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Review Article

Holistic Approach to Health Behaviors and Health Status and their Association in the General Korean Population

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Abstract

Background: In Korea, the health status of the Korean population has changed drastically over the years. The objectives of this study were to identify socio-demographic characteristics that correlate with the maintenance of health behaviors, and to multi-dimensionally examine the association between health behavior and health status in the general Korean population.

Methods: A total of 1,000 individuals responded to a questionnaire that included socio-demographic characteristics, health behaviors, and health status. We utilized the 10 Rules for Highly Effective Health Behavior to assess health behavior, and the questionnaire to evaluate four dimensions of health status and general health status. Multiple logistic regression analysis was conducted to investigate significant associations.

Results: Affiliated occupation was negatively correlated with maintaining health behaviors for more than 6 months, whereas female gender, old age, high education level, married status, and high income were positively associated with the maintenance of health behaviors. Physical health behaviors were associated with physical and mental health; mental health behaviors with physical, mental, social, and spiritual health; social health behavior with social health; and spiritual health behaviors with physical, social, and spiritual health.

Conclusions: Our findings suggest that health behaviors assessed by the 10 Rules for Highly Effective Health Behavior are associated with multidimensional and general health status in the general population

ABBREVIATIONS

PHS: Physical Health Status; MHS: Mental Health Status; SHS: Social Health Status; SpHS: Spiritual Health Status

INTRODUCTION

With the social and economic development in Korea over the years, the health status landscape of the Korean population has changed drastically. Population aging and life style changes have resulted in a sharp increase in the incidence of chronic disease [1,2]. The economic crisis in the late 1990s intensified socioeconomic health inequalities, and a recent rise in national income has led to the development of diversified health care needs [2,3].

Health status is a critical factor that determines happiness, well-being, and consequently quality of life [4]. It also exerts an immense effect on economy. Good health status reduces poverty and increases productivity, ultimately stimulating economic growth [5]. It even curtails healthcare expenditure,

which certainly is a burden in an aging society [6]. Thus, health promotion is a matter of great importance to both individuals and society.

Many studies have shown that good health status can be achieved through the practice of good health behaviors [7-10]. For instance, healthy diet and regular physical activity are associated with low incidences of cardiovascular diseases and diabetes [11,12]. The correlation is not limited to the physical aspect of health: positive thinking is known to have beneficial effects on both mental and physical health [13]; additionally, social support from family improves psychological health by decreasing depression and anxiety, and physical health by encouraging healthier lifestyle [14]. There is also some empirical data suggesting that religious involvement may prevent mental and physical illness [15].

However, not much has been accomplished with respect to a multidimensional approach to the relationship between health behaviors and health status. Previous studies have addressed the importance of various components of health; for instance, the definition of health by World Health Organization as "a state of complete physical, mental, and social well-being" is a prevailing idea [16]. However, there is now a growing argument that emphasizes the interconnectedness of health dimensions [17]. Here, health is defined as a holistic health status that requires balance among physical, mental, social, and spiritual elements. It is suggested that one dimension affects the state of another [18].

Therefore, it would be meaningful to survey health behaviors and the health status of the general population in four different aspects – physical, mental, social, and spiritual – and examine their association. Information from such a study could clarify how health dimensions are related to each other and provide an insight into the promotion of holistic health. We investigated health status and health behaviors from a representative sample of 1,000 individuals aged over 20 years old.

MATERIALS AND METHODS

Study population and data sources

In June 2012, we conducted a national wide cross-sectional survey to investigate the public awareness of health care and practices. The Computer-Assisted Telephone Interviewing (CATI), an efficient method to collect large data [19,20] was utilized. Sampling was based on random time-balanced quota selection from a stratified area. All participants were recruited through random digit dial-ling sampling. Sample weights accounted for the probability of selection, calibrated by age, sex, and place of residence from the 2010 Korean Census. Considering the response rate of 10%, we contacted about 10,000 persons aged over 20 years old. The participants were informed about the purpose and methods of the study beforehand. Total of 1,000 individuals, who agreed to participate with informed consent, responded to a questionnaire. The questionnaire included socio-demographic characteristics such as gender, age, education level, marital status, religious affiliation, place of residence, monthly household income, morbidity, and job status, as well as health status and health behaviors. This project was approved by the Institutional Review Board of the Seoul National University Hospital, Seoul, Republic of Korea.

