

RESEARCH ARTICLE

Gender Differences in Marital Disruption among Patients with Cancer: Results from the Korean National Health and Nutrition Examination Survey (KNHANES)

Hai-Yan Song^{1,2}, Jeoung-A Kwon^{1,2}, Jae-Woo Choi^{1,2}, Sun-Jung Kim^{1,2}, Eun-Cheol Park^{2,3*}

Abstract

Background: Cancer is a major life event that imposes huge economic and mental burdens on patients and families. In addition, the diagnosis of cancer also causes significant family discordance that can lead to marital problems such as divorce or separation. The aim of this study was to investigate the association and any related gender differences between cancer diagnosis and marital disruption among cancer survivors. **Materials and Methods:** We used the recent cross-sectional Korea National Health and Nutrition Examination Survey (4th and 5th; Years 2008-2012). The study participants were 623 married cancer survivors over the age of 19. A multivariate logistic regression analysis was conducted to estimate odds ratios. **Results:** After adjusting for socioeconomic status and health-related behaviors, the odds ratio of marital disruption among female cancer survivors compared with male cancer survivors was 3.94 (95% CI 1.30-11.94; p=0.02). The odds ratio of marital disruption for the below-average economic level compared with the above-average economic level was 5.64 (95% CI: 1.03-31.02; p=0.05). When compared with the non-smoking cancer survivors, the smoking cancer survivors had an OR of marital disruption equal to 2.94 (95% CI: 1.08-8.00; p=0.03). **Conclusions:** The findings of this study suggest that the odds of marital disruption among female cancer survivors are higher than those among their male counterparts. Medical practitioners should be sensitive to early signs of marital discord in couples affected by a cancer diagnosis. Early identification and psychosocial intervention might reduce the frequency of divorce and separation and thus improve quality of life and quality of care for cancer survivors.

Keywords: marital disruption - female - divorces - separation - cancer survivor

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Introduction

Cancer is the most common cause of death in Korea. Recently, the survival rate among patients with cancer has been improving consistently. It was reported that the five-year survival rate from 2007 to 2011 was around 66.3% and that one out of every 100 people is a cancer survivor (Korea Central Cancer Registry, 2014). The impact of cancer on life trajectory depends not only on disease-related factors, treatment factors, and possible late effects but also on life circumstances such as personal resources, socioeconomic status, and social support (Northouse et al., 2005; Ahmad Kiadaliri et al., 2012) (Nazik et al., 2014). A substantial proportion of social support is provided by partners, and married patients with cancer have consistently been found to benefit from such support in terms of better survival rates compared with unmarried patients with cancer (Kato et al., 1992; Kvikstad et al., 1995; Johansen et al., 1996; Ezat et al., 2012).

It might be reasonable to hypothesize, however, that a major life event such as a diagnosis of cancer would

have a considerable effect on the quality of marriage and that patients with cancer are therefore at increased risk of marital disruptions such as divorce and separation. At the same time, marital disruption can increase the risks of an unhealthy lifestyle, which may include increased alcohol consumption and tobacco smoking, reduced physical activity, and an unhealthy diet. Such changes can subsequently increase the risk of recurrence and comorbidity and jeopardize survival (Doyle et al., 2006; Ozturk et al., 2014).

Cancer as a 'major life event' imposes huge economic and mental burdens on patients and families. To our knowledge, most studies have failed to find sufficient evidence to verify a relationship between cancer and divorce and other marital problems such as separation. A Danish cohort study suggested that cancer patients face the same challenges with regard to divorce as people who have never been confronted with cancer (Carlsen et al., 2007). Moreover, studies suggest that some couples find that cancer strengthens their relationship (Rieker et al., 1989; Schover and von Eschenbach, 1985). Other studies show,

¹Department of Public Health, Graduate School, ²Institute of Health Services Research, ³Department of Preventive Medicine, Yonsei University College of Medicine, Seoul, Korea *For correspondence: ecpark@yuhs.ac

however, that some special cancers such as breast cancer and cervix cancer result in marital disruption. Based on some studies, there are some significant differences between males and females in the association between a history of cancer diagnosis and the marital relationship. A Swedish register-based study found that women who were diagnosed with breast cancer had a significant, nearly 25% increase in their risk of divorce, whereas men who were with diagnosed prostate cancer had a reduction of more than 40% in their risk of divorce (Socialstyrelsen, 2006).

