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Does Retirement Promote Healthy Behaviors in Young Elderly Korean People?

Jinhee Kim[1], Seung-Eun Cha[2], Ichiro Kawachi[3], Sunmin Lee[4]

[1]Department of Family Science, School of Public Health University of Maryland College Park, MD 20742, USA, [2]Department of Child, Family and Welfare, The University of Suwon17 Wau-ri, Bongdam-up, Hwasung-si, Gyounggi Province, South Korea, [3]Department of Social and Behavioral Sciences, Harvard University, 677 Huntington Avenue, Kresge Building, 7th Floor Boston, Massachusetts 02115, USA, [4]Department of Epidemiology and Biostatistics, University of Maryland, School of Public Health, 2234C SPH Bldg, College Park, MD 20742, USA

Address for correspondence:
Seung-Eun Cha, Department of Child, Family and Welfare, The University of Suwon 17 Wau-ri, Bongdam-up, Hwasung-si, Gyounggi Province, South Korea.
E-mail: secha@suwon.ac.kr

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ABSTRACT

Introduction: The current study examined the relationship between retirement and health behaviors in Korea. **Methods:** The study has used a sample of 2,188 young, elderly Koreans (aged 55-69) from the first wave of the Korean Longitudinal Study of Aging. Logistic and multinomial regression models were estimated for smoking, drinking, physical activity, and body mass index in men and women separately, while controlling covariates, such as socioeconomic status, financial situation factors, and health status. **Results:** Results indicated that retired participants were more likely to perform physical activity compared with employed participants for both women and men. Retired men were less likely to engage in heavy smoking or heavy drinking compared with their employed counterparts. Retirement status was positively associated with overweight status among women. **Conclusion:** Overall, retirement, with proper policy guidelines, may able to provide an opportunity to promote a healthy lifestyle, yet some areas have different implications based on gender.

KEY WORDS: Alcohol consumption, gender difference, health behavior, physical activity body mass index, retirement, smoking, young elderly

INTRODUCTION

Retirement is marked by changes that have a potential impact on health behaviors such as smoking, drinking, physical activity, and weight gain [1]. However, limited attention has been paid to uncover the retirement process in relation to health behavior. The current study attempts to examine the relationship of retirement and health behaviors among Korean, who are about to traverse through their elderly stage.

Retirement from the workforce generates a major role transition [2,3]. In some research, the process has been compared with role loss, in which full retirement status is often considered the same as unemployment [4]. Indeed, relevant studies argue that role loss from retirement can cause people to feel anxious and depressed because work-related roles often occupy a central place relevant to self-identity [5,6]. Some argued that this role loss may lead to negative adjustment [6], especially when retirement was for involuntary reasons (e.g.,

laid off) [7,8]. This identity disruption hypothesis offers a plausible explanation for what may happen to middle-aged men and women in East Asia who have experienced a deep sense of loyalty to their job [9].

There are contradicting notions, however, especially when retirement happens at a socially desirable time. Role relief hypothesis insists that retirement can provide positive influences on the elderly as they may be able to be relieved from work-related strain and frustration [8,10]. Several economic perspectives also view retirement as an opportunity to adopt positive health behaviors. As retired have abundant free-time, individuals may give a chance to participate in more leisure activities such as walking or other exercise. In addition, income reduction following retirement could lead to fewer cigarettes and alcohol purchases [11-13].

There were a number of empirical studies that examined the relationship between retirement and health behavior in Western countries. Nevertheless, research studies that attempted to link retirement and healthy lifestyles varied in the type of health behaviors that were measured. Furthermore, the results of these studies are inconsistent, and the conclusions are mixed [7]. For example, studies dealing with smoking behavior found a positive association between retirement and smoking cessation [14], but other research reported that retirees stopped smoking only when retirement decisions were made voluntarily [15]. With regards to drinking behavior, some studies concluded retirement was associated with increased drinking [16,17], some found decreased alcohol consumption in retired people [18], and others reported no significant differences [19].

The results of the association between retirement and physical activity also diverge. Some studies have reported a positive association, with physical activity increasing with retirement [15,20-23], while others have found no significant effect [24-26]. To date, there has not been much research done, assessing retirement and body mass index (BMI). Nooyens *et al.* [27] found that retirement was associated with increased body weight, particularly in those retired from jobs in which they were physically active. One Swedish study found that retirement was also significantly associated with long-term weight gain [28].

To explain this inconsistency, Steptoe *et al.* [29] argued that not only do statutory differences lead to lifestyle change but also the underlying socioeconomic status (SES) may play important roles in the transition to retirement. Zantinge *et al.* [7], in their review paper, pointed out that it is important to examine the health status or financial situation involved in the retirement process. Yet prior empirical studies lack a theoretical framework and hence fail to grasp the full picture.

For example, retirement-related loss of income can create serious economic strain for retirees who were unprepared for retirement or whose SES is low [11,30,31]. Lack of financial preparation can result in new financial challenges after retirement, which in turn may negatively affect health behaviors [15]. Moreover, the health status gap among employed and retired individuals also needs to be considered when charting lifestyle differences [7].

Umberson *et al.* [32] proposed that the classic stress model may allow us to connect underlying psychosocial and health status factors with health behavior as the model posits stressor, mediator, moderator, and health outcome [33]. According to the stress framework, retirement can be considered a major life event that creates a large amount of change in daily life. New health behaviors may be used and altered to alleviate the stress-related psychological and physical arousal that is associated with the retirement process [32,34].