Measures

Health Status: The questions used to assess four dimensions of health were as follows.

1) 'Physical health is the state of having normal physical strength, without diseases and injuries. Would you say your physical health is…?'

2) 'Mental health is the state of being mentally stable, able to overcome stress. Would you say your mental health is…?'

3) 'Social health is the state of having good social relationships, carrying out one's work properly. Would you say your social health is…?'

4) 'Spiritual health is the state of having a meaning in life through volunteering, religious experience, and meditation. Would you say your spiritual health is…?'

The question used to assess general health status was:

'Considering your physical, mental, social, and spiritual health status, would you say your general health is…?'

The response scales were 1 - Excellent, 2 - Very Good, 3 - Good, 4 - Fair, and 5 - Poor. For the measure of general health status, we adapted an item from the validated Korean version of the Short Form 36 (SF-36) questionnaire, one of the most frequently used instruments measuring health status [21]; then applied this to the physical, mental, social, and spiritual health status assessment. Internal consistency was determined by Cronbach's α coefficient of 0.78 for all variables.

Health Behaviors

Self-reported health behaviors were asked to investigate their relationship with health status. A health behavior questionnaire developed by our research team from the '10 Rules for Highly Effective Health Behavior,' found to be critical in improving participants' quality of life, which was previously utilized for cancer survivors [22]. The items included the following physical behaviors: regular exercise, balanced diet, regular check-ups, smoking and drinking cessation, work-life balance; mental behaviors: positive thinking, proactive living; social behavior: living with loved ones, and spiritual behaviors: helping others, regular religious life.

The response scales were based on health behavior changes (pre-contemplation, contemplation, preparation, action, and maintenance stages) described in the trans-theoretical model. Stages were converted into scales ranging from 1 (pre-contemplation stage) to 5 (maintenance stage) for each of the 10 health behaviors listed above [23]. For statistical analysis, we dichotomized each health behavior into two groups with a focus on maintenance of behavior change. Internal consistency was assessed by Cronbach's α coefficient of 0.74 for all variables.

Statistical analysis

Descriptive statistics was used to explain the socio-demographic characteristics, health status, and health behaviors of the study sample. For statistical analysis, socio-demographic characteristics were dichotomized with the following standards: age at time of survey (<50 years *vs.* ≥50 years), education level

(<high school graduate *vs.* ≥high school graduate), marital status (married *vs.* widowed/divorced/separated/single), religious affiliation (yes *vs.* no), place of residence (small city/country *vs.* metropolitan area), monthly household income (<3000 USD *vs.* ≥3000 USD), morbidity (yes *vs.* no), and job status (not affiliated *vs.* affiliated). The health status was classified into two groups: good (≥good) and poor, and each health behavior were dichotomized with a cutoff of maintenance.

First, univariate and multiple logistic regression analyses were conducted to determine the association between socio-demographic characteristics and health behaviors. Next, univariate analysis was performed to measure health behaviors as a predictor for health status. The odds ratio, adjusted for socio-demographic variables, was determined from multiple logistic regression and was used to examine the association between the stage of health behavior changes and health status. Multiple regression analyses were conducted with the hierarchical/stepwise method to identify independent factors with statistical significance. The significance level was set at P<0.05. The results were reported in terms of the odds ratio (OR) with a 95% confidence interval (CI). SAS 9.3 software (SAS Institute, Cary, NC) was used for all analyses.

RESULTS AND DISCUSSION

Results

Characteristics of Participants: The socio-demographic characteristics of the participants are summarized in Table 1. Of the participants, 38.7% were ≥50 years old, and more than half (56.2%) were university graduates. In terms of monthly income, 50.9% of respondents had incomes of ≥3,000 USD.

Prevalence of self-assessed health status: The prevalence of each self-assessed health status is reported in Figure 1. The ratings for physical, mental, social, and spiritual health status were disproportionate. Overall, the health status was nowhere near the highest level. Very few participants (0.8%) evaluated all dimensions of health as 'excellent'.

Prevalence of health behaviors: The prevalence of health behaviors in the action and maintenance stages is presented in Figure 2. With a focus on the maintenance of behavior change, the percent of spiritual health behaviors – helping others (33.3%) and regular religious life (41.1%) – were relatively low (less than 50%) compared to other types of health behaviors. Smoking (73.5%) and drinking (68.1%) cessation were the highest.