Most studies of cancer and marital disruption have focused on cervical cancer and breast cancer. Young age and nullipara are known risk factors for divorce (Christoffersen, 2002; Majeed et al., 2014; Mohammadi et al., 2013; Tuncay, 2014; Yan et al., 2014). Furthermore, the treatment of cervical cancer and breast cancer might also affect sexual behavior (Cull et al., 1993) and body image (Juraskova et al., 2003; Hawighorst-Knapstein et al., 2004), perhaps giving rise to marital disharmony and thereby contributing to a higher risk of divorce and other marital problems.

In South Korea, women's relative economic and political status is lower than that in other developed countries. According to the United Nations Gender Empowerment Measure, which monitors women's autonomy along economic, educational, and political dimensions, Korea ranked 53rd out of 75 countries and was far behind most other developed countries (UNDP, 2006). In Korea, even in the last decade, husbands earn the majority of family incomes. For that and other reasons, women are especially vulnerable to marital problems. Hence, women who are diagnosed with cancer may be more likely than men who are diagnosed with cancer to face problems in their marriage.

We asked: besides the special cases of cervical and breast cancers, whether other types of cancer result in significantly more marital disruptions among females than among males? We selected the six types of cancer that are the most common in Korea: gastric cancer, lung cancer, liver cancer, colorectal cancer, breast cancer, and cervical cancer. We aimed to test whether women are more likely than men to be abandoned by their spouses after a cancer diagnosis using the data from the fourth and fifth Korean National Health and Nutrition Examination Surveys (KNHANES; 2008-2012).

Materials and Methods

Subjects

This study was based on data obtained from the fourth and fifth K-NHANES, which were conducted from 2008 to 2012 by the Korea Center for Disease Control and Prevention (KCDC). The sampling protocol for the KNHANES was designed to involve a complex, stratified, multistage, probability-cluster survey of a representative sample of the non-institutionalized civilian population of South Korea. The survey was performed by the Korean Ministry of Health. The target population of the survey was all non-institutionalized civilian Korean individuals aged 1 year or older. The survey employed stratified, multistage probability sampling units based on geographical area,

gender, and age, which were determined based on the household registries of the 2005 National Census Registry—the most recent five-year national census in Korea. The total population of the survey from 2008 to 2012 included 45,811 individuals. Individuals who were younger than 19 years of age or who were unmarried (n=15084), as well as those for whom data were missing (n=2985), were excluded, leaving 26742 individuals. Among those individuals, there were 623 married adult cancer survivors, our target population, whom we analyzed in our study. A detailed description of the sampling can be found in the KNHANES report (Korea Center for Disease Control and Prevention & Ministry of Health and Welfare 2009).

Dependent variables

We defined a marital disruption as either a separation or a legal divorce. To assess marital disruption, the study participants were asked the question: "Have you ever been married?" Based on the answer, the participants were classified as either Married or Unmarried. If a participant was Married, then he or she was asked: "How's your current marital status?" Based on the answer, the participants were further classified as either Living with Spouse, Separated from Spouse, Widowed, or Divorced. Participants who were classified as Married based on the first question and as Separated from Spouse or Divorced based on the second question were considered to have had a marital disruption; those who were classified as Married based on the first question and as Living with Spouse or Widowed based on the second question were considered not to have had a marital disruption.

Independent variables

Demographic and socioeconomic factors: The participants were divided into three age groups: 19-39, 40-59, and ≥60 years of age. The region was classified as urban (Seoul, Busan, Daegu, Incheon, Kwangju, Daejeon, and Woosan) or rural (Kyungki, Kangwon, Chungkuk, Chungnam, Jonbuk, Jonnam, Kyungbuk, Kyungnam, and Jeju). The level of education was classified as: elementary school or less, middle and high school, college, or higher. Economic level was measured by the household income; the household income was the family income adjusted for the number of family members and categorized as: above average, average, or below average. The participants' occupations were classified as white-collar (administrator, professional, or office worker), blue collar (manufacturing, mining, construction, mechanical work, maintenance, technical installation, and various other types of physical work), and non-employed (housewife or student).

Health-related behavior factors: Health-related behavior categories were considered according to the classifications set out in the KNHANES. In terms of smoking status, the subjects were classified as either smoking or non-smoking. The alcohol consumption variable was grouped into two categories: drinking and non-drinking.

