

# Mediating Effects of Social Support and Self-Esteem in the Relation between Life Styles and Health Conservation of Middle-aged Working Men

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## Abstract

This study aims to provide the basic data for the development of health program through the improvement of social support and self-esteem, by understanding the relation between life styles and health conservation of middle-aged working men. This study targeted 154 middle-aged men in their 40-59. Regarding effects of social support, in Step1, the life styles had significant effects in social support( $\beta=.41$ ). In Step2, the life styles had significant effects in health conservation( $\beta=.46$ ). In Step3, the life styles had positive effects( $\beta=.29$ ), the social support had positive effects in health conservation( $\beta=.43$ ). The social support showed partial mediating effects in the relation between life styles and health conservation. Also, regarding the effects of self-esteem, in Step1, the life styles had significant effects in self-esteem( $\beta=.46$ ). In Step2, the life styles had significant effects in health conservation( $\beta=.46$ ). And in Step3, the life styles had positive effects( $\beta=.28$ ), and the self-esteem had positive effects in health conservation( $\beta=.41$ ). The self-esteem showed partial mediating effects. The variables like social support and self-esteem need to be considered for the establishment of infrastructure and operation of health promotion campaign focusing on corporate health promotion centers, public health centers, and health promotion centers.

**Keywords:** Middle-aged men; Life style; Health conservation; Social support; Self-esteem

## Introduction

The middle-aged population in their 40-64 of local residents residing in Korea is 40.0% of total population, which was increased by 0.8% than the previous year(Statistics Korea, 2020a). The median age was 40.3Y in 2014, and 43.1Y in 2019, which means the prolonged period of middle age. And the median age is predicted to get higher by 5-6Y every ten years in the future(Statistics Korea, 2020b). Also, the life expectancy of Korean people was 82.7Y, which was 2 years higher than the average of OECD(80.7Y)(Ministry of Health and Welfare & Korea Institute for Health and Social Affairs, 2019). As the period expected to live healthily, the Healthy Life Expectancy(HALE) was increased by 8% in the whole world from 59Y to 63Y between 2000 and 2016(WHO, 2020). The healthy life expectancy of Korea is 64.4Y that shows the similar aspect to the global trend, and the gap between healthy life expectancy and life expectancy has been increasing in Korea since 2012(Statistics Korea, 2020b). This result might be mostly originated from chronic diseases. According to the data announced by the Korea Disease Control and Prevention Agency(2018), the death caused by non-infectious diseases such as circulatory disorders(cardio-cerebrovascular diseases), diabetes, chronic respiratory diseases,

and cancers is 71%, which already shows the importance of management of major chronic diseases. However, the management of life styles such as smoking, drinking, physical activity, and eating habit that could be the causes for major chronic diseases is not improved yet. Thus, in order to reduce this gap between life expectancy and healthy life expectancy, there should be continuous health management from the middle age, and also continuous efforts to have desirable health life style.

Also, the self-health evaluation of middle-aged adults gets lowered when the age was higher like 52.3% for the 40s, 43.5% for the 50s, and 28.5% for the 60s. In case of stress, the stress from work was the highest(68.0%)(Statistics Korea, 2018). And this is similar to the results of National Health Interview Survey announcing that American men in their 40-59 of the whole-aged men experienced Serious Psychological Distress the most. Like this, the middle-aged working men taking up a great part of members of society get lots of stress from their work for economic activity, feel that they are unhealthy, and feel threatened to their health. Also, the middle-aged men faced a high degree of stress from heavy pressure caused by changes in role and social status in the life developmental cycle(Km, M.J., *et al*, 2010).

Meanwhile, as the harmonious balance of physical, psychological, mental, and social integration, the health conservation is composed of the energy integration aspect meaning the control of input and production of energy, the structural integration aspect meaning the maintenance and enhancement of physical health, and prevention of health problems, the personal integration aspect meaning the self-integration through one's own value, and the social integration aspect meaning the social organization such as religion, family, or culture(Sung K.W., 2005). In this health conservation which is the harmoniously-balanced state of physical, psychological, mental, and social integration, the social support and self-esteem are working as very important positive variables(Shim M.S., 2005) because the social support through social interactions is an element that improves abilities to reduce the subjects' stress, and also to solve their health problems(Jang, S.H., *et al*, 2008), and the self-esteem is a basic element of mental health as a self-evaluation on their own value and respect(Kim Y. J., *et al*. 2008). The social support(Sung K.W., 2005) meaning the actual interactions with others, and self-esteem regarding oneself as important become the elements of health conservation in the aspect of personal and social integration(Oh O.W., *et al*, 2009).

