

Original Article

# Health-related quality of life and health condition of community-dwelling populations with cancer, stroke, and cardiovascular disease

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**Abstract.** [Purpose] The purpose of this study was to investigate health conditions and HRQoL (health-related quality of life) of community-dwelling populations with cancer, stroke, and CVD (cardiovascular disease) based on standardized data. [Subjects] The study subjects numbered 422 in total: 179 patients had cancer, 128 were stroke patients, and 115 were CVD patients. [Methods] This study used data collected during health interviews carried out as part of the sixth Korean National Health and Nutrition Examination Survey. Face-to-face health interviews were conducted by trained surveyors who visited households during 2013. The contents of the interviews included data on demographic factors, physical condition, psychological condition, and HRQoL. [Results] Stress perceptions related to health condition differed significantly across the populations of cancer, stroke, and CVD patients. The HRQoL items of mobility, self-care, usual activities, and anxiety/depression also differed significantly across these populations. [Conclusion] Healthcare teams will now be in a position to plan programs for improvement in these areas according to the features of each disease.

**Key words:** Disease, Health condition, Health-related quality of life

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## INTRODUCTION

In recent years, cancer, stroke, and cardiovascular disease (CVD) are emerging as potent threats to the world's health care systems. In 2014, the top three causes of death in South Korea were cancer, stroke, and CVD, and they accounted for approximately 47% of all deaths that year<sup>1)</sup>. Many people with these diseases have physical and psychological problems, and these problems are placing a growing economic burden on health care. In particular, cancer and CVD are frequently associated with various complications including depression, hypertension, and diabetes<sup>2, 3)</sup>. Stroke commonly influences various aspects of attitudes, perceptions, and performance in the long-term<sup>4, 5)</sup>. In addition, stroke patients report poorer health-related quality of life (HRQoL) than the general population<sup>6)</sup>.

Individuals' HRQoL offers a multidimensional perspective of their physical, psychological, and social function<sup>7)</sup>. For that reason, HRQoL has gained ground as a primary measure of the impact of disease<sup>8, 9)</sup>. In addition, it can often be used more easily than clinical parameters as a health-related index helping healthcare workers to understand patients'

needs and provide them with quality health services<sup>10, 11)</sup>. HRQoL in populations with cancer, stroke, CVD, and other chronic diseases has been studied extensively using different methods in recent years<sup>12–15)</sup>. However, previous studies had limitations with respect to identifying features according to disease and generalizing results, because the study subjects were typically compared with healthy subject groups and the studies were not designed as randomized controlled trials<sup>16–18)</sup>. Healthcare teams need to provide intensive and focused programs for people with any of the above-mentioned diseases. Thus, the primary aim of this study was to investigate the health conditions of community-dwelling populations with cancer, stroke, and CVD based on standardized data. The second aim was to identify the differences in HRQoL among these populations.

## SUBJECTS AND METHODS

This study used data collected during health interviews carried out as part of the sixth Korean National Health and Nutrition Examination Survey (KNHANES VI 2013). KNHANES VI was conducted among the non-institutionalized Korean population by the Korea Centers for Disease Control and Prevention (KCDCP). In addition, KNHANES VI implemented a complex, stratified, probability-based study design using multi-stage and cluster sampling to select household units based on region, gender, and age. KNHANES VI was approved by the institutional review board of the KCDCP (IRB no. 2013-07CON-03-4C).

The study subjects numbered 422 in total, all of whom had

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diseases diagnosed by a doctor. Among the subjects, 179 had cancer, 128 were stroke patients, and 115 had CVD according to KNHANES VI. Comorbidity of diseases was excluded because the aim of this study was to identify the specific features of each disease. The face-to-face health interviews were conducted by trained surveyors who visited households during 2013. The contents of the interviews included data on demographic factors, physical condition, psychological condition, and HRQoL. The general characteristics of the subjects are presented in Table 1. Their physical and psychological conditions were assessed based on the following: a normal week's hard physical activities (e.g., participation in exercise such as running, climbing, riding a bicycle quickly, fast swimming, and carrying heavy objects for more than 10 minutes); a normal week's moderate physical activities (e.g., participation in exercise such as slow swimming, playing table tennis, tennis doubles, badminton, and carrying light objects for more than 10 minutes); a normal week's walking (e.g., participation in walking for work or school, mobility, and exercise for more than 10 minutes); sleep duration for a normal day; and degree of stress (4-point Likert scale: 1 indicates feeling very much, 2 indicates feeling much, 3 indicates feeling a little, and 4 indicates feeling rarely). The HRQoL scale used was the Korean version EuroQoL, EQ-5D-3L (3 level version of the EuroQoL 5 dimensional questionnaire)<sup>19, 20</sup>. EQ-5D-3L defines HRQoL in terms of five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension is rated on a scale from 1 to 3, where 1 indicates no problems, 2 indicates some problems, and 3 indicates severe problems. A higher score represents a greater limitation on the corre-

sponding dimension.