Health status and psychological factors: The stress level of the participants was classified as either "a little bit" or "extremely high". Self-reported depression was evaluated by asking each participant: "Have you ever felt

depression steadily during 2 weeks?" The participants responded either "No" or "Yes".

Statistical analysis

A multivariate logistic regression analysis was conducted to investigate the association between marital status and the independent variables. The multivariate logistic regression analysis was adjusted for sex, age, region, education level, economic level, employment, current smoking status, current alcohol consumption, stress level, and depressive state.

The odds ratio (OR) and 95% confidence interval (CI) were calculated, and the threshold for statistical significance was set at $p < 0.05$. Statistical analyses were performed using SAS software version 9.2 (SAS Institute Inc., Cary, North Carolina, USA) to account for the multistage, stratified survey design and the survey weighting for the estimation of all statistical results.

Results

Table 1 shows the general characteristics of the 623 married cancer survivors aged 19 years or more. A total of 226 (43.2%) males and 397 (56.8%) females were diagnosed with cancer at the baseline. Among the 623 married cancer survivors, there were 27 marital disruptions (20 divorces and 7 separations).

Table 2 shows the univariate and multivariate logistic analyses of the factors associated with marital disruption among the study subjects.

In the adjusted multivariate analysis, the OR of marital disruption for females compared with males was 3.94 (95%CI: 1.30-11.94; $p = 0.12$).

Considering the economic level, the OR of marital disruption for the average economic level compared with the above-average economic level was 1.69 (95%CI 0.47-6.09; $p = 0.43$) and that for the below-average economic level compared with the above-average economic level was 5.64 (95%CI: 1.03-31.02; $p = 0.05$).

When compared with the non-smoking cancer survivors, the smoking cancer survivors had an OR of marital disruption equal to 2.94 (95%CI: 1.08-8.00; $p = 0.03$).

Discussion

In this study, 20 out of 623 cancer survivors were divorced. The overall frequency of divorce was 32.1%, which is much higher than the overall divorce rate of 2.4 per 1,000 individuals in Korea in 2012 (Statistics Korea, 2014). This rate was also higher than that found in prior studies, which suggested that the overall frequency of divorce among cancer patients is in the 5-17% range (Glantz et al., 2009). Prior studies have shown that a cancer diagnosis can bring increased marital distress (Hassali et al., 2013; Kirchoff et al., 2012). Married couples facing a cancer diagnosis encounter additional health-related, emotional, and financial stressors compared with other couples.

We analyzed the relationship between gender and marital disruption, adjusting for age, region, education level, economic status, employment, current smoking status, current alcohol consumption, stress awareness, and self-reported depression. The results of the multivariate logistic regression analysis showed that the OR of marital disruption for female cancer survivors compared with

Table 1. The Characteristics of Study Participants of Cancer Survivors

Variables		Divorced+Separated		Normal marriage		Total N	*p value
		N	(%)	N	(%)		
Sex	Male	7	(3.1)	219	(96.9)	226	0.19
	Female	20	(5.0)	377	(95.0)	397	
Age (years)	19-39	2	(14.3)	12	(85.7)	14	0.07
	40-59	11	(5.4)	192	(94.6)	203	
	≥60	14	(3.4)	392	(96.6)	406	
Region	Rural	13	(3.7)	334	(96.3)	347	0.40
	Urban	14	(5.1)	262	(94.9)	276	
Education level	≤Elementary school	6	(3.0)	196	(97.0)	202	0.30
	Middle or high school	15	(4.3)	333	(95.7)	348	
	≥College	6	(8.2)	67	(91.8)	73	
Economic level	Rich (above average)	6	(4.7)	123	(95.3)	129	0.61
	Average	9	(3.2)	269	(96.8)	278	
	Poor (below average)	12	(5.6)	204	(94.4)	216	
Employment	White collar jobs	18	(4.6)	374	(95.4)	392	0.26
	Blue collar jobs	5	(2.8)	175	(97.2)	180	
	No job/student/house wife	4	(7.8)	47	(92.2)	51	
Smoking	Non-smoking	18	(3.6)	477	(96.4)	495	0.34
	Smoking	9	(7.0)	119	(93.0)	128	
Drinking	Non-drinking	15	(3.3)	440	(96.7)	455	0.07
	Drinking	12	(7.1)	156	(92.9)	168	
Stress awareness	Extremely high	7	(4.4)	153	(95.6)	160	0.48
	A little bit	20	(4.3)	443	(95.7)	463	
Self-reported Depressive	Yes	4	(3.0)	131	(97.0)	135	0.14
	No	23	(4.7)	465	(95.3)	488	
Total		27	(4.3)	596	(95.7)	623	