Viewing the preceding researches related to the factors having effects in health conservation, in the research by Oh(Oh, O.W., *et al*, 2009) targeting the ordinary elderly, the gender, education level, and meaning of life were the influence factors. In the research by Chang(Chang H.K., 2015) targeting the elderly at home, the degree of infirmity, positive thinking, matter of having a spouse, and perceived health status were the influence factors. In the research by Sung(Sung, K.W., *et al*, 2017) targeting the elderly with diabetes in the vulnerable class, the social support, hope, degree of education, and subjective health status were the influence factors of health conservation. In the research by Lee(Lee, H.K., *et al*, 2015) targeting the middle-aged women, the health promotion behaviors and the matter of having a spouse were shown as influence factors of health conservation. Even though the social support and self-esteem were revealed as influence factors having effects in health conservation of the elderly retired from professional job(Sung, K.W. *et al*, 2016), most of the researches on the factors having effects in health conservation were targeting the elderly, so it is very rare to find the researches on the factors having effects in health conservation of middle-aged men. Therefore, this study aims to provide the basic data for raising the health conservation of middle-aged men by verifying the mediating effects of social support and self-esteem in the relation between life styles and health conservation of middle-aged working men.

## **Methodology**

### **Subjects & Data collection**

The subjects of this study were 154 middle-aged working men in their 40-59, residing in C city and S city. The researchers visited companies and offices, explained the objective and methods of this study to people in charge and subjects, and then conducted a survey targeting the people who signed the written consent to participate in this study. In the results of analysis by applying the significance level as .05, effect size as .15, 95% power of test, and five predictor factors for conducting the regression analysis by using the G\*Power 3.1.9.2 Program, the number of samples was 138. Considering the dropout rate, the survey was conducted with 165 subjects. After excluding improper questionnaires from the collected data, total 154 questionnaires were used for the analysis.

### **Instruments**

#### **Life styles**

To measure the life styles, the health promotion behavior evaluation scale by Wilson(Wilson, M.C, *et al*, 1984) was used. The instrument was composed of total 25 items including four items for eating habit, one item for weight control, one item for smoking habit, two items for caffeine/drug addiction, two items for drinking behavior, two items for exercise & leisure activity, two items for safety consciousness, one item for sleep, one item for stress, two items for personality type, two items for thinking of anxiety and depression, two items for job satisfaction, and three items for relationships with family and friends.

Based on the 5-point Likert Scale, total mean score is from one point to five points. The higher score means the healthier life styles. In the research by Wilson(Wilson, M.C, *et al*. 1984) when the instrument was developed, the reliability coefficient Cronbach's  $\alpha$  was 0.88. In this study, it was 0.76.

#### **Social support**

The social support was measured by using the MSPSS(Multidimensional Scale of Perceived Social Support) as a self-report evaluation instrument, developed by Zimet(Zemet, G.D, *et al*, 1988). The instrument was composed of total 12 items about support from family, support from friends, and special support from meaningful others. Based on the 5-point Likert Scale, it is composed of one point for 'Not at all' to five points for 'Very much likely'. The score range is 12~60points, and the higher score means the higher social support. When the instrument was developed, the reliability coefficient Cronbach's  $\alpha$  was 0.88. In this study, it was 0.92.

#### **Self-esteem**

The self-esteem was measured by using the instrument developed by Rosenberg(Rosenberg, M, 1965), and then adapted by Baek(Baek, H.S, *et al*, 2010). As the instrument for measuring the feeling about oneself, degree of evaluation, and self-acceptance, it is composed of total 10 items. Based on the 5-point Likert Scale from one point for 'Not at all' to five points for 'Very much likely', the possible score is 10~50 points. The higher score means the higher self-esteem. When

the instrument was developed, the reliability coefficient Cronbach's  $\alpha$  was .85. In this study, it was 0.88.