We assume that retirement may have a large impact on the daily lives of retired individuals. In such a way, the bio-psychosocial contexts of retirement can be considered as mediators that can, in part, explain the observed differences in health behavior between the retiree and employed. Therefore, in this study, we focused on financial strain and health status, which can both modify [29] and intensify differences in health behavior by retirement status.

Furthermore, gender is considered as an important modifier in our analysis. It is well-known that men and women display or prefer certain health behavior [18,32,33]. Men and women possess different gender role identities and may react differently in the transition to retirement [35]. Kim and Moen [36] analyzed a 2 years follow-up study with 456 participants aged 52-70 and found that men showed higher morale than women when immediate retirement was made. However, men tend to be depressed more often than women if retirement status continued for longer.

In this study, using the stress theory framework, we assess the relationship between retirement and health behaviors of young elderly while considering the social context of retirement. This study aims to expand understandings of relationships between retirement and health behaviors beyond findings from the USA and Europe.

ILLUSTRATING RETIREMENT SITUATION OF YOUNG ELDERLY KOREAN PEOPLE

Retirement can be stressful for some people to adjust with the changes in identities. However, financial strains resulting from the loss of income during retirement can be challenging especially in certain countries. In Korea, elderly who is able to receive a public pension can cover about 60% of the expenses of their elderly life. Elderly with pensions counted only a quarter of the total elderly population in Korea 2006 [9]. Still, a third of elderly are not eligible for receiving public pension scheme in 2015 [37]. Retirement income in Korea used to rely on private transfer rather than public transfer systems. Under the influence of Confucian filial piety, adult children in Korea were once an important source of retirement income for their elderly parents. Yet, this trend has been changing for recent generations [9]. Korean elderly have become economically vulnerable due to the lack of social and private retirement income. A third of Koreans aged 65 and over are situated under the poverty line [38]. The majority perceived their financial conditions as too unstable to meet payments related to increasing living expenses and

medical costs [39]. During the Korean economic crisis of 1998-1999, many workers born between 1936 and 1951 (age 55-69 in 2006) were forced to accept early retirement before they were financially or socially prepared [40]. They experienced a substantial income reduction during the early 2000s, leaving this age group not financially secured for retirement [41].

Korean young elderly, age 55-70, are very much eager participate in the labor market, for a couple of reasons. First, retirees are worried about their financial instability; and second, they wish to manage life balance through social participation [38]. The statutory retirement age is 56 years in many private industries and 60 years for government employees [42]. Yet, almost half (44.2%) of those aged 55 + remained in the labor market in 2006 [41]. Koreans leave the workforce completely at the average age of 71.2 and 67.9 years, respectively, for men and women [42].

While retirement may be financially stressful for many people, working environment in Korea has not been conducive for maintaining healthy behaviors. Koreans work longer hours relative to people in other Organization of Economic Cooperation and Development (OECD) countries, according to 2008 ranking [43]. In western societies, the average employee works for 1,770 h per year [44], while, in Korea, average working hours for employed people reached 2,163 h per year [43]. Indeed, major concerns for young elderly who want to participate in the labor market are the long and rigid work hours [38]. In addition, Koreans, especially men have one of the highest smoking and drinking rates among OECD countries [43]. Korean working men report high levels of work-related stress [9,45] and also are more likely to engage in social drinking and smoking with coworkers than retired counterparts [25].

A number of assumptions can be made about the association between retirement and health behaviors. We speculate that, if Koreans retire, the amount of time they have to invest in leisure activities will increase substantially as free-time can replace the time slot that once was filled with paid labor hours. While increased free-time could result in more negative, self-destructive health behavior [46], research also suggests that large amounts of free-time could lead to more positive health behaviors [12]. In addition, retirement could decrease the number of work-related social occasions available, leading to a reduced likelihood of smoking or drinking for Korean men. Understanding health behaviors of Korean young elderly will provide the unique contributions to the literature as retirement could provide them with a window of opportunity for lifestyle change from adverse work environment but also increase stress through financial instability.

METHODS

Study Population

This study analyzed data from the first wave of the Korean Longitudinal Study of Aging (2006 KLoSA), which was Korea's first population-based panel study focused on people aged 45 years of age and older. A stratified sampling method, based on the 2005 Korean Census enumeration districts, was used. Adults aged 45 years and older were interviewed by a computer-assisted interview system. The response rate for 2006 KLoSA was 78%. The original KLoSA sample contained 10,254 participants aged 45-90 years.

We selected men and women aged 55-69 years (n = 4,259) from the original data. We limited our sample to identify two different groups, retired and employed. Those who were looking for jobs or had intentions to work, at that time, were not included, as well as those who had never been employed (e.g., housewives) (n = 2,633, 60% employed, 40% retired). Who retired for health reasons were excluded from the sample to avoid a reverse causation problem (n = 373). Cases with missing values for BMI and health behavior variables, such as smoking, drinking, and physical activity, were also excluded (n = 72). Final sample consists of 2,188 respondents (women 33%). A few cases with missing covariates were replaced with the most frequent responses, while for family income; a separate missing value category was created instead of exclusion due to the large number of missing cases.