Socio-demographic characteristics associated with health behaviors: Table 2 shows the socio-demographic characteristics associated with health behaviors in the maintenance stage. Only 8.9% of subjects had maintained 10 health behaviors for more than 6 months.

Maintaining health behaviors for more than 6 months was negatively correlated with affiliated occupation. Female gender, old age, education level higher middle school graduation, married status, and high monthly income were positively associated with the maintenance of health behaviors.

Univariate analysis of associations between health behaviors and health status: Analysis of health behaviors showed that regular exercise, balanced diet, work-life balance, positive thinking, proactive living, living with loved ones, and helping others were associated with good physical, mental, social, spiritual, and general health status; regular check-ups and regular religious life with good mental, social, spiritual, and general health status; and smoking cessation with good mental and general health status (Table 3).

Table 1: Socio-demographic characteristics of the participants (N=1000).

	N	%
Gender		
Male	493	49.3
Female	507	50.7
Age, years (mean ± SD, 44.8 ± 14.3)		
19–29	190	19.0
30–39	208	20.8
40–49	215	21.5
50–59	186	18.6
60–69	201	20.1
Education Level		
≤Middle school graduate	167	16.7
≤High school graduate	260	26.0
>High school graduate	562	56.2
Marital Status		
Widowed/Divorced/Separated/Single	308	30.8
Married	690	69.0
Religious Affiliation		
No	437	43.7
Yes	530	53.0
Place of Residence		
City/Country	311	31.1
Metropolitan area	689	68.9
Monthly Household Income, in 10,000 Korean won (1 USD)		
<100	119	11.9
100–200	139	13.9
200–300	155	15.5
300–400	185	18.5
>400	324	32.4
Comorbidity		
Yes	287	28.7
No	704	70.4
Job status		
Not affiliated	427	42.7
Affiliated	573	57.3

Health behaviors associated with good physical, mental, social, and spiritual health status: Multiple logistic regression analysis after adjustment for socio-demographic characteristics showed that participants with certain health behaviors in the maintenance stage reported good physical, mental, social, and spiritual health status (Table 4). Participants with regular exercise in the maintenance stage reported their physical and mental health as good; those with balanced diet in the maintenance stage reported their physical and general health status as good; those with smoking cessation in the maintenance stage reported their general health status as good; and those with work-life balance

