Health Conditions Sensitive to Retirement and Job Loss Among Korean Middle-aged and Older Adults

Susan Park1,2, Sung-Il Cho1, Soong-Nang Jang3

1Graduate School of Public Health, Seoul National University; 2Nursing Science Research Institute, Chung-Ang University; 3Department of Nursing, Red Cross College of Nursing, Chung-Ang University, Seoul, Korea

Objectives: This study was conducted to examine the association between health condition and leaving the labor market among middle-aged and older adults in South Korea.

Methods: Data was obtained from individuals aged 45 years and older participating in the 2006 and 2008 Korean Longitudinal Study of Ageing. We used various health measures including chronic diseases, comorbidities, traffic accident injuries, disability of instrumental activities of daily living, depressive symptoms, and self-rated health. The odds ratios of job loss, and retirement, versus employment were calculated using multinomial logistic regression by each health measure.

Results: In our cross-sectional and longitudinal analysis, health problems related to physical disabilities had the greatest effect on leaving the worksite. A shift in health condition from good to poor in a short period was a predictor of increased risk of unemployment but a persistent pattern of health problems was not associated with unemployment. Women with health problems showed a high probability of retirement, whereas among men, health problems instantly the possibility of both job loss and retirement.

Conclusions: Health problems of middle aged and older workers were crucial risk factors for retirement and involuntarily job loss. Especially functional defect and recent health problems strongly and instantly affected employment status.

Key words: Chronic disease, Disability, Depression, Wounds and injuries, Retirement, Job loss

INTRODUCTION

Occupational health involves a consideration of the two-way relationship between work and health [1]. Working environment influences workers’ health, and in turn, health condition affects working productivity and labor force participation. Therefore, occupational health professionals have to pay attention to risk management of the relationship between work and health, and health and work. However, most studies from a public health perspective have focused on only a one-sided relationship—considering only the influence of working environment on health [2-4]. Health status has been considered a factor for employment status based on the social selection hypothesis in previous epidemiological studies [5,6]. Economic research, mostly focused on work ability issues, has suggested that chronic disease and disability are determinants of participation in the labor force, labor supply, salary level, and work hours [7,8].

Although increasing empirical evidence from the last decade supports a link between health and leaving the labor force, less is known about the plausible association in Korean society, in which early retirement and job loss exploded after the South Korea’s economic crisis in the late 1990s. Research on Korean cases has relevance because it may capture the vicious cycle of poor health, unemployment, and poverty, especially among the middle-aged or older population in a rapidly aging society. It has been noted in some studies that age discrimination in the workplace has become more common since the national economic crisis leading to an increase in early retirement and involuntarily job loss in Korea [9]. However, older Koreans face considerable financial distress if they do not continue to work in their old age. Specifically, Korea is distinguished by the high employment rates among adults aged 60 or older: 55% for 60 to 64 years old and 30% for 65 years old and over in 2006. These rates are higher than the mean labor force participation rates for men and women in this age group in Organization for Economic Cooperation and Development countries [10]. Although they may plan to work in a “bridge” job after temporary job loss or...
retirement due to health issues, they may realize that they cannot find employment appropriate to their health status. Such unmet needs may negatively affect health among both the employed older population and the unemployed, including both those dealing with job loss and retired people [10].

Middle-aged and older individuals are transitioning not only in terms of health but also in terms of social roles. Thus, it would be valuable to identify how changes in health status influence changes in employment status, as the relationship between health and social role may be reinforced in this age group. Additionally, identifying the differences in each health outcome is a crucial task to gain a clear understanding of the pathways to employment.

The objective of this study was to determine which health problems are predictive of workers’ leaving the labor market among middle-aged and older Koreans. We aimed to encompass various health outcomes including a change of health status in a short period. Consequently, this study provided information for the occupational health program to manage the risk of workers in poor health.