Variables

Independent variable: Retirement status

To measure retirement status, we used one questionnaire item, "Are you fully retired?" (coded: Employed = 0, retired = 1). In KLoSA, retirement status was defined as the status that an individual no longer participates in the labor force and has no intention of searching for a new job (or work), which distinguishes from unemployed status.

Dependent variables

Current smoking status was based on responses to the question, 'How many cigarettes do you smoke per day?' We classified the answers according to three categories, which defined each participant as a non-smoker, light smoker (<1 pack per day), or heavy smoker (more than 20 cigarettes per day).

Alcohol consumption was measured using two questions: "How often do you usually drink alcohol?" and "How frequently do you drink each one of these 5 types of alcohol?" The five types of alcohol presented were *soju* (Korean vodka), beer, wine, traditional wine, and whiskey. We defined alcohol consumption according to participants' consumption of these drinks. Three response categories were used: Non-drinker, light drinker (up to 3 times weekly), and heavy drinker (4 or more times weekly).

Physical activity was assessed by asking questions concerning the frequency of participants' engagement in regular exercise (vigorous physical activity) per week (e.g., "How often do you exercise per week?"). Exercising three or more times a week was considered frequent exercise, according to Korean national health practice guidelines [47] and was compared with less frequent exercise (0-2 times weekly).

BMI was created using weight and height information reported by participants (BMI = weight [kg]/height [m]^2). We categorized participants according to BMI status, as

follows: overweight (BMI ≥ 23), normal (BMI = 20-23), and underweight (BMI < 20) according to Asian guidelines [48,49].[1]

Covariates

Financial strain was measured via annual family income, debt-to-income ratio, financial satisfaction, and future financial perspectives. Annual family income was categorized as follows: Below the poverty line ($8,400 in 2006); 100-200%, 201-300%, 301-400%, and ≥401% above the poverty line; and missing values. Debt-to-income ratio, calculated by dividing total household debt by annual household earnings (reports of the preceding year's earnings), was categorized as follows: No debt, 1-199%, and ≥200%. To measure financial satisfaction and future financial perspective (i.e., "Do you think your financial situation will turn out well in the near future?"), we classified responses into three categories (low range: 0-39, midrange: 40-69, and high range: 70-100). The high range indicated greater satisfaction and more positive future financial perspectives.

Sociodemographic variables included age, education, marital status, and a number of children as covariates. Age, as a continuous variable, was adjusted. Education was categorized as follows: Middle school and below, some high school or high school graduate, and college undergraduates or graduates and above. Marital status was categorized according to the presence of a spouse, whereby participants were classified as married or single (including bereaved, divorced, and never married categories). We used a number of children in the household as a proxy for parental status and an indicator of potential social support.

Health status was included as a control variable in our study using four variables, as follows. Depression was measured using a CES_D measure (non-depressed=0, depressed=1). Self-rated health (fair to excellent=0 or bad to worst=1), physical disability (using activities of daily living measures; no limitation = 0, 1 or more limitation = 1), and total number of chronic health conditions (none = 0, chronic condition = 1, two or more chronic conditions = 2) were included.

Gender was considered a potential effect modifier between retirement and health behaviors [50]. Separate models were examined for men and women in the study.

Data Analysis Procedure

We estimated five-step hierarchical models of four health behavior variables for men and women separately. The basic model (Model 1) includes retirement status and age because age increase was related with healthy behavior while exhibiting a higher likelihood of weight gain [48]. The second model includes education and family income. In Model 3, we add two family variables, marital status and number of children, from Model 2. In Model 4, financial strain factors were added to Model 3. The full model (Model 5) includes all other variables in addition to health status variables. For men, three sets of hierarchical multinomial regression analyzes were conducted for smoking, drinking, and BMI, while one binary hierarchical logistic regression model for physical activity was used. In women, one multinomial (BMI) and two binary logistic regression models (drinking and physical activity) were assessed. The smoking analysis was not performed for women, due to very low prevalence. In addition, we tested two different sets of interaction effects between retirement status and financial strain variables (debt-to-income ratio, financial satisfaction, and future financial perspective) and SES variables (education and family income).

RESULTS

Descriptive Statistics

Descriptive statistics for the sample are reported in Table 1. Results showed that 30% of the participants were fully retired, and 70% still worked in this age group. The average age of respondents was 62.12 years. Most respondents were married (85.7%) and lived with an average of more than one child in the household (1.59). College graduates made up 12.3% of the sample. Median annual family income was approximately $18,000, with 34.5% of respondents living below the poverty line. Over half (58.9%) of the sample did not owe money, while 32.9% were satisfied with their financial situation. Only 28.8% viewed their financial futures positively.

Descriptive statistics regarding health behavior variables are presented in Table 2. Overall, retired individuals showed better performance in health promoting behaviors compared with working individuals. Retired individuals reported lower rates of smoking and drinking than working people and a higher rate of performed physical activities.

Results demonstrate gender differences, particularly in smoking and drinking behavior, which is consistent with prior findings [25,51]. The trend of smoking or drinking habits revealed that Koreans, especially young, elderly men, drink, and smoke more, relative to people in other OECD countries [43].

Associations between Retirement and Health Behaviors

The results of our five-step hierarchical model were estimated. Here, we have re-ordered the dependent variable to show the prominent significance with retirement status, which is physical activity followed by smoking, drinking, and lastly, BMI.