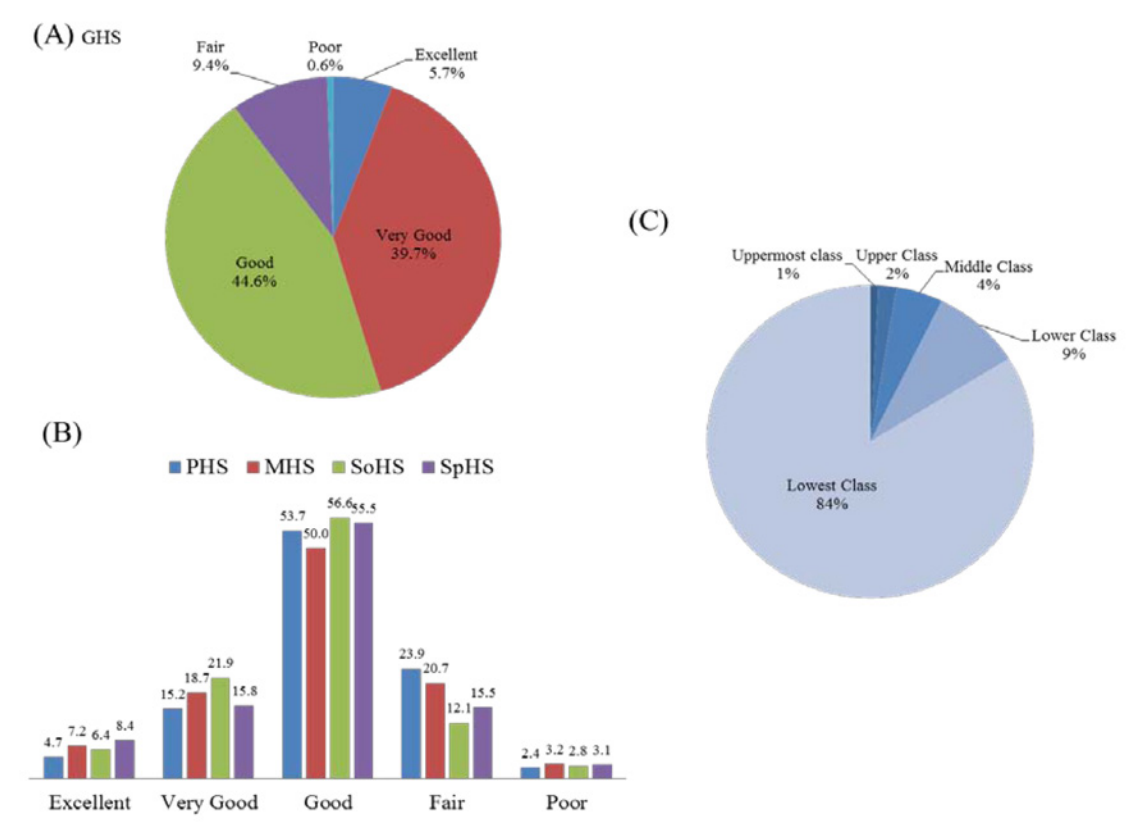

Figure 1 Prevalence of self-assessed health status
(A) GHS: General Health Status
(B) PHS: Physical Health Status; MHS: Mental Health Status; SoHS: Social Health Status; SpHS: Spiritual Health Status
(C) Uppermost Class: evaluated 4 dimensions of health as excellent; Upper Class: evaluated 3 dimensions of health as excellent; Middle Class: evaluated 2 dimensions of health as excellent; Lower Class; evaluated 1 dimension of health as excellent; Lowest Class; evaluated none of the health dimensions as excellent; The numbers are expressed as percentages.

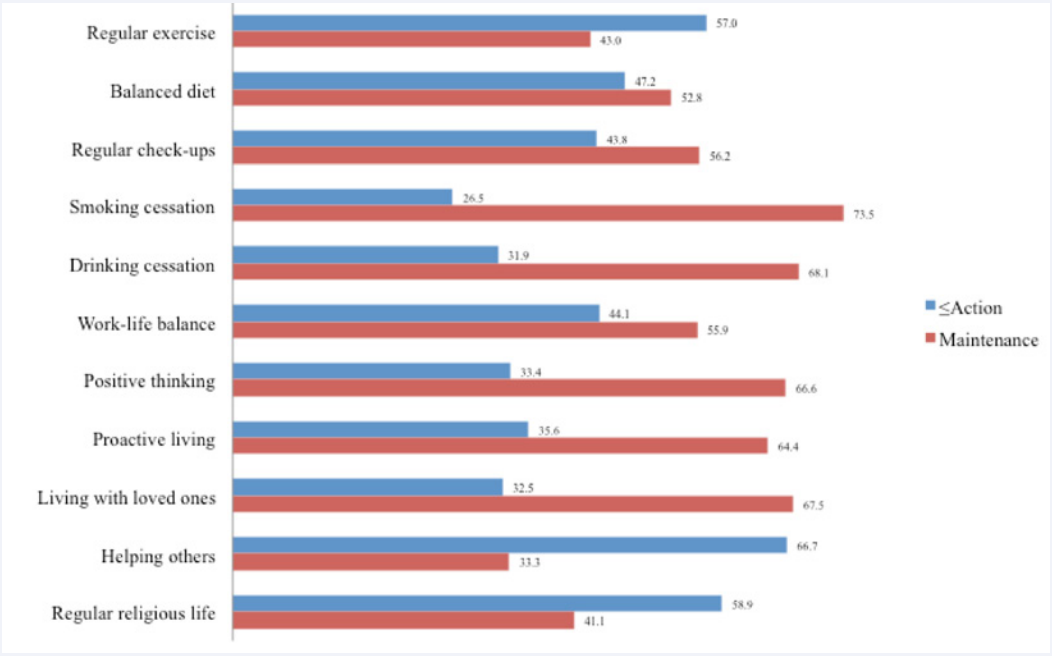

Figure 2 Prevalence of health behaviors in ≤ the action stage, and in the maintenance stage. The number of participants is expressed as a percentage.

Table 2: The association of socio-demographic characteristics with maintenance of health behaviors for more than 6 months (A) [a,b].