METHODS

I. Data

We used baseline (2006) and second wave (2008) data obtained from the Korean Longitudinal Study of Ageing, which was designed to produce a nationally representative sample [10]. In the baseline survey, 10,254 individuals aged 45 or over participated, and the second wave data included 8688 repeat participants (follow-up losses, 1379; deaths, 187). We used all of the data from the two waves except cases with incomplete information (n=124).

II. Measures

Baseline employment status was classified into three categories: employment, job loss, and retirement. Those outside of the labor force were excluded. Among those who had worked before, people not currently working but seeking a job were classified as having lost a job. People who were retired and had no interest in working were categorized as retired. Follow-up employment status focused on the change in employment status from baseline among employed workers. Follow-up employment status was categorized into continuing employment, transition to job loss, and retirement from employment since baseline.

We used various health measures including chronic diseases, comorbidities, traffic accident injuries, instrumental activities of daily living (IADL) disability, depressive symptoms, and self-rated health. The number of chronic diseases was categorized into three groups (0, 1, and 2 or more). Depressive symptoms were defined as a score above 4 on the Center for Epidemiological Studies-Depression 10 scale [11]. Self-rated poor health was defined as the answers of poor and very poor.

We classified recent changes in chronic diseases, traffic accident injuries, and disabilities into three time frames for assessment: 1) none, 2) before baseline, and 3) during the follow-up period. Changes in self-rated health and depression were categorized into four groups: 1) continuously good, 2) from poor to good, 3) from good to poor, and 4) continuously poor. Covariates included age, marital status, education level, type of health insurance, tertile of household equivalent income, and type of employment contract.

III. Analysis

We calculated a weighted percentage of each employment status according to socio-economic status and health problems at baseline. We then presented the absolute percentage (non-weighted) of follow-up employment status among the baseline employed. We did not apply the sample weights for longitudinal analysis because we used only an employed subsample derived from the whole data set.

For the cross-sectional analysis, we used multinomial logistic regression to calculate the odds ratios (ORs), adjusting for covariates based on likelihood estimates of job loss, and retirement, versus employment at baseline. Each category of health problem was analyzed with a separate multinomial logit model. To compare the effects of short and long-term health problems, we simultaneously analyzed the baseline health problems and the recent health problems during the follow-up interval. The ORs of transition to job loss and retirement versus staying employed were calculated with adjustments for baseline covariates.

The analysis of specific types of chronic diseases was excluded because of low frequency. Men and women were separately analyzed due to different distribution and transition patterns in employment status. Multinomial analysis was performed with SAS version 9.2 (SAS Inc., Cary, NC, USA) using PROC SURVEYLOGISTIC for cross-sectional analysis and PROC CATMOD for longitudinal analysis.
Table 1. Employment status according to socio-economic position at baseline survey

| Marital status          | Men         | Women        |
|-------------------------|-------------|--------------|
| With a living partner   | 3075 (71.7) | 1497 (63.7)  |
| Without a living partner| 243 (47.5)  | 600 (43.8)   |
| Education               |             |              |
| No formal education     | 222 (45.9)  | 487 (42.3)   |
| Elementary/middle school| 1256 (65.9)| 968 (61.0)   |
| More than high school   | 1840 (74.5)| 642 (64.6)   |
| Health insurance        |             |              |
| Public health insurance | 3157 (71.8)| 1957 (59.9)  |
| Medicare                | 161 (32.0)  | 140 (36.8)   |
| Equivalent household income |       |              |
| 1T                      | 985 (50.6)  | 672 (45.8)   |
| 2T                      | 1070 (69.8)| 729 (61.0)   |
| 3T                      | 1263 (82.3)| 696 (66.7)   |
| No. of chronic diseases |             |              |
| 0                       | 1971 (79.0)| 1132 (67.2)  |
| 1                       | 887 (60.1)| 604 (52.0)   |
| 2+                      | 460 (44.2)| 361 (38.8)   |
| Self-rated health       |             |              |
| Good                    | 2649 (71.7)| 1384 (65.5)  |
| Poor                    | 669 (37.7) | 713 (43.6)   |
| Depression              |             |              |
| No                      | 2569 (74.7)| 1338 (65.6)  |
| Yes                     | 749 (51.5)| 759 (45.1)   |
| Traffic accident injury |             |              |
| No                      | 2935 (70.1)| 1882 (59.0)  |
| Yes                     | 383 (69.1)| 215 (53.2)   |
| IADL disability         |             |              |
| No                      | 2846 (72.4)| 1931 (59.8)  |
| Yes                     | 472 (54.5)| 166 (38.7)   |
| Employment contract     |             |              |
| Self-employed           | 2305 (100) | 1548 (100)   |
| Nonstandard employed    | 256 (100)  | 239 (100)    |
| Standard employed       | 796 (100)  | 310 (100)    |

