



Disability and quality of life in community-dwelling elderly cancer survivors: Case-control study in the Korean population



Myung Kyung Lee

College of Nursing, Research Institute of Nursing Science, Kyungpook National University, 680 Gukchabosangro, Jung-gu, Daegu, 700-842, Republic of Korea

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ABSTRACT

Purpose: Advanced age is a significant risk factor for cancer and functional disabilities increase with age. The purpose of this case-control study of Korean individuals was to determine the effect of cancer and cancer treatment on functional disability and quality of life (QOL). Thus, we compared community-dwelling elderly cancer patients (ECPs) with individuals from the general elderly population (GEP) who never had diagnoses of cancer.

Methods: We selected 1776 ECP who were at least 65 years-old from the 2008 Korean Community Health Survey data and used propensity score matching to randomly select 1766 individuals from the GEP who closely resembled the ECPs. Functional disability was measured using the Instrumental Activities of Daily Living (IADL) scale, and QOL was measured by the EuroQol Group EQ-5D.

Results: ECPs were more dependent in preparation of food, doing laundry, and shopping (IADL scale), and in mobility and usual activities (EQ-5D). Although ECP had more problems with pain, discomfort, anxiety, and depression, they were more independent in self-care and handling of financial responsibilities.

Conclusions: ECPs had multiple physical and psychological symptoms that adversely affected functional disability and QOL, but higher functional ability, such as self-care and handling of financial responsibilities. Promotion of self-care by ECPs is pivotal for effective management in community practice.

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1. Background

Advanced age is a significant risk factor for cancer (Siegel et al., 2015). Sixty percent of newly diagnosed cancers occur in people who are at least 65 years-old (Kinsella and Velkoff, 2001). Functional independence, the ability to perform essential life skills on a daily basis, has an important role in determining quality-of-life (QOL) (Hamama-Raz et al., 2015). Functional independence is particularly important among older individuals with health-related risk factors, and is a priority in aging research (Morey et al., 2009). Elderly cancer survivors represent an important target for improving functional independence because cancer and its treatment are associated with accelerated functional decline, poor QOL, and frailty in these individuals (Baker et al., 2003; Ness et al., 2006; Perez-Zepeda et al., 2016). Previous research reported that individuals with functional limitations had an increased risk for health problems, progression to disability, and possibly for earlier

mortality (Fried et al., 2001). Furthermore, increased functional limitations in cancer survivors increases the risk for a second cancer and other chronic diseases such as cardiovascular disease, osteoporosis, and diabetes (Deimling et al., 2007).

There is limited knowledge of the QOL in elderly cancer patients (ECPs). A few studies examined the effect of cancer and cancer treatment on QOL by comparing elderly patients with and without cancer (Baumann et al., 2009; Gooneratne et al., 2007; Thomé et al., 2004). However, comparisons of the QOL of ECPs with age-matched counterparts without cancer have produced conflicting results: some studies reported similar QOL in both groups (Fredheim et al., 2008), some reported better QOL in cancer patients (Krouse et al., 2007), and some reported worse QOL in cancer patients (Bellizzi et al., 2005; Krouse et al., 2007; Thomé et al., 2004). However these previous studies have focused on QOL rather than functional limitations in daily living, and they are limited due to their small sample sizes and lack of control for selection bias.

The current case-control study aimed to determine whether cancer and cancer treatment affect functional ability and QOL in the elderly by comparison of ECPs with the general elderly population

E-mail address: mlee@knu.ac.kr.

(GEP) in Korea. This study will provide important information on the most significant functional disabilities, the interventions that could be used to manage disability and QOL issues in ECPs, and specific aspects of functional disabilities that may be best managed by self-administered interventions.

2. Methods

2.1. Data and subjects

We used data from a nationally representative sample of Korean adults from the 2008 Korean Community Health Survey (KCHS) to assess the functional disability and QOL of ECP in Korea. The 2008 KCHS was conducted in 253 regions of 16 metropolitan cities and provinces of Korea (Kim et al., 2012b). The 2008 KCHS, a nationwide health survey of individuals at least 19 years-old, was performed by the Korean Centers for Disease Control and Prevention (KCDC) from September to November 2008. The KCHS used two-probability sampling methods: cluster sampling and systematic sampling. A sample unit with a commensurate probability was used to select a sample area (tong/ban/ri, the smallest administrative district unit in Korea). There were 800 households (or subjects) in the sample area (tong/ban/ri). A directory of households was created, and sample households were then selected using a systematic sampling method (Rim et al., 2011).

