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Factors Affecting Subjective Health Status in Adult Male Workers with Metabolic Syndrome Using Seventh Korean National Health and Nutrition Examination Survey (KNHANES, 2016-2018)

Lee Kyongeun

Assistant Professor, Department of Nursing, Tongmyong University, Republic of Korea

Abstract

Background/Objectives: Metabolic syndrome has been increasing for the last 10 years in South Korea, and the rate of increase in the prevalence rate of male workers is especially fast. Metabolic syndrome is a disease for which continuous care is important. Motivation for health behavior that induces health promoting behavior is affected by subjective health status. Accordingly, subjective health status of adult male workers with metabolic syndrome in South Korea and factors influencing subjective health status will be examined in this study.

Method/Statistical Analysis: This study performed secondary data analysis using the Seventh Korean National Health and Nutrition Examination Survey. The number of participants of the Seventh Korean National Health and Nutrition Examination Survey was 29,321. There were 469 adult male workers with metabolic syndrome. Subjective health status was measured using a 5-point scale for subjective judgment of one's health status. In this study,subjective health status of the subjects according to general characteristics, health-related characteristics and health-related behavioral characteristics were verified by t-test and ANOVA. Multiple regression was used to analysethe factors causing significant differences in subjective health status.

Findings: The results showed body discomfort, perceived stress, comorbidity, muscle strengthening and walking exercise, restriction of activity were significantly associated with subjective health status.

Improvements/Applications: The results of this study show that the developed interventions are needed to improve health ofadult male workers with metabolic syndrome in Korea.

Keywords: *Metabolic syndrome, adulthood, subjective health status, national survey, secondary analysis*

Introduction

Metabolic syndrome is defined as a comprehensive disease that is clinically classified as to have three or more symptoms among abdominal obesity, blood pressure, diabetes, HDL cholesterol and neutral fat[1].In South Korea, the prevalence rate of metabolic syndrome is very high that 32.1% of adults in their 30s and older have metabolic syndrome. In adults aged up to 50s, metabolic syndrome is 2~3 times more often in men than women[2].The risk and incidence rate of metabolic syndrome in Korean male workers are high because stress from work intensity, overtime work and get-togethers and lack of exercise lead to an increase of neutral fat and fasting blood sugar, decrease of HDL cholesterol, and increase of blood pressure and waist size. This is shown in the results of a previous study, which reports that sex,

Corresponding Author:
Lee Kyongeun
Assistant Professor, Department of Nursing,
Tongmyong University, Republic of Korea
e-mail: leekyongeun@gmail.com

age and occupational class are associated with metabolic syndrome[3].

These previous study proposed to intervene the factors influencing metabolic syndrome[4]. In other words, since the prevalence rate of metabolic syndrome is high in adult men in South Korea,it is regarded as important to verify the factors related to metabolic syndrome and providing interventions to lower the risk of metabolic syndrome. Various previous studies made the effects to verify and intervene the factors related to metabolic syndrome[5-6].

In terms of nursing,it is important not only to examine the risk factors of metabolic syndrome but also to examine perceived subjective health status related to metabolic syndrome. By paying attention to subjective health status that affects health behavior of metabolic syndrome patients and verifying the factors influencing subjective health status,method of improving subjective health status can be prepared. Subjective health status is self-perceived health status, and accurate perception of health status is known to have significant impact on health promoting activities[7-8]. Improved perception of subjective health status can lead to an increase of health promoting activities, which would then create a virtuous circle of managing metabolic syndrome as patients can positively perceive their own health status.

Previous studies on metabolic syndrome patients of diverse ages propose various method of improving health promoting activities to take care of metabolic syndrome. Body weight, drinking, smoking, sleep, rest, stress, health examination and exercise were presented as the factors influencing metabolic syndrome, and efforts were made to intervene these factors[9]. Such efforts can directly affect health-related behavior of metabolic syndrome,but they cannot examine changes in subjective health status perceived by the patient group. Since subjective health status determines subjective status of one's health, positive perception can be turned into a more comfortable and long-term habit of metabolic syndrome management. However, domestic studies on subjective health status of metabolic syndrome patients only compared subjective health status between normal group and metabolic syndrome group. None of them investigated the factors influencing health promoting activities.