### **Health conservation**

The health conservation was measured by using the health conservation scale developed by Sung(Sung K.W., 2014). This instrument is composed of total 37 items with four subareas including 14 items for personal integration, eight items for energy conservation, eight items for structural integration, and seven items for social integration.

Based on the 4-point Likert Scale from one point for 'Not at all' to four points for 'Yes', the six reversed items were reversely converted, and the range of possible score was 37~148 points. The higher score means the higher degree of health conservation. When the instrument was developed, the reliability coefficient Cronbach's  $\alpha$  was .94. In this study, it was 0.91.

### **Data collection**

The data was collected by the researchers of this study. For the accuracy of data, they had a meeting before collecting data, shared the data collection method and research objective, and also discussed the expected questions and answers. The structured questionnaire was used for data collection. In case of difficult understanding, the researcher read the contents of questionnaire for subjects, and then recorded their responses on the questionnaire. The data was collected from January 20<sup>th</sup> to February 20<sup>th</sup> 2021. It took about 30-40 minutes to fill out the questionnaire. After distributing total 165 questionnaires, all of the 165 questionnaires were collected. However, total 154 questionnaires were used for final analysis after excluding 11 questionnaires hard to be analyzed.

### **Ethical consideration**

Before starting the research, this study obtained the approval for exemption from deliberation (KNU\_IRB-2020\_101) from the Institutional Review Board of K University. During the research period, the guidelines for ethical research were obeyed. First, after receiving permission from each participating institution, the objective, methods, and process of this study were explained to the research subjects who agreed to participate in this study. After explaining that they could stop participating in this study if they would not desire, they were asked to sign the written consent to participation.

They were explained that even though they agreed to participate in this study following their voluntary will, they could stop participating anytime they would want, and there would be no disadvantages. They were also explained that the collected data would not be used for other purposes than the research purpose, and then would be shredded and discarded after being stored in a locked place for three years.

### **Data analysis**

The collected data was analyzed by using the SPSS/WIN 22.0 Program. The general characteristics were calculated through real number and percentage. The degree of life styles, social support, self-esteem, and health conservation of subjects was calculated through mean and

standard deviation. The correlations of life styles, social support, self-esteem, and health conservation of subjects were calculated through Pearson's correlation coefficients. For the mediating effects of social support and self-esteem in the relation between life styles and health conservation of subjects, the multiple regression analysis was conducted. The significance test was analyzed by using the Sobel test.

## Results

### General characteristics of subjects

The mean age of 154 subjects was  $49.28 \pm 5.65$ , and 87.7% (N=135) of them had a spouse. The subjects with no religion were 58.4% (N=90), and as the academic background, the graduation from university or higher was the most (84.4%: N=130). The subjects without diseases for currently taking drugs were over the majority (61.0%: N=94), which was followed by the case of having one disease (31.2%: N=48), the case of having two diseases (6.5%: N=10), and the case of having three diseases (1.3%: N=2) in order [Table 1].

**Table 1.** General Characteristics in Subjects

(N=154)

Variables	Categories	N(%)	M±SD
Age(yr)	40~49	79(51.3)	49.28±5.65
	50~59	75(48.7)	
Spouse	Yes	135(87.7)	
	No	19(12.3)	
Religion	Yes	64(41.6)	
	No	90(58.4)	
Education	Graduation from elementary school	1(0.6)	
	Graduation from middle school	3(1.9)	
	Graduation from high school	20(13.0)	
	Graduation from university or higher	130(84.4)	
Number of drugs	0	94(61.0)	
	1	48(31.2)	
	2	10(6.5)	
	3	2(1.3)	

### Degree of life styles, social support, self-esteem, and health conservation in subjects

The degree of life styles of subjects was shown as  $3.47 \pm 0.30$  of 5.0, social support as  $3.96 \pm 0.57$  of 5.0, self-esteem as  $3.83 \pm 0.49$  of 5.0, and health conservation as  $3.24 \pm 0.24$  of 4.0. In other words, the life styles, social support, and self-esteem of subjects were the moderate degree while the health conservation was pretty good[Table 2].