The KCHS survey was administered face-to-face by trained interviewers. The standardized questionnaire consisted of 358 questions in 13 fields and covered a wide variety of health topics, including patterns of disease prevalence and morbidity, health-related behaviors, health examinations, vaccinations, use of medical services, trauma, functional disability, QOL, and employment status (Kim et al., 2012b). Detailed demographic and socioeconomic characteristics, health-related problems, and past medical histories were also obtained. Of the 220,258 individuals in the 2008 KCHS, we initially selected individuals who were at least 65 years-old ($n = 53,427$). The cancer population was defined as those who said they had cancer and were diagnosed by a physician. Individuals who did not respond to these two questions or had mismatches in the answers to these questions were deleted from the dataset ($n = 384$). Among the remaining individuals ($n = 53,043$), 1776 (962 men and 814 women) met both criteria for cancer and were categorized as ECP. The remaining 51,267 individuals were categorized as the GEP.

Propensity score matching (PSM) was used to ensure comparability of the ECP and GEP groups without selection biases, and yielded a propensity matched GEP (PMGEP, $n = 1766$). The 2008 KCHS was approved by the KCDC Institutional Review Board. The KCDC also obtained written informed consent from all participants.

2.2. Study variables and measurements

The variables used to generate propensity scores were baseline characteristics of the GEP and ECP (Peterson et al., 2013): age, sex, marital status, educational level, number of adult family members, household size, National Basic Livelihood Act beneficiary status, monthly household income, number of comorbidities, housing ownership, smoking status, and employment status.

The variables used to compare health-related characteristics of the PMGEP and ECP groups were: sleep duration (h/day), subjective stress level (almost none, some, much, very much), chronic illness, experience of hospitalization in the past year, and body mass index (kg/m^2). The presence of a chronic illness consisted of those who were currently suffering from the illness based on diagnosis by a physician.

2.2.1. Functional disability

Functional disability is defined as the difficulty, or need for assistance, in carrying out activities essential to independent living. It is mostly diagnosed by self-reporting of specific task difficulties, including essential roles, self-care for living independently, and desired activities important to maintain QOL (Nagi, 1991). Functional disability was measured using the Instrumental Activities of Daily Living (IADL) scale, which measures complex activities necessary for independent daily life (Lawton and Brody, 1969). This is a widely used informant-based measure that rates ability to complete 8 activities: housework, prepare food, do laundry, use public transportation, shop, handle financial responsibilities, use a telephone, and administer medication. Each activity was coded as “dependent” (0) or “independent” (1) (Cromwell et al., 2003; Graf, 2009; Lawton and Brody, 1969), so the IADL score ranges from 0 to 8, with a higher score indicating greater independence. The Korean version of IADL (K-IADL) has good reliability and validity in the geriatric population (Won et al., 2002).

2.2.2. Quality of life (QOL)

QOL was measured by the EuroQol Group EQ-5D questionnaire (EuroQol Group, 1990). This questionnaire assesses 5 dimensions: mobility, self-care, usual activities, pain and discomfort, and anxiety and depression. Each dimension has 3 levels (no problems, some problems, extreme problems). One of the dimensions of the questionnaire is a visual analogue scale (EQ-VAS), in which the respondent indicates his or her health status by drawing a line from the origin box to a vertical line that is numbered from 0 (at the bottom, indicating worst imaginable health state) to 100 (at the top, indicating best imaginable health state). This information is used as a quantitative measure of health outcome as judged by each respondent. The Korean version of EQ-5D was tested for reliability and validity in patients with cancer (Kim et al., 2012a).

2.3. Statistical analyses

2.3.1. Propensity score matching (PSM)

Balanced comparisons of ECPs and the GEP can be made by adjusting for differences of covariates (confounders) that potentially affect outcomes, so that the results provide unbiased estimates of functional ability and QOL of the two groups. Propensity score matching (PSM) was used to adjust for differences of covariates in this study (Rosenbaum and Rubin, 1983; Rubin, 2001). PSM allows comparison of cases and controls who have similar “propensities” or likelihoods for being a case, conditional on a set of several covariates. PSM finds matches from pool of the comparison group so that measured confounders are equally distributed between cases and controls. The covariates used to generate propensity scores (PSs) are factors that are theoretically related to outcome and are available in the sample data (Brookhart et al., 2006). In theory, important issues impacting functional ability and QOL in older patients may include socio-demographic factors, engaging in healthy behaviors, co-morbidities, mobility, psychosocial factors, emotional function, and social support or involvement (Kvale et al., 2010; Schootman et al., 2009). These factors should be controlled as covariates to identify differences in the main outcomes – functional disability and QOL – in ECPs and the GEP.

Several previous case-control studies have used PSM to compare QOL or working status between cancer patients and the general population (Lee et al., 2011a, 2008, 2011b; Lee and Yun, 2015). In the present study and previous studies, cases are patients who were diagnosed and treated for cancer, and controls are individuals from the general population who were never diagnosed with cancer. A logistic regression model yielded estimates of the probability

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