* P values from Pearson's Chi-square test

Table 2. The Univariate and Multivariate Logistic Regression Analysis (Factors Associated with Marital Disruption)

Variables		Univariate analysis		p value	Multivariable analysis		p value
		OR	95%CI		OR	95%CI	
Sex	Male	1.00			1.00		
	Female	1.99	(0.71-5.60)	0.19	3.94	(1.30-11.94)	0.02
Age (years)	19-39	6.36	(0.94-43.17)	0.06	5.41	(0.27-109.13)	0.27
	40-59	1.90	(0.77-4.71)	0.17	2.20	(0.54-8.98)	0.27
	≥60	1.00			1.00		
Region	Rural	1.00			1.00		
	Urban	1.47	(0.60-3.63)	0.40	1.26	(0.46-3.48)	0.65
Education level	≤Elementary school	1.00			1.00		
	Middle or high school	1.61	(0.53-4.88)	0.40	1.42	(0.46-4.36)	0.54
	≥College	2.79	(0.78-9.95)	0.11	2.38	(0.64-8.81)	0.20
Economic level	Rich (above average)	1.00			1.00		
	Average	1.60	(0.51-5.06)	1.00	1.69	(0.47-6.09)	0.42
	Poor (below average)	1.60	(0.51-5.06)	0.42	5.64	(1.03-31.02)	0.05
Employment	White collar jobs	1.00			1.00		
	Blue collar jobs	0.51	(0.16-1.66)	0.27	0.44	(0.09-2.03)	0.29
	No job/student/house wife	1.77	(0.51-6.15)	0.37	1.31	(0.33-5.23)	0.70
Smoking	Non-smoking	1.00			1.00		
	Smoking	1.60	(0.60-4.29)	0.35	2.94	(1.08-8.00)	0.03
Drinking	Non-drinking	1.00			1.00		
	Drinking	2.31	(0.91-5.87)	0.08	2.63	(0.81-8.61)	0.11
Stress awareness	Extremely high	1.00			1.00		
	A little bit	1.42	(0.54-3.75)	0.48	1.23	(0.49-3.08)	0.66
Self-reported Depressive	Yes	1.00			1.00		
	No	2.49	(0.71-8.76)	0.15	3.21	(0.82-12.61)	0.10

male cancer survivors was 3.94 (95%CI: 1.30-11.94; $p=0.02$). This result implies that a diagnosis of cancer brings a higher risk of marital disruption to women than to men. One explanation for this result may be the low social status of South Korean women.

Women in South Korea have recently experienced great social change, improving their social status over the last 30 years. Despite this evidence of official equality, questions remain about the true nature of the improvement in women's social status and gender-equality; inequality persists in some areas, such as the scarcity of women in professional fields, the prevalent imbalance of housework, the coherent belief in gender differences, and other factors. Korea still remains a patriarchal society.

According to some researches, wives who work very long hours as paid employees are more likely to divorce or separate than wives who are out of the labor force (Shin et al., 2014; Yean-Ju and 2008), and a wife's employment increases the chance of marital disruption (Jolovaara and Marika, 2003; Poortman et al., 2002; Schoen et al., 2002). Some studies argue that a wife's income allows her to walk away from an unhappy marriage; researchers call this the "independence effect", in contrast to the "income effect", which refers to the stabilizing effect of incomes on marriages (Oppenheimer and Valerie, 1997; Sayer and Bianchi, 2000; Yu-soon, 2005). In South Korea, although increasing numbers of women work outside the home, the dominant conception, particularly for the college-educated middle class, is that the husband is the "outside person", whose employment provides the main source of economic support, whereas the wife is the "inside person", whose chief responsibility is the maintenance of the household. The rate of labor-force participation among married women from 15 to 49 years of age is approximately 40%

in urban areas according to the 2000 census, and the average wage for women is 61% that of men (KOSIS, 2008). Women tend to leave the labor force when they get married. Many women manage the family finances, and informal private short-term credit associations give them access to funds that might not be obtainable from a conventional bank. The most important responsibility of married women is probably the management of their children's education.