Data are presented as weighted % (SE). IADL, instrumental activity of daily living; T, tertile.

RESULTS

About half of the women had worked regularly, whereas over 90% of the men had work experience (data not shown). Approximately 50% of the total sample suffered from one or more chronic diseases. Both genders showed a high proportion of employment in the following categories: having a living partner, high education level, public health insurance, and high household income (Table 1).

Approximately 6% of workers had been newly diagnosed with a chronic disease within the past 2 years and traffic accident injuries and IADL disability were higher in men than in women. During the follow-up interval, 4.3% (8.5%) and 5.4% (10.1%) of employed men (women) lost their job and retired, respectively (Table 2).

Table 3 shows a cross-sectional and longitudinal association between health problems and employment status after adjusting for age, marital status, education, health insurance, household equivalent income, and employment contract. In the results of the cross-sectional analysis, job loss and retirement were related to most of the health problems among men, whereas women’s
Table 2. Employment status of baseline employed subjects according to health problems within a follow-up

| Health problems at baseline | Men | 2-year follow-up | Women | 2-year follow-up |
|----------------------------|-----|------------------|-------|------------------|
|                            | Baseline employed | Employed | Job loss | Retired | Baseline employed | Employed | Job loss | Retired |
| Total (n)                  | 2116 | 1912 (90.4) | 90 (4.3) | 114 (5.4) | 1184 | 963 (81.3) | 101 (8.5) | 120 (10.1) |
| Comorbidity                |      |              |        |          |      |              |        |          |
| 0                          | 1463 | 1347 (92.1) | 56 (3.8) | 60 (4.1) | 750  | 635 (84.7)  | 54 (7.2) | 61 (8.1) |
| 1                          | 475  | 419 (88.2)  | 25 (5.3) | 31 (6.5) | 305  | 235 (77.1)  | 33 (10.8) | 37 (12.1) |
| 2+                         | 178  | 146 (82.0)  | 9 (5.1)  | 23 (12.9)| 129  | 93 (72.1)   | 14 (10.9) | 22 (17.1) |
| Self-rated poor health     | 225  | 187 (83.1)  | 11 (4.9) | 27 (12.0)| 293  | 229 (78.2)  | 26 (8.9)  | 38 (13.0) |
| Depression                 | 354  | 308 (87.0)  | 17 (4.8) | 29 (8.2) | 331  | 259 (78.3)  | 32 (9.7)  | 40 (12.1) |
| Traffic accident injury    | 242  | 218 (90.1)  | 10 (4.1) | 14 (5.8) | 108  | 84 (77.8)   | 14 (13.0) | 10 (9.3)  |
| IADL disability           | 218  | 194 (89.0)  | 9 (4.1)  | 15 (6.9) | 59   | 48 (81.4)   | 6 (10.2)  | 5 (8.5)   |