SPSS 21.0 (IBM Corporation, Armonk, NY, USA) was used for statistical analysis purposes. Statistical analysis took into account the clustering and stratification of the sample survey data as usually done in complex survey design. A frequency analysis was performed to examine the distribution of the subjects. Linear regression analysis was also performed to identify differences in health conditions and HRQoL for each disease according to population. The statistical significance level used for statistical testing was  $\alpha = 0.05$ .

## RESULTS

Individuals' physical conditions did not differ significantly across the populations of cancer, stroke, and CVD patients. Stress perceptions relating to psychological condition differed significantly across the populations of cancer, stroke, and CVD patients ( $p = 0.022$ ). The scores of the stroke population (mean score = 3.18) were higher than those of the other diseases (mean score of cancer = 2.88, mean score of CVD = 2.87). However, no significant difference was found between populations regarding the relationship between sleeping and the three diseases (Table 2).

HRQoL items of mobility, self-care, usual activities, and anxiety/depression differed significantly across the populations of cancer, stroke, and CVD patients. The mean scores of the stroke population were significantly higher than those of the other diseases in all dimensions except for anxiety/depression (Table 3).

**Table 1.** Characteristics of subjects

| Parameters     | Cancer    | Stroke     | CVD†      |
|----------------|-----------|------------|-----------|
| Total subjects | 179 (100) | 128 (100)  | 115 (100) |
| Gender         | Male      | 65 (39.1)  | 74 (59.8) |
|                | Female    | 114 (60.9) | 54 (40.2) |
| Age            | ≤39       | 12 (7.6)   | 4 (5.7)   |
|                | 40–49     | 27 (18.9)  | 6 (8.3)   |
|                | 50–59     | 36 (23.5)  | 23 (26.1) |
|                | 60–69     | 38 (17.0)  | 40 (23.1) |
|                | ≥70       | 66 (33.1)  | 55 (36.9) |

\*Sample size (estimated percent of the population). †CVD: cardiovascular disease

**Table 3.** Mean scores of HRQoL of the three diseases

| EQ-5D-3L           | Cancer (ref.†)            | Stroke                   | CVD‡                     |
|--------------------|---------------------------|--------------------------|--------------------------|
| Mobility*          | 1.18 (0.03) <sup>ab</sup> | 1.56 (0.09) <sup>a</sup> | 1.41 (0.06) <sup>b</sup> |
| Self-care*         | 1.07 (0.02) <sup>a</sup>  | 1.41 (0.09) <sup>a</sup> | 1.17 (0.04)              |
| Usual activities*  | 1.17 (0.03) <sup>a</sup>  | 1.55 (0.09) <sup>a</sup> | 1.33 (0.09)              |
| Pain/discomfort*   | 0.36 (0.05) <sup>a</sup>  | 1.77 (0.11) <sup>a</sup> | 1.44 (0.06)              |
| Anxiety/depression | 1.17 (0.03)               | 1.39 (0.11)              | 1.20 (0.04)              |

Values are mean (standard error). \* $p < 0.05$ . †ref.: reference. ‡CVD: cardiovascular disease. <sup>a,b</sup>Significantly different among the disease groups

**Table 2.** Mean scores of health condition of the three diseases

| Parameters              | Cancer (ref.†)                 | Stroke                   | CVD‡                     |
|-------------------------|--------------------------------|--------------------------|--------------------------|
| Physical condition      | Hard physical activities§      | 64.43 (13.46)            | 62.38 (13.67)            |
|                         | Moderated physical activities§ | 748.32 (8.58)            | 51.23 (17.11)            |
|                         | Walking§                       | 347.33 (49.80)           | 263.66 (33.47)           |
| Psychological condition | Sleeping¶                      | 6.92 (0.193)             | 8.13 (1.08)              |
|                         | Stress*                        | 2.88 (0.73) <sup>a</sup> | 3.18 (0.09) <sup>a</sup> |

Values are mean (standard error). \* $p < 0.05$ . †ref.: reference. ‡CVD: cardiovascular disease. §Total minutes of activities for a normal week. ¶Total hours of sleeping in a normal day. <sup>a</sup>Significantly different among the disease groups

## DISCUSSION

The results of this study show that health condition and HRQoL were significantly different across the populations with cancer, stroke, and CVD. Populations with cancer and CVD were found to experience greater stress than the stroke population. In this study, as with previous studies, cancer was found to have a relationship with stress<sup>21</sup>). The current study highlights a need for customized stress management programs aimed at the cancer population. For cancer patients in South Korea, naturopathic treatments such as music, dance, laughter, yoga, aromatherapy, and enzyme therapies have been introduced to decrease stress<sup>22</sup>).