Physical activity

Retirement was significantly associated with engaging in regular physical activity for both sexes [Table 3]. In the Model 1 through Model 5, the odds of exercising three or more times per week were significantly higher for retired men, relative to employed men (odds ratio [OR] = 3.13, 95% confidence interval [CI]: 2.37-4.15). Retired women also showed a nearly four-fold greater probability of engaging in regular physical activity in Model 1 (OR = 3.91, 95% CI: 2.76-5.54) compared with employed women, and these odds remained in the Model 5, even after covariance was entered (OR = 3.85, 95% CI: 2.65-5.59).

Table 1: Sample descriptive statistics

Variables	Total (*n*=2,188) (%)	Men (*n*=1,455)		Women (*n*=733)	
		Retired (*n*=404) (%)	Employed (*n*=1,051) (%)	Retired (*n*=239) (%)	Employed (*n*=494) (%)
Economic status					
Retired	643 (29.40)	404 (27.80)	-	239 (32.70)	-
Employed	1.545 (70.60)		1.050 (72.20)		494 (67.30)
Age (mean, SD)	62.1 (4.6)	64.8 (4.3)	61.3 (4.4)	62.6 (4.5)	61.3 (4.4)
Education					
≥College	269 (12.30)	103 (25.50)	131 (12.50)	19 (7.90)	16 (3.20)
High school graduate	605 (27.70)	156 (38.60)	353 (33.60)	39 (16.30)	57 (11.50)
≤Middle school	1.314 (60.00)	145 (35.90)	567 (53.90)	181 (75.70)	421 (85.20)
Marital status					
With spouse	1.876 (85.70)	375 (92.80)	995 (94.70)	151 (63.20)	355 (71.90)
Without spouse	312 (14.30)	29 (7.20)	56 (5.30)	88 (36.80)	139 (28.10)
Numbers of children in household (mean, SD)	1.6 (0.5)	1.7 (0.5)	1.5 (0.5)	1.6 (0.5)	1.7 (0.5)
Family income					
≥401%	254 (11.60)	42 (10.40)	159 (15.10)	18 (7.50)	35 (7.10)
301-400%	158 (7.20)	24 (5.90)	93 (8.80)	10 (4.20)	31 (6.30)
201-300%	381 (17.40)	61 (15.10)	216 (20.60)	33 (13.80)	71 (14.40)
101-200%	438 (20.00)	63 (15.60)	236 (22.50)	27 (11.30)	112 (22.70)
<100% poverty line	754 (34.50	165 (40.80	255 (24.30)	118 (49.40)	216 (43.70)
Missing	203 (9.30)	49 (12.10)	92 (8.80)	33 (13.80)	29 (5.90)
Debt-to-income ratio					
No debt	1.289 (58.90)	267 (66.00)	597 (56.80)	130 (54.40)	295 (59.70)
100-200%	524 (23.90)	77 (19.10)	303 (28.80)	54 (22.60)	90 (18.20)
>200%	375 (17.10)	60 (14.90)	151 (14.40)	55 (23.00)	109 (22.10)
Financial satisfaction					
Satisfied	719 (32.90)	152 (37.60)	372 (35.40)	73 (30.50)	122 (24.70)
Midrange	952 (43.50)	159 (39.40)	480 (45.70)	92 (38.50)	221 (44.70)
Not satisfied	517 (23.60)	93 (23.00)	199 (18.90)	74 (31.00)	151 (30.60)
Future financial prospects					
Not negative	631 (28.80)	138 (34.20)	264 (34.20)	74 (31.00)	155 (31.40)
A little negative	1.037 (47.40)	183 (45.30)	530 (50.40)	98 (41.00)	226 (45.70)
Very negative	520 (23.80)	83 (20.50)	257 (24.50)	67 (28.00)	113 (22.90)
Depression					
Not depressed	1.192 (81.90)	321 (79.50)	871 (82.90)	158 (64.40)	328 (66.40)
Depressed	263 (18.10)	83 (20.50)	180 (17.10)	85 (35.60)	166 (33.60)
Self-rated health					
Fair to excellent	960 (43.90)	174 (43.10)	551 (52.40)	79 (33.10)	156 (31.60)
Bad to worst	1.228 (56.10)	230 (56.90)	500 (47.60)	160 (66.90)	338 (68.40)
Physical disability					
No limitations	2.163 (98.90)	390 (96.50)	1.047 (99.60)	236 (98.70)	490 (99.20)
Physical limitations	25 (1.10)	14 (3.50)	4 (0.40)	3 (1.30)	4 (0.80)
Chronic health conditions (CDs)					
No CD	1.424 (65.10)	218 (54.0)	734 (69.80)	148 (61.90	324 (65.60)
1 CD	572 (26.10)	129 (31.90)	234 (22.30)	74 (31.00)	135 (27.30)
2 or more CDs	192 (8.80)	57 (14.10)	83 (7.90)	17 (7.10)	35 (7.10)

Note: Family income level was categorized using the poverty line (two-person households=$8,400 in 2006) as a cut-off point. Therefore, annual family income <100% means that those families live below the standard poverty line while 200% refers to family income twice that of the poverty line threshold amount

In physical activity function, there was a marginally significant ($P < 0.10$) interaction effect between negative future perspective and retirement status in men. Therefore, stratified analyzes were conducted to test the differences. Among those with negative financial expectation, retired men were four times more likely to exercise than employed (OR = 4.38; 95% CI: 2.31, 7.43). Of those who had a positive future financial expectation, retired men were twice as likely to exercise as employed (OR = 2.12; 95% CI: 1.29, 3.48). The results indicate that retired men exercise more compared with employed people and that this is especially evident for retired persons who see their future finances more negatively. One possible interpretation of these findings is that with limited income sources after retirement, men may become more cautious about their health and health behaviors.