In South Korea, because of their low social status and low labor-force participation rate, women are generally at a disadvantage to men within a marriage. After a cancer diagnosis, the situation will be even worse, because women can no longer perform their usual roles within the household and can no longer take care of the families. At such times, husbands may look down upon their spouses and choose to leave or abandon them.

From Table 2, the OR of marital disruption for individuals with below-average incomes compared with those with above-average incomes was 5.64 (95%CI: 1.03-31.02; $p=0.05$), and that for individuals with average incomes compared with those with above-average incomes was 1.69 (95%CI: 0.47-6.09; $p=0.43$). In fact, higher levels of marital stability among couples with higher socioeconomic status have already been observed (Bernardi et al., 2011; Esping-Andersen, 2009; Salvini et al., 2011). In other words, lower economic status results in a higher risk of marital disruption, which is the same as the finding of our study.

The OR of marital disruption for cancer survivors who smoke compared with those who do not smoke was 2.94 (95%CI: 1.08-8.00; $p=0.0347$). One explanation for this result may be that the impact of smoking and marital disruption is bidirectional; the result may also be explained

by a higher rate of smoking among cancer survivors who had marital disruptions compared with those who did not. A cohort study conducted in the United States found that women who became divorced or widowed had an increased risk of relapsing or starting to smoke (Lee et al., 2005).

Although age is known to be a strong risk factor for divorce and separation (Christoffersen, 2002; Socialstyrelsen, 2006), we found a negative (albeit non-significant because of the small sample size) trend in marital disruption as age increased. Marital relationships, in particular, may be strained for younger cancer patients as they face health-related, emotional, and financial stressors as a result of the cancer. For married couples, as cancer diagnosis can bring increased marital distress, uncertainty about a partner's health, problems with sexual functioning and fertility, as well as added financial stress and instability (Avci and Kumcagiz, 2011; Gurney et al., 2009). However, the impact of cancer on marital outcomes among young adults may be unique because of the complex lifestyle and social changes that occur during young adulthood. Marriage can bring significant social and emotional support to young cancer patients as well as provide important resources during treatment and recovery through a spouse's income and health insurance coverage. Younger marriages may be less resilient to the stresses of cancer treatment and recovery, however, and they may face competing burdens of having young children or lower job security than older couples. Among young cancer survivors, the increased emotional and financial burdens of cancer may impact on marriages in ways not seen among other survivor populations.

Compared with other individuals with cancer, young cancer survivors may have a higher risk of divorce and separation, although our findings cannot support such a conclusion, possibly because the sample of young cancer survivors was very small. Future studies could expand the sample size and explore the effects of age on the likelihood of marital disruptions due to cancer through case-control and cohort studies.

To our knowledge, this study is the first to use the data from the KNHANES to try to determine whether female cancer survivors are at a higher risk than male cancer survivors of being abandoned by their spouses in Korea. The advantage of this study is that we used the KNHANES, which was designed as a complex, stratified, multistage, probability-cluster survey and thus excludes the possibility of selection biases.

There are several limitations to our study, however. First, because the subjects of our study were cancer survivors, information on cancer status is important, such as the cancer stage, the time of the first diagnosis, and whether or not complications exist. We could not confirm those factors, because the KNHANES did not include such information. Second, all information in the KNHANES was collected by the participants' responses to questions, so information biases may exist. For example, the rates of reported smoking and alcohol drinking might have been underestimated, whereas stress awareness and self-reported depression might have been overestimated. Third, our study did not include information on the

participants' children, such as how many children were in the household and the ages of the children and also some other psychosocial factors such as depression, which are known to be risk factors for marital disruption. One of the most important limitations of our study is the cross-sectional design, which made it difficult for us to identify causal relationships between marital disruption and gender and other associated factors.

In conclusion, the risk of partner abandonment following a cancer diagnosis was higher among women than among men, so we recommend that medical practitioners be especially sensitive to early signs of marital discord in couples affected by the occurrence of a serious medical illness such as cancer, especially when the affected spouse is female. Early identification and psychosocial intervention might reduce the frequency of divorce and separation and thus improve the quality of life and quality of care for cancer survivors.

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