This study was carried out only on adult male workers aged 20 years or above who are exposed to a high risk of metabolic syndrome to analyze subjective health status and propose a health-related intervention that can improve subjective health status.

Method

1. **Study Design:** This study involves secondary data analysis. Data used in this study were constructed based on the Seventh Korean National Health and Nutrition Examination Survey, and weighted values were considered to increase representativeness and accuracy of data. Accordingly,this study was designed to calculate the analytical results by considering complex sampling factors according to the data structure and analysis method presented in the Korean National Health and Nutrition Examination Survey Analysis Guideline.

2. **Sample:** The Seventh Korean National Health and Nutrition Examination Survey was not a complete enumeration survey but a sample survey conducted on 29,321 respondents. Based on the criteria for Adults Treatment Panel of the National Cholesterol Education Program, along with the criteria for men suggested by Korean Society for the Study of Obesity in the case of waist size, 469 final subjects of this study were selected by classifying adult workers who satisfy three or more of the following criteria[10] [Table 1].

Table 1. Clinical identification of the metabolic syndrome in men – Any 3 of the following

Risk Factor	Defining Level
Abdominal obesity	Waist circumference >90cm
Triglycerides	≥150mg/dL
HDL cholesterol	<40mg/dL
Blood pressure	sbp≥130mmHg/dbp≥85mmHg
Fasting glucose	≥110mg/dL

3. **Ethical Considerations:** This study obtained prior approval of the Institutional Review Board at T University (201905-HR-004). Data used in this study were provided by Korea Centers for Disease Control and Prevention after removing personal identification information in accordance with the Personal Information Protection Act.

4. **Measures:**

    1. **General characteristics and health-related characteristics:** Items of the Korean National Health and Nutrition Examination Survey such

as education, occupation status, living state, home ownership, income, unmet healthcare needs, weight change, perceived body shape, body discomfort, restriction of activity, comorbidity, perceived stress and depressive mood were analyzed as general characteristics and health-related characteristics. Health-related characteristics included unmet healthcare needs, weight change, perceived body shape, body discomfort, restriction of activity, comorbidity, perceived stress and depressive mood as items that can influence metabolic syndrome.

2. **Health-related behavioral characteristics:** Current smoking status, current alcohol drinking status, frequency of binge drinking, participatory rate of aerobic exercise, muscle strengthening exercise, walking exercise were analyzed as health-related behavioral characteristics. Drinking, smoking and exercise are known as primary risk factors of metabolic syndrome, and they were included as health-related behavioral characteristics.

5. **Data Analysis:** The study results were derived using SPSS 23.0 and STATA 13.0 programs. Subjective health status of adult male workers with metabolic syndrome according to general characteristics, health-related characteristics and health-related behavioral characteristics were analyzed using t-test, ANOVA and multiple regression.

Result

In the Korean National Health and Nutrition Examination Survey, subjective health status was measured on a 5-point Likert scale ranging from '1 point: Extremely poor' to '5 points: Extremely good.'Responses with a score closer to 5 points were continuous variables meaning 'poor' subjective health status.

The differences in subjective health status of adult male workers with metabolic syndrome in South Korea according to general characteristics and health-related characteristics are as presented in [Table 2]. There were statistically significant differences in subjective health status according to income, unmet healthcare needs, weight change,body discomfort, restriction of activity, comorbidity, perceived stress and depressive mood.