In women, the interaction of education and retirement status was significant. Results revealed that in the group with middle school or lower education, the odds of being engaged in frequent physical activity in retired women was four times higher than that of employed (OR = 4.4; 95% CI: 2.87-6.54). However, in high school (OR = 2.27; 95% CI: 0.65-6.11) and college graduates (OR = 2.05, 95% CI: 0.37-11.77), the gap between retired women and employed women's physical activity was significant, but the odds were reduced. In other words, the impact of retirement status

Table 2: Distribution of health behavior variables

Variables	Total (*n*=2,188) (%)	Men (*n*=1,455)		Women (*n*=733)	
		Retired (*n*=404) (%)	Employed (*n*=1,051) (%)	Retired (*n*=239) (%)	Employed (*n*=494) (%)
Smoking					
Non-smoking	1.600 (73.20)	275 (68.10)	613 (58.30)	232 (97.10)	480 (97.40)
<1 pack per day	244 (11.20)	61 (15.10)	171 (16.30)	4 (1.70)	8 (1.60)
1 pack or more per day	343 (15.70)	68 (16.80)	267 (25.40)	3 (1.30)	5 (1.00)
Drinking					
No alcohol	1.121 (51.20)	170 (42.10)	366 (34.80)	198 (82.80)	387 (78.30)
Alcohol up to 3 times per week	589 (26.90)	132 (32.70)	339 (32.30)	35 (14.60)	83 (16.80)
Alcohol more than 4 times per week	478 (21.80)	102 (25.20)	346 (32.90)	6 (2.50)	24 (4.90)
PA					
None to twice per week	1.432 (65.50)	165 (40.80)	746 (71.70)	127 (53.10)	394 (79.80)
Three times or more per week	754 (34.50)	239 (59.20)	303 (28.90)	112 (46.90)	100 (20.20)
BMI					
BMI≤19 (underweight)	159 (7.30)	31 (7.70)	79 (7.50)	17 (7.10)	32 (6.50)
BMI=20-22 (midrange)	783 (35.80)	145 (35.90)	361 (34.30)	82 (34.00)	195 (39.50)
BMI≥23 (overweight/obese)	1.246 (56.90)	228 (56.40)	611 (58.10)	140 (58.60)	267 (54.00)

BMI: Body mass index, PA: Physical activity

Table 3: Results of logit analysis for regular physical activity

Variables	Physical activity more than 3 days versus twice or less (per week)			
	Men (*n*=1,455)		Women (*n*=733)	
	Odds ratio	95% CI	Odds ratio	95% CI
Retirement status				
Employed	1.00		1.00	
Retired	3.14***	2.37-4.15	3.85***	2.65-5.59
Age	1.02	0.98-1.04	0.94***	0.91-0.98
Education				
≥College	1.00		1.00	
High school graduate	0.57***	0.41-0.81	0.81	0.34-1.93
≤Middle school	0.33***	0.23-0.47	0.32***	0.14-0.72
Marital status				
With spouse	1.00		1.00	
Without spouse	0.94	0.56-1.58	1.22	0.83-1.81
Numbers of children in household	0.91	0.71-1.15	0.98	0.69-1.41
Family income				
≥401%	1.00		1.00	
301-400%	0.84	0.50-1.39	1.12	0.43-2.90
201-300%	0.92	0.57-1.48	0.62	0.25-1.49
101-200%	0.74	0.45-1.21	0.92	0.39-2.14
<100% poverty line	0.88	0.54-1.44	1.02	0.46-2.26
Missing	0.72	0.42-1.25	0.77	0.29-2.01
Debt-to-income ratio				
No debt	1.00		1.00	
100-200%	0.96	0.72-1.28	0.87	0.54-1.42
>200%	0.93	0.64-1.35	1.17	0.74-1.86
Financial satisfaction				
Satisfied	1.00		1.00	
Midrange	0.77‡	0.59-1.01	0.92	0.58-1.31
Not satisfied	0.54***	0.37-0.77	0.65***	0.38-1.01
Future financial expectation				
Not negative	1.00		1.00	
Bit negative	1.31	0.98-1.72	0.87	0.58-1.31
Very negative	1.07	0.77-1.48	0.62*	0.39-1.03
Depression				
Not depressed	1.00		1.00	
Depressed	1.14	0.84-1.61	0.71	0.46-1.08
Self-rated health				
Fair to excellent	1.00		1.00	
Bad to worse	0.79‡	0.61-1.02	1.03	0.65-1.54
Activities of daily living				
No limit	1.00		1.00	
Have physical limit	0.44	0.15-1.28	0.46	0.05-4.29
Chronic health conditions (CDs)				
No CDs	1.00		1.00	
1 CD	1.36*	1.03-1.81	1.02	0.68-1.53
2 and more CDs	2.43***	1.62-3.65	1.58	0.79-3.18
df	22		22	
Log-likelihood	−848.74		−385.28	
Chi-square	222.06		111.17	

‡*P*<0.10, **P*<0.05, ***P*<0.01, ****P*<0.001, CI: Confidence interval

on physical activity was larger among those who have low educational attainment.