			Regular exercise	Balanced diet	Regular check-ups	Smoking cessation	Drinking cessation	Work-Life balance
		N (%)	aOR (CI)	aOR(CI)	aOR(CI)	aOR(CI)	aOR(CI)	aOR(CI)
Gender								
	Male	493 (49.3)	-	**1**	-	**1**	**1**	**1**
	Female	507 (50.7)		**1.35 (1.00-1.82)**		**3.35 (2.40-4.67)**	**3.02 (2.58-4.94)**	**1.38 (1.03-1.85)**
Age						1 1.71 (1.23-2.38)		
	<50	873 (87.3)	**1**	**1**	**1**		**1**	**1**
	≥50	127 (12.7)	**7.65 (5.23-11.19)**	**7.70 (5.37-11.05)**	**8.98 (6.04-13.37)**		**1.95 (1.25-2.42)**	**4.00 (2.86-5.59)**
Education				NS	NS	-	NS	NS
	<High School Graduate	167 (16.7)	**1**					
	≥High School Graduate	822 (82.2)	**1.56 (0.98-2.46)**					
Currently married			NS	NS		-	-	NS
	No	308 (30.8)			**1**			
	Yes	690 (69.0)			**3.37 (2.37-4.80)**			
Monthly Income					-	NS	NS	-
	<300	413 (41.3)	**1**	**1**	**1**			**1**
	≥300	509 (50.9)	**1.72 (1.23-2.40)**	**1.94 (1.40-2.67)**	**1.51 (1.07-2.15)**			**1.51 (1.11-1.85)**
Morbidity			-	-	NS	-	-	-
	Yes	287 (28.7)						
	No	704 (70.4)						
Occupation					NS	**NS**	NS	
	None	427 (42.7)	**1**	**1.0**				**1**
	Affiliated	573 (57.3)	**0.73 (0.53-1.01)**	**0.73 (0.53-1.02)**				**0.52 (0.38-0.72)**

Abbreviation: aOR: adjusted Odds Ratios; CI: Confidence Interval; NS: Not Significant
(A) All of the health behaviors analyzed here are classified as physical health behaviors.
a. Multiple logistic regression analysis included variables identified as independent predictors in the univariate analysis. Predictors that were not significantly correlated with each health behavior in the univariate cross tabulations are presented as '-'; these variables were not included in the model.

Table 3: Univariate analysis of association of maintenance of health behaviors for more than 6 months with health status.

			Poor PHS	Good PHS	p-value	Poor MHS	Good MHS	p-value	Poor SHS	Good SHS	p-value	Poor SpHS	Good SpHS	p-value
		N (%)	26.3 (%)	73.6 (%)		23.9 (%)	75.9 (%)		14.9 (%)	84.9 (%)		18.6	79.7	
Regular exercise														
	≤Action[c]	570 (57.0)	**31.4**	**68.6**	**<0.001**	**32.6**	**67.4**	**<0.001**	**20.6**	**79.4**	**<0.001**	**24.2**	**75.8**	**<0.001**
	Maintenance	430 (43.0)	**19.6**	**80.4**		**12.6**	**87.4**		**7.5**	**92.5**		**11.8**	**88.2**	
Balanced diet														
	≤Action	472 (47.2)	**33.1**	**66.9**	**<0.001**	**34.5**	**65.5**	**<0.001**	**23.1**	**76.9**	**<0.001**	**25.6**	**74.4**	**<0.001**
	Maintenance	528 (52.8)	**20.3**	**79.7**		**14.4**	**85.6**		**7.6**	**92.4**		**12.9**	**87.1**	
Regular check-ups														
	≤Action	438 (43.8)	25.8	74.2	0.772	**33.4**	**66.6**	**<0.001**	**21.2**	**78.8**	**<0.001**	**24.1**	**75.9**	**<0.001**
	Maintenance	562 (56.2)	26.7	73.3		**16.6**	**83.4**		**10.0**	**90.0**		**14.8**	**85.2**	
Smoking cessation														
	≤Action	265 (26.5)	29.8	70.2	0.143	28.4	71.6	0.053	16.7	83.3	0.366	22.5	77.5	0.366
	Maintenance	735 (73.5)	25.1	74.9		22.3	77.7		14.3	85.7		17.6	82.4	
Drinking cessation														