**Table2.** Degree of Life styles, Social Ssupport, Self-esteem, and Health Conservation in Subjects(N=154)

Variable	M±SD	Range
Life styles	3.47±.30	1~5
Social support	3.96±.57	1~5
Self-esteem	3.83±.49	1~5
Health conservation	3.24±.24	1~4

### Correlations of life styles, social support, self-esteem, and health conservation in subjects

The health conservation of subjects had significantly positive correlations with life styles( $r=.46$ ,  $p<.001$ ), social support( $r=.55$ ,  $p<.001$ ), and self-esteem( $r=.54$ ,  $p<.001$ ). There were also positive correlations between self-esteem and life styles( $r=.46$ ,  $p<.001$ ), self-esteem and social support( $r=.59$ ,  $p<.001$ ), and social support and life styles( $r=.41$ ,  $p<.001$ ) of subjects.

In other words, when the life styles were better, when the social support was higher, and when the self-esteem was higher, the degree of health conservation of subjects was high. When the life styles were better and when the degree of social support was higher, the self-esteem was high. When the social support was higher, the life styles were better[Table 3].

**Table3.** Correlations of Life styles, Social Support, Self-esteem, and Health Conservation in Subjects

Variables	Life styles r(p)	Social support r(p)	Self-esteem r(p)	Health conservation r(p)
Life styles	1			
Social support	.41(<.001)	1		
Self-esteem	.46(<.001)	.59(<.001)	1	
Health conservation	.46(<.001)	.55(<.001)	.54(<.001)	1

### Mediating effects of social support and self-esteem in the relation between life styles and health conservation in subjects

In the results of reviewing the auto-correlation of dependent variable and the multicollinearity between independent variables before verifying the mediating effects of social support and self-esteem in the relation between life styles and health conservation of subjects, the Durbin-Watson index of auto-correlation was 2.005 close to 2, which was shown as independent. Regarding the

multicollinearity between independent variables, the VIF(Variance Inflation Factor) index was 1.320~1.698 less than 10, so there was no multicollinearity.

For verifying the mediating effects of social support and self-esteem in the relation between life styles and health conservation of middle-aged working men, the Baron& Kenny (Baron R. M., *et al.*, 1986) 3-Step Procedure was performed. First, in the results of verifying the mediating effects of social support, in Step1, the life styles as an independent variable had significant effects in social support as a mediating variable( $\beta=.41$ ,  $p<.001$ ), and the explanatory power on social support was 16.7%. In Step2, the life styles had significant effects in health conservation( $\beta=.46$ ,  $p<.001$ ), and the explanatory power on health conservation was 21.6%. In Step3, in the results of verifying the effects of social support in health conservation by taking the social support as a predictor factor, and the health conservation as a dependent variable, the life styles( $\beta=.29$ ,  $p<.001$ ) and social support( $\beta=.43$ ,  $p<.001$ ) were the significant predictor factors of health conservation.

In the results of comparing the  $\beta$  value, the social support showed the mediating effects as much as 0.18. The  $\beta$  value(.29) of Step3 was lower than the  $\beta$  value(.46) of Step2. The effects of life styles were decreased by social support as a mediating variable, which verified the partial mediating effects of social support. In the results of significance test of mediating effects, it was statistically significant( $Z=4.56$ ,  $p<.001$ )[Table 4].

**Table 4.** Mediating effects of Social Support in the relation between Life Styles and Health Conservation in Subjects

Variables	B	$\beta$	t	p	R <sup>2</sup>	Adj. R <sup>2</sup>	F	p
step1: Life styles→Social support	.77	.41	5.51	<.001	.167	.161	30.38	<.001
step2: Life styles→Health conservation	.38	.46	6.47	<.001	.216	.211	41.81	<.001
step3: Life styles, social support→Health conservation					.369	.360	44.07	<.001
1) Life styles→Health conservation	.24	.29	4.09	<.001				
2) Social support→Health conservation	.19	.43	6.05	<.001				
Sobel test: $Z=4.56$ , $p<.001$								

Also, in the results of analyzing the mediating effects of self-esteem of subjects, in the results of regression analysis of Step1, the life styles as an independent variable had significant effects in self-esteem as a mediating variable( $\beta=.46$ ,  $p<.001$ ), and the explanatory power on self-esteem was 21.5%. In Step2, the life styles had significant effects in health conservation( $\beta=.46$ ,  $p<.001$ ), and the explanatory power on health conservation was 21.6%. In Step3, in the results of verifying the effects of self-esteem in health conservation by taking the life styles and self-esteem as predictor factors, and health conservation as a dependent variable, the life

styles( $\beta=.28, p<.001$ ) and self-esteem( $\beta=.41, p<.001$ ) were the significant predictor factors of health conservation.