Drinking

In Table 4, retired men's odds for heavy drinking were 33% lower relative to those for employed men (OR = 0.67, 95% CI: 0.49-0.90) in model 1. The gap was reduced, yet it remained significant in Model 5 (OR = 0.73, 95% CI: 0.53-0.99. These results demonstrate that retired status does have an impact on cutting down on heavy drinking habits, even though other contextual factors were in effect. Yet, light drinkers and non-drinkers did not differ significantly according to retirement status.

BMI

Findings from multinomial logistic regression analyzes are presented in Table 5. Retired women were more likely to be overweight relative to their employed counterparts. In Model

Table 4: Results of multinomial and logit analysis for drinking

Variables	Men (n=1,455)				Women (n=733)	
	Drink alcohol 3 days and less vs. no drink vs. 4 days and more (per week)				Drink alcohol vs. not drink alcohol	
	≤3 days/per week		≥4 days		Drink alcohol	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Retirement status						
Employed	1.00		1.00		1.00	
Retired	1.02	0.75-1.39	0.73*	0.53-0.99	0.83	0.54-1.27
Age	0.98	0.95-1.01	0.98	0.95-1.01	0.92***	0.88-0.97
Education						
≥College	1.00		1.00		1.00	
High school graduate	1.21	0.83-1.76	1.23	0.81-1.86	2.83	0.60-13.41
≤Middle school	0.91	0.61-1.35	1.41	0.93-2.14	3.37	0.75-15.01
Marital status						
With spouse	1.00		1.00		1.00	
Without spouse	0.77	0.42-1.42	1.43	0.84-2.42	1.32	0.88-1.99
Numbers of children in household	0.76*	0.58-0.98	1.05	0.81-1.36	1.33	0.90-1.97
Family income						
≥401%	1.00		1.00		1.00	
301-400%	0.82	0.47-1.42	1.35	0.74-2.46	0.77	0.24-2.48
201-300%	0.75	0.48-1.17	1.06	0.65-1.75	1.28	0.49-3.35
101-200%	0.86	0.54-1.37	1.25	0.75-2.07	1.08	0.42-2.80
<100% poverty line	0.67	0.42-1.06	1.26	0.77-2.07	1.28	0.51-3.18
Missing	0.91	0.53-1.53	1.47	0.83-2.61	1.24	0.41-3.75
Debt-to-income ratio						
No debt	1.00		1.00		1.00	
100-200%	1.21	0.89-1.65	0.99	0.72-1.37	0.78	0.45-1.35
>200%	0.99	0.65-1.49	1.23	0.84-1.82	1.51‡	0.99-1.97
Financial satisfaction						
Satisfied	1.00		1.00		1.00	
Midrange	1.14	0.85-1.54	1.18	0.87-1.87	1.28	0.78-2.09
Not satisfied	1.22	0.83-1.79	1.29	0.87-1.89	1.12	0.65-1.96
Future financial expectation						
Not negative	1.00		1.00		1.00	
Bit negative	1.16	0.86-1.57	1.15	0.85-1.56	0.88	0.57-1.38
Very negative	1.39	0.97-1.98	1.31	0.91-1.87	1.18	0.72-1.94
Depression						
Not depressed	1.00		1.00			
Depressed	0.97	0.68-1.36	1.15	0.81-1.63	0.89	0.58-1.36
Self-rated health						
Fair to excellent	1.00		1.00		1.00	
Bad to worse	0.70**	0.53-0.92	0.74*	0.5-0.98	1.08	0.70-1.65
Chronic health conditions (CDs)						
No CDs	1.00		1.00		1.00	
1 CD	1.01	0.74-1.37	0.99	0.72-1.34	1.01	0.65-1.53
2 and more CDs	0.96	0.62-1.53	0.86	0.54-1.37	0.82	0.37-1.81
df	42				21	
Log-likelihood	−1553.15				−353.73	
Chi-square	80.79				30.98	

‡P<0.10, *P<0.05, **P<0.01, ***P<0.001, Note: Activities of daily living variable was dropped due to the size of cells, CI: Confidence interval

1, the probability ratio for being overweight was non-significant (OR = 1.27; 95% CI: 0.91-1.77); the association became significant in the fully adjusted model (OR = 1.40; 95% CI: 1.02–1.99). This result was in line with previous research [27,28]. In men, however, retirement was not significantly associated with being underweight or overweight.

Smoking

Retired men showed lower odds in heavy smoking compared with employed individuals in the initial Model 1 (OR = 0.64, 95% CI: 0.47-0.88). In the model 5, [Table 6], however, the gap became narrowed about 8% and only marginally significant when other variables were controlled (OR = 0.72, 95% CI: 0.52-1.01). It implies that it is not the statutory difference that generates the reduction of heavy smoking, but perceived financial difficulties and health concerns may influence the reduction in numbers of cigarettes that are smoked. However, retirement and smoking <20 cigarettes per day were not significantly associated in models 1 through Model 5.