	≤Action	319 (31.9)	24.8	75.2	0.488	27.3	72.7	0.095	15.1	84.9	0.924	20.6	79.4	0.924
	Maintenance	681 (68.1)	27.0	73.0		22.4	77.6		14.9	85.1		18.1	81.9	
Work-Life balance														
	≤Action	441 (44.1)	**30.0**	**70.0**	**0.021**	**36.5**	**63.5**	**<0.001**	**21.1**	**78.9**	**<0.001**	**27.4**	**72.6**	**<0.001**
	Maintenance	559 (55.9)	**23.4**	**76.6**		**14.0**	**86.0**		**10.1**	**89.9**		**12.2**	**87.8**	
Positive thinking														
	≤Action	334 (33.4)	**37.1**	**62.9**	**<0.001**	**49.7**	**50.3**	**<0.001**	**30.3**	**69.7**	**<0.001**	**35.6**	**64.4**	**<0.001**
	Maintenance	666 (66.6)	**20.9**	**79.1**		**11.0**	**89.0**		**7.2**	**92.8**		**10.4**	**89.6**	
Proactive living														
	≤Action	356 (35.6)	**34.8**	**65.2**	**<0.001**	**45.6**	**54.4**	**<0.001**	**30.3**	**69.7**	**<0.001**	**34.7**	**65.3**	**<0.001**
	Maintenance	644 (64.4)	**21.6**	**78.4**		**12.0**	**88.0**		**6.4**	**93.6**		**10.0**	**90.0**	
Living with loved ones														
	≤Action	325 (32.5)	**33.0**	**67.0**	**0.001**	**42.6**	**57,4**	**<0.001**	**31.7**	**68.3**	**<0.001**	**32.4**	**67.6**	**<0.001**
	Maintenance	675 (67.5)	**23.1**	**76.9**		**15.0**	**85.0**		**6.8**	**93.2**		**12.4**	**87.6**	
Helping others														
	≤Action	667 (66.7)	**29.4**	**70.6**	**0.002**	**28.8**	**71.2**	**<0.001**	**19.5**	**80.5**	**<0.001**	**25.2**	**74.8**	**<0.001**
	Maintenance	333 (33.3)	**20.1**	**79.9**		**14.2**	**85.8**		**5.7**	**94.3**		**6.2**	**93.8**	
Regular religious life														
	≤Action	589 (58.9)	25.7	74.3	0.610	**29.1**	**70.9**	**<0.001**	**20.1**	**79.9**	**<0.001**	**27.6**	**72.4**	**<0.001**
	Maintenance	411 (41.1)	27.3	72.7		**16.6**	**83.4**		**7.6**	**92.4**		**6.7**	**93.3**	

Abbreviations: PHS: Physical Health Status; MHS: Mental Health Status; SHS: Social Health Status; SpHS: Spiritual Health Status

a. Poor Health Status was defined as responses of 'bad,' and 'quite bad.'

b. Good Health Status was defined as responses of 'excellent,' 'very good,' and 'good.'

c. ≤Action was defined as the pre-contemplation, contemplation, preparation, and activation stages of the health behavior

Table 4: Association of maintenance of health behaviors for more than 6 months with health status[a,b].

			Good Physical Health Status[c]	**Good Mental Health Status**	**Good Social Health Status**	**Good Spiritual Health Status[d]**	**Good General Health Status**
		N (%)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)	aOR (CI)
Gender							
	Male	493 (49.3)					
	Female	507 (50.7)	-	-	-	-	-
Age							
	<65	873 (87.3)					
	≥65	127 (12.7)	NS	NS	NS	NS	NS
Education							
	≤High school graduate	427 (42.7)	**1**				**1**
	>High school graduate	562 (56.2)	**1.80 (1.12-2.90)**	-	-	-	**1.60 (1.03-2.50)**
Currently married							
	No	308 (30.8)		**1**	**1**	**1**	
	Yes	690 (69.0)	-	**2.13 (1.44-3.15)**	**2.17 (1.43-3.29)**	**1.41 (0.96-2.06)**	NS
Residence							
	Small city/Country	311 (31.1)	**1**				
	Metropolitan area	689 (68.9)	**1.35 (0.95-1.92)**	-	-	-	-
Monthly Income							
	<300	413 (41.3)	**1**			**1**	**1**