In the results of comparing the  $\beta$  value, the self-esteem showed the mediating effects as much as 0.19. The  $\beta$  value(.28) of Step3 was lower than the  $\beta$  value(.46) of Step2. The effects of life styles were decreased by self-esteem as a mediating variable, which verified the partial mediating effects of self-esteem. In the results of significance test of mediating effects, it was statistically significant( $Z=5.01, p<.001$ )[Table 5].

**Table 5.** Mediating effects of Self-esteem in the relation between Life styles and Health conservation in Subjects

Variables	B	$\beta$	t	p	R <sup>2</sup>	Adj R <sup>2</sup>	F	p
step1: Life styles→Self-esteem	.75	.46	6.45	<.001	.215	.210	41.70	<.001
step2: Life-styles→Health conservation	.38	.46	6.46	<.001	.216	.211	41.81	<.001
step3: Life styles, self-esteem→Health conservation					.347	.338	40.11	<.001
1) Life styles→Health conservation	.22	.28	3.70	<.001				
2) Self-esteem→Health conservation	.21	.41	5.50	<.001				
Sobel test: $Z=5.01, p<.001$								

## Discussion

This study aimed to understand the degree of life styles, social support, self-esteem, and health conservation, and the relation between life styles and health conservation of middle-aged working men, and then to verify the mediating effects of social support and self-esteem in the relation. This study aims to discuss based on such results above.

The score of life styles of middle-aged working men was shown as 3.47 of 5.0, the social support as 3.96 of 5.0, the self-esteem as 3.83 of 5.0, and the health conservation as 3.24 of 4.0. The score of life styles of subjects was 3.47 in this study. In the research by Lee(Lee, H.K., *et al*, 2016) targeting the middle-aged women, the score was 3.30~3.45 in each age group. In the research by Lee(Lee, H.K., *et al*, 2018) targeting the elderly, it was low as 3.27. Thus, the life styles of Korean middle-aged working men were more positive than the middle-aged women and the elderly. The score of social support was 3.96 in this study. In the research by Kang(Kang Y.H., 2015) targeting the ordinary middle-aged men, it was 3.58. And in the research by Chang(Chang H.K., 2018) targeting the ordinary middle-aged men and women, it was 3.75. Thus, the social support of middle-aged working men was higher than the middle-aged women and the elderly. The degree of self-esteem was 3.83(1~5) in this study. In the research by Sung(Sung, K.W., *et al*, 2016) targeting the elderly in their 60 or up, it was 31(10~40). In the research by



Kim(Kim J.S., 2020) targeting the middle-aged women, it was 3.0 of 4.0. Thus, the results of those researches were similar to the result of this study.

The score of health conservation was 3.24 of 4.0 in this study. In the research by Lee(Lee, H.K., *et al*, 2016) targeting the middle-aged women, it was 2.6 of 4.0. In the research by Sung(Sung, K.W., *et al*, 2017) targeting the elderly with diabetes, it was 2.61~2.94 of 4.0. Thus, the result of this study was higher than the results of those researches. Just as the results above, the degree of life styles, social support, self-esteem, and health conservation of Korean middle-aged working men is higher than the ordinary middle-aged women/men and the elderly because they probably form positive self-esteem and life styles regarding themselves as important through positive environment based on interactions with colleagues at work.