The population with stroke showed lower (Table 2) scores than the other disease populations in dimensions of physical activity related to HRQoL. The stroke population generally felt that engaging in physical activities was problematic<sup>23</sup>). One year after stroke onset, physical functions are almost recovered, however quality of life is about 40% lower than before stroke onset<sup>24</sup>). In addition, HRQoL scores were lower for stroke patients than for cancer patients<sup>25</sup>). The results of this study highlight the need for programs to improve the physical activities of stroke patients. According to Hansson et al., functional independence is an important factor that influences HRQoL of stroke patients<sup>26</sup>). In the anxiety/depression dimension of the results, the mean values for stroke were higher than those of the other diseases; however, the differences were not significant. In previous studies, depression prevalence was found to be high in stroke patients and strongly linked with post-stroke disabilities in areas such as social participation<sup>27, 28</sup>). However, some studies have reported that although chronic diseases usually exert a negative impact on physical health in terms of HRQoL, mental health may be relatively unaffected in terms of HRQoL, as shown by the results of the present study<sup>29–31</sup>).

This study had some limitations. First, it was intended to compare the diseases that are known to be the top three causes of death in South Korea. It is difficult to find features of diseases other than those three that require the planning of customized health management programs. Second, this study used secondary data from the KNHANES VI, and all factors related to the diseases could not be managed. However, because all data were collected from a systematically randomized sample by trained surveyors and medical doctors, the potential for generalization is strong. In conclusion, the cancer population had high perceptions of stress, while the stroke population showed strong associations with the physical dimensions of HRQoL. On the basis of these findings, healthcare teams will now be in a position to plan programs for improvement in these areas according to the features of each disease.