	≥300	509 (50.9)	**1.38(0.97-1.97)**	NS	NS	**1.51 (1.04-2.18)**	**1.73 (1.25-2.39)**
Morbidity							
	Yes	287 (28.7)	**1**	**1**	**1**		
	No	704 (70.4)	**4.98 (3.51-7.07)**	**2.28 (1.57-3.32)**	**2.78 (1.81-4.27)**	-	NS
Occupation							
	None	427 (42.7)	**1**	**1**			
	Affiliated	573 (57.3)	**1.52 (1.05-2.20)**	**1.34 (0.90-1.99)**	NS	NS	-
Regular exercise							
	≤Action[e]	570 (57.0)	**1**	**1**			
	Maintenance	430 (43.0)	**1.50 (1.01-2.23)**	**1.68 (1.10-2.56)**	NS	NS	NS
Balanced diet							
	≤Action	472 (47.2)	**1**				**1**
	Maintenance	528 (52.8)	**1.55 (1.02-2.36)**	NS	NS	-	**1.37 (0.97-1.94)**
Regular check-ups							
	≤Action	438 (43.8)					
	Maintenance	562 (56.2)	-	NS	NS	-	-
Smoking cessation							
	≤Action	265 (26.5)					**1**
	Maintenance	735 (73.5)	-	NS	-	-	**1.42 (1.00-2.01)**
Drinking cessation							
	≤Action	319 (31.9)					
	Maintenance	681 (68.1)	-	-	-	-	-
Work-Life balance							
	≤Action	441 (44.1)		**1**			
	Maintenance	559 (55.9)	NS	**1.53 (1.01-2.32)**	NS	NS	NS
Positive thinking							
	≤Action	334 (33.4)	**1**	**1**	**1**	**1**	**1**
	Maintenance	666 (66.6)	**2.35 (1.56-3.53)**	**5.04 (3.03-8.39)**	**2.03 (1.10-3.76)**	**2.15 (1.27-3.64)**	**2.87 (1.79-4.61)**
Proactive living							
	≤Action	356 (35.6)		**1**	**1**	**1**	**1**
	Maintenance	644 (64.4)	NS	**1.58 (0.93-2.69)**	**1.65 (0.87-3.13)**	**1.75 (1.02-3.01)**	**2.06 (1.29-3.27)**
Living with loved ones							
	≤Action	325 (32.5)			**1**		
	Maintenance	675 (67.5)	NS	NS	**2.58 (1.53-4.37)**	NS	NS
Helping others							
	≤Action	667 (66.7)	**1**		**1**	**1**	**1**
	Maintenance	333 (33.3)	**1.48 (1.00-2.20)**	NS	**1.83 (1.01-3.32)**	**2.02 (1.18-3.47)**	**1.40 (1.00-1.96)**
Regular religious life							
	≤Action	589 (58.9)				**1**	**1**
	Maintenance	411 (41.1)	-	NS	NS	**A.81 1.74-4.53)**	**1.39 1.00-1.93)**

Abbreviations: aOR: adjusted Odds Ratios; CI: Confidence Interval; NS: Not Significant

a. Multiple logistic regression analysis included variables identified as independent predictors that showed statistical significance in the univariate analysis. Predictors that were not significantly correlated with each health status in the univariate cross tabulations are presented as '-'; there variables were not included in the model.

b. Backward-selected multiple logistic regression analysis was conducted with sl entry = 0.05 and sl stay = 0.05

c. Good Health Status was defined as responses of 'excellent,' 'very good,' and 'good.'

d. In case of Spiritual Health Status, stepwise method was utilized for the goodness of fit.

≤Action was defined as the pre-contemp lation, contemplation, preparation, and activation stages of the health behavior

in the maintenance stage reported their mental health status as good.

Participants with positive thinking in the maintenance stage reported all of four dimensions and general health status as good; those with proactive living in the maintenance stage reported their social, spiritual, and general health status as good; and those living with loved ones reported their social health status as good. Participants who reported the behavior of helping others in the maintenance stage reported their physical, social, spiritual, and general health status as good, and those with regular religious life reported their spiritual and general health status as good

Discussion

This study demonstrates the importance of a holistic approach in the complete understanding of the association between health behavior and health status. Based on a national survey with a representative sample of Korean population, it examines health status in four dimensions – physical, mental, social, and spiritual – and addresses a number of noteworthy health behaviors that are correlated with good health status.