DISCUSSION

These results suggest that retirement may provide opportunities to develop a healthy lifestyle. It reveals that physical activity benefits most from retirement, relative to other health

Table 5: Results of multinomial analysis for BMI

Variables	Men (n=1,455)				Women (n=733)			
	BMI≤19 vs. normal range vs. BMI≥23				BMI≤19 vs. normal range vs. BMI≥23			
	BMI≤19		BMI≥23		BMI<19		BMI>23	
	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Retirement status								
Employed	1.00		1.00		1		1	
Retired	0.95	0.56-1.6	1.03	0.77-1.34	1.09	0.54-2.18	1.4*	1.02-1.99
Age	1.03	0.97-1.08	0.97	0.95-1.01	1.09*	1.01-1.18	0.97	0.94-1.01
Education								
≥College	1		1		1		1	
High school graduate	0.56	0.28-1.15	1.22	0.85-1.75	1.48	0.23-9.49	1.54	0.66-3.61
≤Middle school	0.89	0.45-1.77	1.17	0.81-1.69	2.11	0.39-11.44	1.89	0.86-4.14
Marital status								
With spouse	1.00		1.00		1.00		1.00	
Without spouse	1.84	0.85-3.98	1.32	0.78-2.21	1.11	0.56-2.18	0.92	0.64-1.31
Numbers of children	0.89	0.58-1.37	0.91	0.71-1.14	0.56‡	0.31-1.03	0.91	0.65-1.26
Family income								
≥401%	1.00		1.00		1.00		1.00	
301-400%	1.51	0.52-4.38	1.01	0.59-1.71	0.26	0.02-2.62	1.42	0.6-3.36
201-300%	1.12	0.45-2.75	0.66*	0.43-0.98	0.84	0.21-3.4	1.84‡	0.89-3.79
101-200%	1.48	0.61-3.67	0.88	0.56-1.36	0.38	0.08-1.89	2.96**	1.43-6.14
<100% poverty line	1.59	0.65-3.88	0.58*	0.38-0.9	1.24	0.34-4.51	2.18*	1.1-4.37
Missing	0.55	0.17-1.81	0.85	0.52-1.38	0.27	0.04-1.79	1.33	0.61-3.02
Debt-to-income ratio								
No debt	1.00		1.00		1.00		1.00	
100-200%	1.43	0.84-2.39	0.73*	0.55-0.97	1.06	0.42-2.67	1.18	0.77-1.82
>200%	1.51	0.84-2.82	0.13	0.78-1.63	0.85	0.37-1.96	1.04	0.68-1.59
Financial satisfaction								
Satisfied	1.00		1.00		1.00		1.00	
Midrange	0.64	0.38-1.07	1.08	0.82-1.41	0.86	0.38-1.96	0.65	0.47-1.01
Not satisfied	0.82	0.45-1.51	0.97	0.68-1.37	0.81	0.31-2.09	0.82	0.53-1.25
Future fin expectation								
Not negative	1.00		1.00		1.00		1.00	
Bit negative	1.45	0.87-2.44	1.2	0.91-1.57	2.55*	1.12-5.81	0.69*	0.47-1.02
Very negative	1.34	0.71-2.51	1.61***	1.15-2.21	1.08	0.39-3.01	0.83	0.53-1.25
Depression								
Not depressed	1.00		1.00		1.00		1.00	
Depressed	0.71	0.43-1.18	1.17	0.86-1.61	0.99	0.47-2.05	0.84	0.58-1.21
Self-rated health								
Fair to excellent	1.00		1.00		1.00		1.00	
Bad to worse	1.59*	1.04-2.55	0.68*	0.53-0.88	0.81	0.39-1.71	0.93	0.65-1.34
Chronic health conditions (CDs)								
No CDs	1.00		1.00		1.00		1.00	
1 CD	0.71	0.41-1.23	1.96***	1.48-2.61	0	0	1.64	0.86-3.06
2 and more CDs	0.72	0.29-1.74	2.51***	1.62-3.86	1.17	0.56-2.42	1.87**	1.29-2.71
df	42				42			
Log-likelihood	−1216.15				−603.38			
Chi-square	128.53				74.79			

‡P<0.10, *P<0.05, **P<0.01, ***P<0.001, Note: Activities of daily living variable was dropped due to the size of cells, BMI: Body mass index, CI: Confidence interval

behaviors. In our study, retired men and women were three to four times as likely to engage in frequent exercise relative to their employed counterparts. Interaction analysis revealed that such a gap in exercise behavior is most prominent among women with low education. Low educated Korean women may benefit the most from retirement in terms of physical activity. It may be due to the fact that low educated women often spend long hours at low-paying jobs, yet provide most of the household labors at home after work, leaving little time for leisure activities. In addition, retired Korean men were less likely to engage in heavy smoking or heavy drinking compared with their employed counterparts. Since, job-related stress and social gatherings have been identified as major contexts encouraging drinking, the distance from job stress or burden may have promoted the cessation of unhealthy drinking [8,14,15]. These findings suggest that retirees may have more chances to adopt healthy behaviors due to their increased leisure time and the reduced opportunity cost of leisure resulting than employed counterparts [13,15,20-22].