Examining the correlations of life styles, social support, self-esteem, and health conservation of subjects, when the life styles were better, when the social support was higher, and when the self-esteem was higher, the degree of health conservation was high. First, in the results of analyzing the mediating effects of social support, the life styles had significant effects in social support as a mediating variable( $\beta=.41$ ,  $p<.001$ ). Thus, the results of this study show the mediating effects of social support in the relation between life styles and health conservation. The life styles had significant effects in social support as a mediating variable( $\beta=.40$ ,  $p<.001$ ), and the explanatory power on social support was 16.7%. The life styles had significant effects in health conservation as a dependent variable( $\beta=.46$ ,  $p<.001$ ), and the explanatory power on health conservation was 21.6%. In the results of verifying the effects of social support as a mediating variable in health conservation as a dependent variable by taking the life styles and social support as predictor factors, and the health conservation as a dependent variable, the life styles( $\beta=.29$ ,  $p<.001$ ) and social support( $\beta=.42$ ,  $p<.001$ ) were the significant predictor factors of health conservation.

Such results of this study accorded with the results of a research by Lee(Lee, H.K., *et al*, 2015) targeting the middle-aged adults, reporting that when the life styles and social network were higher, the degree of health conservation was high. Also, in the research by Lee(Lee, H.K., *et al*, 2018) targeting the community elderly, the life styles and social network were shown as significant predictor factors of health conservation. The social network was working as a mediating variable, and had positive effects in the relation between life styles and health conservation of the elderly. Also, in the research by Kang(Kang Y.H., 2015) targeting the middle-aged men, the social support was a factor having effects in life satisfaction, which was verified as an important predictor factor that could raise the life satisfaction of middle-aged working men. Also, in the research by Lim (Lim E.J., 2012) analyzing the factors related to health promotion behaviors of late middle-aged adults, the social support was understood as a factor having effects in health promotion behaviors( $\beta=.46$ ,  $p<.001$ ). To be prepared for the loss of roles in the upcoming old age, it would be necessary to provide various supports that could guarantee the active participation in leisure activity for the enhancement of social support, expansion of community-centered infrastructure, and social participation.

Examining the mediating effects of self-esteem in the relation between life styles and health conservation, the life styles had significant effects in self-esteem( $\beta=.46$ ,  $p<.001$ ). Thus, the results of this study present the mediating effects of social support in the relation between life styles and health conservation. The life styles had significant effects in self-esteem as a mediating variable ( $\beta=.46$ ,  $p<.001$ ), and the life styles had significant effects in health conservation as a dependent variable( $\beta=.46$ ). In the results of verifying the effects of self-esteem as a mediating variable in health conservation by taking the life styles and self-esteem as predictor factors, and the health conservation as a dependent variable, the life styles( $\beta=.27$ ) and self-esteem( $\beta=.40$ ,

$p < .001$ ) were the significant predictor factors of health conservation. In the research by Sung (Sung, K.W., *et al*, 2017) targeting the elderly with diabetes, when the self-esteem was higher, the degree of health conservation was high. And when the self-esteem of middle-aged women was higher, the quality of life was high (Kang, H.S., *et al*, 2017). Also, the self-esteem ( $\beta = -.42$ ) was shown as a factor having effects in depression of middle-aged men (Jo, N.H, *et al*, 2016). To prevent the depression of the elderly, it would be also important to establish the measures for increasing the self-esteem in the middle-age.

Thus, if the life styles of middle-aged working men could be healthily maintained, and their perception of social support and self-esteem could be highly maintained, their health conservation could be increased. Therefore, the middle-aged working men need to seek for the multilateral approaches in the level of individual and community to improve the social support and self-esteem by maintaining their healthy life styles in daily life.

### Conclusion

This study aimed to verify the mediating effects of social support and self-esteem in the relation between life styles and health conservation of middle-aged working men.

The life styles, social support, and self-esteem showed positive correlations with health conservation of middle-aged working men, and the social support and self-esteem showed partial mediating effects in the relation between life styles and health conservation. It would be needed to provide supports for health conservation of middle-aged men by establishing diverse projects that could induce desirable life styles such as health education, physical activity promotion projects, and health risk behaviors preventive projects focusing on the primary healthcare institutions like public health centers located in communities and companies where the middle-aged men are working for, based on such results of this study.

Also, the people in charge and managers of companies should encourage their workers to have healthy life styles by providing programs considering the variables like social support and self-esteem with mediating effects. Moreover, the middle-aged men should be equipped with an attitude to make efforts and to participate in programs that could improve their own self-esteem and perception of social support.

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