Table 2. Subjective health status according to general and health-related characteristics

Characteristics	Categories	M±SE	t or F	P post-hoc
Age		48.06±10.57		
Education (complete school)	≤Elementary Middle High ≥College	3.22±0.85 2.95±0.74 2.85±0.68 2.88±0.65	2.525	.057
Occupation	Office worker Service worker Manufacturing worker	2.86±0.65 2.96±0.72 2.91±0.72	0.699	.498
Living state	Not alone Alone	2.87±0.67 3.15±0.88	1.401	.176
Home ownership	No One More than two	2.93±0.68 2.87±0.67 2.91±0.74	0.322	.725
Income	Lower Lower-middle Lower-upper upper	3.07±0.67 2.83±0.71 2.80±0.68 2.88±0.66	3.650	.013
Unmet healthcare needs	Yes No No needs	3.30±0.66 2.86±0.68 2.91±0.60	7.275	.001 a>b

Characteristics	Categories	M±SE	t or F	P post-hoc
Weight change	Weight loss No change Weight gain	3.08±0.76 2.83±0.66 2.98±0.70	3.748	.024
Perceived body shape	Underweight Normal weight Overweight	3.20±0.56 2.83±0.75 2.90±0.66	1.982	.139
Body discomfort (during the past 2 weeks)	Yes No	3.19±0.83 2.85±0.66	2.841	.006
Restriction of activity	Yes No	3.54±0.78 2.87±0.67	3.489	.001
Comorbidity (hypertension, diabetes mellitus, dyslipidemia)	Yes No	2.99±0.75 2.83±0.63	-2.566	.011
Perceived stress	Very High High Moderate Low	3.00±0.80 3.01±0.61 2.88±0.67 2.63±0.82	3.866	.009 b>d
Depressive mood (more than 2 weeks)	Yes No	3.18±0.77 2.87±0.68	2.542	.011

Note. n(%), M±SE were except missing values.

Likewise, the differences in subjective health status of adult male workers with metabolic syndrome in South Korea according to health-related behavioral characteristics are as presented in [Table 3]. There were statistically significant differences in subjective health status according to current smoking status, walking exercise and muscle strengthening exercise.

Table 3. Subjective health status according to health-related behavioural characteristics

Characteristics	Categories	M±SE	t or F	P post-hoc
Current smoking status	Every day Sometimes Not now Never	3.01±0.66 2.82±0.80 2.83±0.71 2.79±0.64	3.077	.027
Current alcohol drinking status	Yes No	2.88±0.68 2.95±0.76	0.626	.531
Frequency of binge drinking	None 1/month 1/week Almost daily	2.89±0.75 2.89±0.71 2.87±0.56 2.95±0.77	0.210	.890
Participatory rate of aerobic exercise	Yes No	2.82±0.69 2.94±0.66	1.947	.052
Muscle Strengthening Exercise (within 1 week)	No 1-3/week ≥4/week	2.97±0.65 2.67±0.76 2.66±0.68	9.477	<.001
Walking Exercise (within 1 week)	No 1-3/week ≥4/week 7/week	2.96±0.69 3.02±0.64 2.81±0.76 2.75±0.64	4.464	.004 b>d

Note. n(%), M±SE were except missing values.

The factors influencing subjective health status of adult male workers with metabolic syndrome in South Korea are as shown in [Table 4]. The regression model for subjective health status of the subjects was significant (F = 6.960, p<.001), and explanatory power of the overall model was 12.3% (adjusted R2 = .123). The factors influencing subjective health status were found to be recent body discomfort, perceived stress, comorbidity, restriction of activity, walking exercise and muscle strengthening exercise.

Table 4. Factors affecting perceived subjective health status in metabolic syndrome group

Characteristics	Unstandard coefficient B	SE	Standard coefficient β	t	p
(Constant)	5.743	.479		11.990	<.001
Income	-0.051	.027	-0.082	-1.880	.061
Unmet healthcare needs	-0.142	.085	-0.074	-1.679	.094
Weight change	0.042	.054	0.035	0.781	.435
Body discomfort (during the past 2 weeks)	-0.253	.097	-0.117	-2.596	.010
Restriction of activity	-0.477	.188	-0.115	-2.532	.012
Comorbidity (hypertension, diabetes mellitus, dyslipidemia)	0.155	.062	0.111	2.489	.013
Perceived stress	-0.115	.045	-0.115	-2.577	.010
Depressive mood (more than 2 weeks)	-0.209	.118	-0.078	-1.769	.078
Current smoking	-0.017	.012	-0.065	-1.482	.139
Muscle Strengthening Exercise (within 1 week)	-0.167	.048	-0.156	-3.501	.001
Walking Exercise (within 1 week)	-0.069	.028	-0.109	-2.439	.015
	R2 = .144 Adj R2 = .123 F = 6.960 p<.001				

Note. n(%), M±SE were except missing values.