| Health problems during f/u interval | Men | Woman |     |     |
|------------------------------------|-----|-------|-----|-----|
| Comorbidity                        |     |       |     |     |
| 0                                  | 1334| 1242 (93.1)| 47 (3.5)| 45 (3.4)| 674 | 580 (86.1)| 45 (6.7)| 49 (7.3) |
| 1                                  | 539 | 475 (88.1)| 29 (5.4)| 35 (6.5)| 334 | 299 (75.7)| 38 (11.4)| 37 (11.1) |
| 2+                                 | 243 | 195 (80.3)| 14 (5.8)| 34 (14.0)| 176 | 124 (70.5)| 18 (10.2)| 34 (19.3) |
| Self-rated poor health             | 397 | 311 (78.3)| 26 (6.6)| 60 (15.1)| 394 | 295 (74.9)| 38 (9.6) | 61 (15.5) |
| Depression                         | 815 | 708 (86.9)| 46 (5.6)| 61 (7.5) | 601 | 462 (76.9)| 63 (10.5)| 76 (12.7) |
| Traffic accident injury            | 277 | 241 (87.0)| 17 (6.1)| 19 (6.9) | 121 | 93 (76.9)| 16 (13.2)| 12 (9.9)  |
| IADL disability                   | 328 | 272 (82.9)| 22 (6.7)| 34 (10.4)| 76  | 55 (72.4)| 7 (9.2)  | 14 (18.4) |

Change of diagnosis of chronic disease

| Continuously good                 | 1719| 1601 (93.1)| 64 (3.7)| 54 (3.1) | 790 | 668 (84.6)| 63 (8.0)| 59 (7.5) |
| From good to good                 | 127 | 113 (89.0)| 4 (3.2)  | 10 (7.9) | 140 | 121 (86.4)| 9 (6.4) | 10 (7.1) |
| Continuous poor                   | 172 | 124 (72.1)| 15 (8.7) | 33 (19.2)| 101 | 66 (65.4)| 12 (11.9)| 23 (22.8) |
| Change of depression              | 98  | 74 (75.5)| 7 (7.1)  | 17 (17.4)| 153 | 108 (70.6)| 17 (11.1)| 28 (18.3) |

| Continuously normal               | 1301| 1204 (92.5)| 44 (3.4)| 53 (4.1) | 583 | 501 (85.9)| 38 (6.5)| 44 (7.6) |
| From depression to normal         | 133 | 120 (90.2)| 3 (2.3)  | 10 (7.5)| 116 | 90 (77.6)| 11 (9.5)| 15 (12.9) |
| From normal to depression         | 461 | 400 (86.8)| 29 (6.3)| 32 (6.9)| 270 | 203 (75.2)| 31 (11.5)| 36 (13.3) |
| Continuously depression           | 221 | 188 (85.1)| 14 (6.3)| 19 (8.6)| 215 | 169 (78.6)| 21 (9.9)| 25 (11.6) |

Traffic accident injury

| None                               | 1839| 1671 (90.9)| 73 (4.0) | 95 (5.2) | 1063| 870 (81.8)| 85 (8.0)| 108 (10.2) |
| Before baseline                    | 242 | 218 (90.1)| 10 (4.1)| 14 (5.8)| 108 | 84 (77.8)| 14 (13.0)| 10 (9.3)  |
| During f/u interval               | 35  | 23 (65.7)| 7 (20.0)| 5 (14.3)| 13  | 9 (69.2)| 2 (15.4)| 2 (15.4)  |

IADL disability

| None                               | 1788| 1640 (91.7)| 68 (3.8)| 80 (4.5)| 1108| 908 (82.0)| 94 (8.5)| 106 (9.6) |
| Before baseline                    | 218 | 194 (89.0)| 9 (4.1)  | 15 (6.9)| 59  | 48 (81.4)| 6 (10.2)| 5 (8.5)   |
| During f/u interval               | 110 | 78 (70.9)| 13 (11.8)| 19 (17.3)| 17  | 7 (41.2)| 1 (5.9) | 9 (22.9)  |

Data are presented as n (%).

IADL, instrumental activity of daily living; f/u, follow-up.