However, we should remain cautious when interpreting these findings. The benefits of increased physical activity for retirees may have been overestimated, since our study did not include information regarding physical activities related to employment,

Table 6: Results multinomial analysis for smoking: Men only (compared to non-smokers)

Variables	Men (n=1,455)			
	<1 pack of cigarette		More than 1 pack of cigarette	
	Odds ratio	95% CI	Odds ratio	95% CI
Retirement status				
Employed	1.00		1.00	
Retired	0.86	0.6-1.24	0.72‡	0.52-1.01
Age	1.02	0.98-1.05	0.97	0.94-1.01
Education				
≥College	1.00		1.00	
High school graduate	1.39	0.85-2.28	1.56*	1.02-2.41
≤Middle school	1.91**	1.16-3.14	1.71*	1.02-2.69
Marital status				
With spouse	1.00		1.00	
Without spouse	0.84	0.44-1.62	1.17‡	
Numbers of children in household	0.76‡	0.57-1.03	0.81‡	0.62-1.05
Family income				
≥401%	1.00		1.00	
301-400%	1.28	0.67-2.45	0.64	0.35-1.17
201-300%	0.9		0.93	0.59-1.47
101-200%	0.96	0.54-1.69	0.59*	0.37-0.98
<100% poverty line	1.11	0.64-1.97	0.82	0.51-1.34
Missing	1.01	0.53-1.96	0.73	0.42-1.27
Debt-to-income ratio				
No debt	1.00		1.00	
100-200%	1.03	0.71-1.49	1.48	0.84-1.57
>200%	1.08	0.67-1.68	1.49*	1.01-2.22
Financial satisfaction				
Satisfied	1.00		1.00	
Midrange	1.13	0.8-1.95	1.19	0.87-1.63
Not satisfied	1.2	0.76-1.88	1.99***	1.35-2.93
Financial satisfaction				
Not negative	1.00		1.00	
Bit negative	1.12	0.78-1.61	1.11	0.81-1.51
Very negative	1.51*	1.01-2.28	1.31	0.91-1.88
Depression				
Not depressed	1.00		1.00	
Depressed	0.75	0.51-1.09	1.18	0.82-1.69
Self-rated health				
Fair to excellent	1.00		1.00	
Bad to worse	0.92	0.67-1.26	1.1	0.84-1.46
Chronic health conditions (CDs)				
No CDs	1.00		1.00	
1 CD	0.95	0.67-1.35	0.61***	0.43-0.84
2 and more CDs	0.92	0.55-1.55	0.63*	0.38-0.99
df	42		42	
Log-likelihood	–1,216.15		–1309.2	
Chi-square	128.53		94.44	

‡P<0.10, *P<0.05, **P<0.01, ***P<0.001, Note: Activities of daily living variable was dropped due to the size of cells, CI: Confidence interval

particularly for those who retired from a physically demanding job [24,26]. In Korea, older people can engage in walking and hiking at very low cost. There are some possibilities that reported vigorous activity, indicated by sweating and being out of breath, include light hiking or walking. Indeed, as we observed BMI results, retirement was also associated with an increased risk of being overweight for women. Even though physical activity differences between retired and employed are evident, we can assume that such physical activity may have been insufficient to support maintenance of normal weight. Retirees may benefit from physical education programs for more intensive or effective workouts.

There was some other evidence supporting the converse argument that retirement may increase challenges for positive health behaviors. First, retired men tend to worry more about their financial future. Those financial concerns are likely to generate a higher prevalence of exercise. Second, mediating effects in heavy smoking reveal that the retirement benefit on smoking may be conditional on retiree's financial situation as well as health concerns. We speculate that retirees may try to improve or maintain their human capital (i.e., their health) given the negative financial forecast.

Third, from the results of light smoking or drinking, there were no significant differences between retired and employed men. This suggests that retirees may withdraw from heavy tobacco or alcohol consumption without completely discontinuing use. In other words, retirement may exert an influence on these behaviors at the "intensive," rather than the "extensive," margin. This suggests that smoking and drinking cessation programs may have to take place earlier while they are employed prior to retirement.

There are a number of limitations to the present study. It was based on cross-sectional data; therefore, no causal relationships can be assumed. Although retirement is considered to be a process and a gradual transition, we acknowledge that our data and analysis models could not fully realize the complexity of the contemporary retirement process. In estimating health behaviors, the relevant factors we selected were optimal variables that were assumed to be related to all four health behaviors (exercise, smoking, drinking, and BMI). However, as prior studies have noted, each health behavior may be influenced by unique factors that generate or obstruct their practice.

In addition, important information, such as that related to diet, occupation, and other activities relevant to the present study was not available for use in the study. Furthermore, the KLoSA did not include any direct questions designed to determine whether an individual retired voluntarily. Future research is required to verify whether there are differences in health behaviors between individuals who have retired voluntarily and those who have retired involuntarily.

CONCLUSION

Findings from this research reveal that retirement may provide an opportunity for positive health behavior changes though varying by the type of lifestyle and the socioeconomic situation of the retiree. Our findings also suggest that gender must be considered when designing and implementing policies and intervention programs for retirees. To date, Korean society lacks systematic management of health behavior. Promoting good health is left to the individual, which unhealthy behaviors are considered individual failures. Health promotion programs and policies for aging Koreans, particularly those who lack resources, are required in this rapidly aging nation.

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