (1997). Marital status effects on health: Are there differences between never married women and divorced and separated women? *Soc Sci Med*, **45**, 1387-97.
Zunzunegui MV, Beland F, Otero A (2001). Support from children, living arrangements, self-rated health and depressive symptoms of older people in Spain. *Int J Epidemiol*, **30**, 1090-9.