Health problems were mainly related to retirement. Cerebrovascular disease in men, liver disease in women, and multiple morbidities in both genders were associated with a higher risk of retirement. In the results of longitudinal association, analyses showed that higher comorbidity, self-rated poor health, and depression at baseline increased the likelihood of retirement among men. However, baseline health problems were not related to follow-up employment status among women. Interestingly, a new occurrence of a chronic disease, a traffic accident injury, and IADL disability affected job loss and retirement, and these associations were much higher than the association between ongoing health problems and employment status. Additionally, traffic accident injuries and IADL disabilities were more likely to increase the risk of job loss and retirement than was chronic disease. Finally, a change in self-rated health from good to poor and newly emerging depression had a much greater impact on the risk for employment transition than did consistently poor health status. Comparing the effect size of all measured health problems, physical health problems accompanied by functional limitations constituted the best predictor of employment transition.
Table 3. Cross-sectional and longitudinal associations between health problems and employment status within a 2-year follow-up

| Cross-sectional analysis (2006) | Job loss | Retired | Job loss | Retired |
|---------------------------------|----------|---------|----------|---------|
| n / N                            | 947 / 3318 | 254 / 3318 | 701 / 2097 | 212 / 2097 |

Diagnosis of chronic disease

| Health problems during f/u interval | Men | Women |
|------------------------------------|-----|-------|
| Controllability                     |     |       |
| 0                                  |     |       |
| 1                                  | 1.29 (0.91, 1.81) | 1.37 (0.84, 2.22) |
| 2+                                 | 2.29 (1.47, 3.57) | 2.77 (0.51, 1.61) |

Self-rated poor health

| Health problems during f/u interval | Men | Women |
|------------------------------------|-----|-------|
| Controllability                     |     |       |
| 0                                  | 1.31 (0.79, 2.16) | 1.37 (0.84, 2.22) |
| 1                                  | 1.44 (0.68, 3.04) | 1.43 (0.70, 2.67) |

Depression

| Health problems during f/u interval | Men | Women |
|------------------------------------|-----|-------|
| Controllability                     |     |       |
| 0                                  | 1.31 (0.79, 2.16) | 1.37 (0.84, 2.22) |
| 1                                  | 1.44 (0.68, 3.04) | 1.43 (0.70, 2.67) |

Traffic accident injury

| Health problems during f/u interval | Men | Women |
|------------------------------------|-----|-------|
| Controllability                     |     |       |
| 0                                  | 1.31 (0.79, 2.16) | 1.37 (0.84, 2.22) |
| 1                                  | 1.44 (0.68, 3.04) | 1.43 (0.70, 2.67) |

IADL disability

| Health problems during f/u interval | Men | Women |
|------------------------------------|-----|-------|
| Controllability                     |     |       |
| 0                                  | 1.31 (0.79, 2.16) | 1.37 (0.84, 2.22) |
| 1                                  | 1.44 (0.68, 3.04) | 1.43 (0.70, 2.67) |

The reference category was employed status.

IADL, instrumental activity of daily living; f/u, follow-up.

Adjusted for age group, marital status, education level, type of health insurance, tertile of household equivalent income, and type of employment contract at baseline survey.
Health problems related to a physical disability had the greatest effect on workers’ leaving the workplace in the older Korean population. A shift in health condition from good to poor in a short period was more strongly associated with an increase in the risk of unemployment than was a pattern of continuing health problems. Women with health problems showed only a high probability of retirement, whereas among men, health problems increased the possibility of job loss and retirement.

Health problems were the important risk factors for unemployment and retirement among older workers. As this study revealed that unhealthy employees had the higher risk to lose or quit a job, it supported the social selection hypothesis in which health status affects their socio-economic status [5]. Recent studies focused on older workers provided evidence that various chronic diseases, mobility problems, poor self-rated health, and psychological distress were associated with unemployment and retirement [12-15]. Health problems were likely to have an adverse effect on work performance and productivity, and consequently weaken workers’ competitiveness in the labor market [16]. In turn, decreased earning potential associated with low productivity resulted in a lower willingness to work. Furthermore, older workers with poor health are more likely to decrease the willingness to work above economic decision considering life expectancy [17].