## REFERENCES

- 1) Statistic Korea: Statistic of death cause 2013, 2013.
- 2) Poirier P, Giles TD, Bray GA, et al. American Heart Association Obesity Committee of the Council on Nutrition, Physical Activity, and Metabolism: Obesity and cardiovascular disease: pathophysiology, evaluation, and effect of weight loss: an update of the 1997 American Heart Association Scientific Statement on obesity and heart disease from the obesity committee of the council on nutrition, physical activity, and metabolism. *Circulation*, 2006, 113: 898–918. [Medline] [CrossRef]
- 3) Que JC, Sy Ortin TT, Anderson KO, et al.: Depressive symptoms among cancer patients in a Philippine tertiary hospital: prevalence, factors, and influence on health-related quality of life. *J Palliat Med*, 2013, 16: 1280–1284. [Medline] [CrossRef]
- 4) Kelly-Hayes M, Beiser A, Kase CS, et al.: The influence of gender and age on disability following ischemic stroke: the Framingham study. *J Stroke Cerebrovasc Dis*, 2003, 12: 119–126. [Medline] [CrossRef]
- 5) Bluvol A, Ford-Gilboe M: Hope, health work and quality of life in families of stroke survivors. *J Adv Nurs*, 2004, 48: 322–332. [Medline] [CrossRef]
- 6) De Smedt D, Clays E, Annemans L, et al.: Health related quality of life in coronary patients and its association with their cardiovascular risk profile: results from the EUROASPIRE III survey. *Int J Cardiol*, 2013, 168: 898–903. [Medline] [CrossRef]
- 7) McDowell I: *Measuring health: a guide to rating scales and questionnaires*, 3rd ed, New York: Oxford University Press, 2006, pp 10–30.
- 8) Thompson DR, Roebuck A: The measurement of health-related quality of life in patients with coronary heart disease. *J Cardiovasc Nurs*, 2001, 16: 28–33. [Medline] [CrossRef]
- 9) Oldridge N, Saner H, McGee HM, HeartQoL Study Investigators: The Euro Cardio-QoL Project. An international study to develop a core heart disease health-related quality of life questionnaire, the HeartQoL. *Eur J Cardiovasc Prev Rehabil*, 2005, 12: 87–94. [Medline]
- 10) Maripuu M, Wikgren M, Karling P, et al.: Relative hypo- and hypercortisolism are both associated with depression and lower quality of life in bipolar disorder: a cross-sectional study. *PLoS ONE*, 2014, 9: e98682. [Medline] [CrossRef]
- 11) Testa MA, Simonson DC: Assessment of quality-of-life outcomes. *N Engl J Med*, 1996, 334: 835–840. [Medline] [CrossRef]
- 12) Ellis C, Grubaugh AL, Egede LE: Factors associated with SF-12 physical and mental health quality of life scores in adults with stroke. *J Stroke Cerebrovasc Dis*, 2013, 22: 309–317. [Medline] [CrossRef]
- 13) Kim KJ, Heo M, Chun IA, et al. PhDc: The relationship between stroke and quality of life in Korean adults: based on the 2010 Korean community health survey. *J Phys Ther Sci*, 2015, 27: 309–312. [Medline] [CrossRef]
- 14) Lim Y, Kim Y, Yoon H: Quality of life of older cancer patients in comparison with older chronic disease patients and middle-aged cancer patients. *Kor J Soc Wel*, 2013, 65: 367–393.
- 15) Wikman A, Wardle J, Steptoe A: Quality of life and affective well-being in middle-aged and older people with chronic medical illnesses: a cross-sectional population based study. *PLoS ONE*, 2011, 6: e18952. [Medline] [CrossRef]
- 16) Hopman WM, Verner J: Quality of life during and after inpatient stroke rehabilitation. *Stroke*, 2003, 34: 801–805. [Medline] [CrossRef]
- 17) Schweikert B, Hunger M, Meisinger C, et al.: Quality of life several years after myocardial infarction: comparing the MONICA/KORA registry to the general population. *Eur Heart J*, 2009, 30: 436–443. [Medline] [CrossRef]
- 18) Soto Torres M, Márquez Calderón S, Ramos Díaz I, et al.: Health-related quality of life in coronary heart disease compared to norms in Spanish population. *Qual Life Res*, 2004, 13: 1401–1407. [Medline] [CrossRef]
- 19) EuroQol Group: EuroQol—a new facility for the measurement of health-related quality of life. *Health Policy*, 1990, 16: 199–208. [Medline] [CrossRef]
- 20) Rabin R, de Charro F: EQ-5D: a measure of health status from the EuroQol Group. *Ann Med*, 2001, 33: 337–343. [Medline] [CrossRef]
- 21) Jeon YH: Influence of anxiety, stress, and concern for recurrence on quality of life, and moderating effect of social support among cancer patients. Unpublished Master's thesis, Inje University. 2010.
- 22) Hong SJ, Kim SY, Kim S, et al.: Efficacy of naturopathic treatments of Korean cancer patients on their stresses and anxiety indices. *J Naturopathy*, 2014, 3: 1–9.
- 23) Kim Y, Kim E, Gong W: The effects of trunk stability exercise using PNF on the functional reach test and muscle activities of stroke patients. *J Phys Ther Sci*, 2011, 23: 699–702. [CrossRef]
- 24) Raju RS, Sarma PS, Pandian JD: Psychosocial problems, quality of life, and functional independence among Indian stroke survivors. *Stroke*, 2010, 41: 2932–2937. [Medline] [CrossRef]
- 25) Ryu JH: The effect of social support of stroke disabled person on quality of life. Unpublished Master's thesis, Daegu University. 2011.
- 26) Hansson EE, Beckman A, Wihlborg A, et al.: Satisfaction with rehabilitation in relation to self-perceived quality of life and function among patients with stroke - a 12 month follow-up. *Scand J Caring Sci*, 2013, 27: 373–379. [Medline] [CrossRef]
- 27) Herrmann N, Black SE, Lawrence J, et al.: The Sunnybrook Stroke Study: a prospective study of depressive symptoms and functional outcome.

- Stroke, 1998, 29: 618–624. [[Medline](#)] [[CrossRef](#)]
- 28) Lo RS, Cheng JO, Wong EM, et al.: Handicap and its determinants of change in stroke survivors: one-year follow-up study. *Stroke*, 2008, 39: 148–153. [[Medline](#)] [[CrossRef](#)]
- 29) Alonso J, Ferrer M, Gandek B, et al. IQOLA Project Group: Health-related quality of life associated with chronic conditions in eight countries: results from the International Quality of Life Assessment (IQOLA) Project. *Qual Life Res*, 2004, 13: 283–298. [[Medline](#)] [[CrossRef](#)]
- 30) Hopman WM, Harrison MB, Coe H, et al.: Associations between chronic disease, age and physical and mental health status. *Chronic Dis Can*, 2009, 29: 108–116. [[Medline](#)]
- 31) Singer MA, Hopman WM, MacKenzie TA: Physical functioning and mental health in patients with chronic medical conditions. *Qual Life Res*, 1999, 8: 687–691. [[Medline](#)] [[CrossRef](#)]