High-level wellness can be conceptualized as an excellent balance of physical, mental, emotional, spiritual, and social components [24]. However, our findings suggest that these different components of health are not balanced in the general population. This imbalance could be attributed to a lack of public awareness. The survey revealed that more than half of the participants placed emphasis on physical health among other types of health. These indicate that there is an urgent need to change the way Koreans understand health, extending the concept to incorporate all dimensions, in order to reach a higher level of health status.

This study also revealed that the Korean population is poor in practicing spiritual health behaviors – helping others and regular religious life – compared to other types of health behaviors. So far, the multidimensional nature of health behavior has been neglected in public health policy. For instance, the National Health Plan 2020 addresses physical and mental health, but disregards social and spiritual health [25]. This indicates that an equal amount of public effort should be exerted in the management of multi-dimensions of health. In order to improve general health status, intervention programs that cover the holistic aspects of health should be developed and implemented.

In addition, our findings suggest that people with an affiliated occupation are less likely to maintain certain health behaviors for more than 6 months. The result is consistent with previous studies reporting that job strain may promote adverse health behaviors and may impede the practice of planned health behavior [26,27]. These findings suggest that companies should be interested in investigating health management options for their employees, such as workplace wellness or health programs [28,29]. We also confirmed the disparity in health behaviors between different levels of socioeconomic status (education level and income) as noted by other studies [30-32]. Targeted intervention programs are needed for vulnerable subgroups, including those with occupations, low education level, and low income.

Our comprehensive study suggests that some health behaviors should be recommended and promoted, in consideration of their relationship with good health status. The study emphasizes the multidimensional nature of health: good general health status is associated with physical, mental, and spiritual health behaviors. These results shed light on the significance of mental, social, and spiritual health behaviors in particular. All of these were correlated with at least one dimension of health status.

First, the value of physical health behavior (regular exercise) was proven, as it showed a correlation with both physical and mental health status. Several lines of evidence have proposed that physical activities are effective at reducing the symptoms of depression and anxiety [33,34]. Along with previous studies, this implies that regular physical activity should be continuously promoted in the general public as a practical means of improving overall health and quality of life. The result also demonstrated the importance of work-life balance by revealing its association with good mental health status. As burnout, caused by chronic stress from work, is strongly related to depression, adequate balance between work and life could contribute to mental well-being [35,36].

Mental health behavior (positive thinking) was not only associated with good mental health status, but also with good physical, social, and spiritual health status. It is possible that people who practice positive thinking develop self-efficacy in the process, building belief in one's own ability to accomplish goals. It was suggested that optimistic self-beliefs have operative power that helps people set goals, implement plans, and keep up motivation [37]. Thus, those with a positive attitude could be better at self-management, such as coping with stress and even general health care [13]. Our study also revealed that proactive living and good spiritual health status are correlated; this can be explained by the fact that curiosity plays a role in finding the meaning of life as well as in the promotion of well-being [38]. Mental health behavior is indeed a valuable field of study with far-reaching implications.

Social health behavior (living with loved ones) was correlated with good social health status, as expected. This is consistent with a previous study reporting that social support has a positive effect overall, as a result of elevated self-esteem and stability [39]. There is also evidence suggesting that social support "buffers" potential harms that emerge from stressful events [39]. These observations together support the idea that social health behavior is an essential part of health promotion.

The correlation of spiritual health behavior (helping others) with physical health status in addition to social and spiritual health status was notable. There have been numerous studies indicating a positive association between volunteering and health [40]. Although it is possible that healthy, active people engage in volunteer work, some studies indicate that there are health-related benefits to volunteering. For instance, Field *et al.* demonstrated that volunteer work lowered stress hormones in retired elders [41]. If this causality is established, volunteer work could become a new area of interest in public health promotion.

Certain limitations should be taken into account in the interpretation of these results. First, the cross-sectional study only reveals associations between health behaviors and health

status, not causality. Cohort studies or randomized controlled trials are needed to clarify the issue. Second, this study was performed through telephonic interviews and might not have correctly evaluated health status and health behaviors. Further studies with more validated methods are needed to confirm these findings.

CONCLUSION

Our data reports on the holistic health status of Korean population and suggests a meaningful interpretation of the association of multi-dimensional health behaviors with holistic health status in a large, population-based sample with a wide range of variables. Our findings can contribute to the development of more comprehensive health promotion programs by raising awareness regarding the importance of multidimensional health behaviors

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