The present study found that the onset of physical disabilities and traffic accident injuries directly affected job loss and retirement, whereas the presence of those problems at baseline had no significant effect on job loss and retirement. This result indicates the need to review working conditions carefully in terms of adaptation to physical functioning in older workers and in terms of difficulty of finding a new job with a disability. The employment rate of disabled people in Korea is only 0.95%, even though the government suggests a mandatory criterion of >2% of employees [18]. Because older Korean workers have mostly engaged in manual jobs demanding physical labor (66.2%), the onset of a disability may be a critical reason for leaving the workplace.

We considered the recent incidence of health problems and comorbidities so that we would not underestimate the association between health problems and employment status. Workers who experience a health status change are most vulnerable to remaining employed. The lack of a coping strategy to deal with the new health problem and multiple chronic diseases could be related to this outcome. It is easy to quit a job, but difficult to re-enter the labor market, so those who leave the workforce are likely to remain retired or unemployed.

Although public assistance is available for retirees and disabled people, many basic pensions and social security systems were just launched in 2007, and pension coverage is still very low. For example, only 28% of all elderly people in South Korea are covered by a basic old-age pension [19]. Furthermore, the proportion of out-of-pocket expenses for medical services is relatively high (almost 50% of total payments) compared with the situation in Hong Kong and Taiwan, which among Asian countries have a gross domestic product level similar to that of South Korea [20]. In other words, if older workers quit their job due to a health problem, they are likely to suffer from both decreased income and increased health payments.

Women were more likely than men to retire when health problems appeared. The association between health and employment status showed a gender difference. Men’s health problems were related with both job loss and retirement, whereas women’s health problems were associated only with retirement. There were two possible explanations, which were the gender disparity of the work environment and the traditional working role.

The Korean labor market based on a patriarchal economy has involved mainly men, so in this study the employed proportion of the women was less than half that of the men. Furthermore, employed women are embedded in relatively poor working conditions including wage and job positions in Korea. According to 2010 statistics of the National Statistical Office, the proportion of non-standard work was 27% and 41% among men and women, respectively. Furthermore, the average wage of women reached only 66% of that of men [19]. Discrimination against women in work environment would force them into retirement.

In addition, the traditional work role of women, which was focused on childcare and family care, could affect employment status. A previous study using a British household panel survey from 1991 to 1998 showed that women had a higher transition rate from employment to non-employment (including unemployment, retirement, family care, etc.) and an especially higher non-employment rate for family care than did men [21]. Also, social norms related to work roles prompted a gender difference in the psychological reaction to job loss. Men tended to understand their job...
loss as social failure, while women tended to think of their job loss as a chance to spend more time with family, because basically the men’s self-identity was derived from a breadwinner role and the women’s consisted of various roles (wife, mother, daughter, and friend) above the work role [22]. Therefore when employment status was changed due to health problems, women were more likely to give up their willingness to work than men because they could pursue the other role over the work role.

There are several limitations to this study. The problem of endogeneity with respect to the relationship between self-reported health status and employment status should be considered [23]. For example, people who lost or retired from their job may justify their non-participation by claiming their poor health. A reverse causation between health and labor may have occurred in the relation between the health outcome of the cross-sectional and follow-up period and employment status.

Recent health problems are critical in workers’ retirement and involuntarily job loss in Korean society. This finding has two important implications for improving the work participation of older workers. First, occupational health professionals should pay attention to self-management education for chronic disease patients, especially newly diagnosed patients. Self-management education allows workers having health problems to continue their work while managing their disease. Second, health promotion policies for older workers, such as flexible working time and healthcare support, should be high priorities for improving labor participation by middle-age and older adults. If workers could manage their time for health care in the early stage of their health problem, more workers with various health issues could work longer.

ACKNOWLEDGEMENTS

This study was supported in part by the 2010 research fund of Chung-Ang University and was also supported by a National Research Foundation of Korea grant funded by the Korean Government (NRF-2011-0011875).

CONFLICT OF INTEREST

The authors have no conflicts of interest with the material presented in this paper.