Discussion

This study is secondary data analysis using data from the Seventh Korean National Health and Nutrition Examination Survey, carried out to examine the factors influencing subjective health status of adult male workers aged 20 years or above among metabolic syndrome patients through multiple regression analysis.

In this study, perceived subjective health status was examined as an indicator that reflects actual health status by checking subjective health status of adult male workers with metabolic syndrome in South Korea. Since subjective health status is a universal tool to self-evaluate one's health status, it is included in the Korean National Health and Nutrition Examination Survey. Therefore, examining the factors influencing subjective health status measured using this tool can be presented as the grounds for policy suggestions to improve health status of the subjects.

Mean age of the adult male workers with metabolic syndrome was 48.06 years. As they need to work for more than 10 years based on the retirement age of 60 years in South Korea, male workers with metabolic syndrome can be regarded as the primary targets of health care. The results related to medical services that were not suggested in previous studies on metabolic syndrome were found in this study. It was found that the subjects who cannot receive medical services when they want have poor subjective health status. In addition, low income of workers was associated with poor subjective health status, which agrees with previous study[11]. Also, reduction of body weight was found to have an adverse effect on subjective health status in this study. Weight loss had an adverse effect in this study because the subjects of this study are men. As for health-related characteristics, body discomfort during the past 2 weeks and restriction of activity were related to poor subjective health status. Perception of subjective health status was found to have direct impact on the judgment of one's actual health status[8].

The subjects of this study who have one or more comorbidities such as hypertension, diabetes mellitus and dyslipidemia showed poor subjective health status. This is probably because patients who have to manage

more than one disease have low subjective perception of health status. The subjects with high perceived stress showed poor subjective health status compared to low perceived stress. Poor subjective health status was also shown with depressive mood that continued for more than 2 weeks. Since subjective health status is health status perceived by oneself, both physical and mental health status seem to affect the results. In terms of health care,it would be necessary to pay attention to the intervention of negative mental health status of adult male workers with metabolic syndrome[12].

For health-related behavioral characteristics, subjective health status of adult male workers with metabolic syndrome was not affected by drinking. The subjects who smoke on a daily basis showed poor subjective health status compared to other subjects. Continuous smoking can be habitual or caused by mental stress. Therefore, patients with metabolic syndrome are recommended to manage health by planning interventions based on the reason for smoking. For exercise, subjective health status was improved with increasing consistency of muscle exercise and walking exercise. This was similar to the results of a previous study reporting that physical activities can become interventions to reduce the risk of metabolic syndrome[4]. It is suggested to create exercise interventions for Korean male workers with metabolic syndrome.

Looking at previous overseas studies on subjective health status, comparison was difficult due to the lack of research papers about metabolic syndrome patients. The results of this study derived from the analysis of national data were helpful in examining subjective health status of Korean adult male workers with metabolic syndrome, verifying their general characteristics, health-related characteristics and health-related behavioral characteristics, and proposing directions for health care.

Conclusion

In this study, physical factors such as exercise performed to improve health, body discomfort and restriction of activity were found to be the factors influencing subjective health status. Accordingly, various interventions need to be developed and applied to enhance health and improve subjective health status of adult male workers with metabolic syndrome in South Korea. Although health care interventions should be provided on the national level for adult male workers with metabolic syndrome, there are realistic limitations. A possible method is to make each company manage metabolic syndrome of workers through policy suggestion, but it needs to be preceded by an additional study that verifies the grounds for intervention of metabolic syndrome.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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