REFERENCES

1. Aw TC, Gardiner K, Harrington JM. Pocket consultant: occupational health. 5th ed. Oxford: Blackwell Publishing; 2006, p. 3.
2. Morris JK, Cook DG, Shaper AG. Loss of employment and mortality. BMJ 1994;308(6937):1135-1139.
3. Kivimaki M, Vahtera J, Virtanen M, Elovainio M, Pentti J, Ferrie JE. Temporary employment and risk of overall and cause-specific mortality. Am J Epidemiol 2003;158(7):663-668.
4. Kim MH, Kim CY, Park JK, Kawachi I. Is precarious employment damaging to self-rated health? Results of propensity score matching methods, using longitudinal data in South Korea. Soc Sci Med 2008;67(12):1982-1994.
5. Bartley M. Unemployment and ill health: understanding the relationship. J Epidemiol Community Health 1994;48(4):333-337.
6. Schuring M, Burdorf L, Kunst A, Mackenbach J. The effects of ill health on entering and maintaining paid employment: evidence in European countries. J Epidemiol Community Health 2007;61(7):597-604.
7. Bartel A, Taubman P. Health and labor market success: the role of various diseases. Rev Econ Stat 1979;61(1):1-8.
8. Berkowitz M, Johnson W. Health and labor force participation. J Hum Resour 1974;9(1):117-128.
9. Lee JW, Rhee C. Macroeconomic impacts of the Korean financial crisis: comparison with the cross-country patterns. World Econ 2002;25(4):539-562.
10. Jang SN, Cho SI, Chang J, Boo K, Shin HG, Lee H, et al. Employment status and depressive symptoms in Koreans: results from a baseline survey of the Korean Longitudinal Study of Aging. J Gerontol B Psychol Sci Soc Sci 2009;64(5):677-683.
11. Andresen EM, Malmgren JA, Carter WB, Patrick DL. 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 1994;10(2):77-84.
12. Karpansalo M, Manninen P, Kauhanen J, Lakka TA, Salonen JT. Perceived health as a predictor of early retirement. Scand J Work Environ Health 2004;30(4):287-292.
13. Leino-Arjas P, Liira J, Mutanen P, Malimivaara A, Matkainen E. Predictors and consequences of unemployment among construction workers: prospective cohort study. BMJ 1999;319(7210):600-605.
14. Alavinia SM, Burdorf A. Unemployment and retirement and ill-health: a cross-sectional analysis across European countries. Int Arch Occup Environ Health 2008;82(1):39-45.
15. Van den Berg T, Schuring M, Avendano M, Mackenbach J, Burdorf A. The impact of ill health on exit from paid employment in Europe among older workers. Occup Environ Med 2010;67(12):845-852.
16. Grossman M. On the concept of health capital and the demand for health. J Polit Econ 1972;80(2):223-255.
17. Cai L, Kalb G. Health status and labour force participation: evidence from Australia. Health Econ 2006;15(3):241-261.
18. Kim S, Byun Y, Park S. Social integration for relieving discrimination of disabled people in Korea. Seoul: Korean Institute of Health and Social Affairs; 2004, p.70 (Korean).
19. Statistics Korea. Statistics for the elderly, 2011 [cited 2011 Oct 15]. Available from: http://kosis.kr/ups/ups_01List01.jsp?pubcode=KO (Korean).
20. Van Doorslaer E, O’Donnell O, Rananan-Eliya R, Somanathan A, Adhikari S, Garg C, et al. Effect of payments for health care on poverty estimates in 11 countries in Asia: an analysis of household survey data. The Lancet 2006;368(9544):1357-1364.
21. Thomas C, Benzeval M, Stansfeld SA. Employment transitions and mental health: an analysis from the British household panel survey. J Epidemiol Community Health 2005;59(3):243-249.
22. Forret ML, Sullivan SE, Mainiero L.A. Gender role differences in reactions to unemployment: exploring psychological mobility and boundaryless careers. J Organ Behav 2010;31(5):647-666.
23. Kalwij A, Vermeulen F. Health and labour force participation of older people in Europe: what do objective health indicators add to the analysis? Health Econ 2008;17(5):619-638.