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Factors Influencing Self-rated Health Status in Middle-aged Women with Osteoporosis: Based on the 7th Korea National Health and Nutrition Examination Survey

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Abstract

Background/Objectives: The purpose of this study was to examine factors influencing self-rated health status in middle-aged women with osteoporosis in Korea.

Method/Statistical Analysis: This study carried out secondary analysis using the available data of the 7th Korea National Health and Nutrition Examination Survey (2016-2018). Total subjects are 462 middle-aged women with osteoporosis. The data were analyzed by using descriptive statistics, multiple regression.

Findings: Health-related quality of life ($p = .045$), comorbidity (hypertension, diabetes mellitus, dyslipidemia) ($p = .001$), body discomfort ($p = .038$), current alcohol drinking status ($p<.001$), perceived stress ($p<.001$), occupation ($p<.001$) were significantly associated with self-rated health status in middle-aged women with osteoporosis. The regression model for self-rated health status of the subjects was significant($F = 15.622$, $p<.001$), and explanatory power of the overall model was 34.7%. (Adjusted R2 = .347). Based on the results of this study, factors influencing self-rated health status of middle-aged women with osteoporosis in Korea included occupation ($p = .011$), current alcohol drinking status ($p = .024$), body discomfort during the past 2 weeks ($p = .001$), comorbidity (hypertension, diabetes mellitus, dyslipidemia) ($p = .030$), perceived stress ($p = .004$), and health-related quality of life ($p<.001$).

Improvements/Applications: The results of this study will be helpful in developing interventions to improve health management and can ultimately improve self-rated health status.

Keywords: *Osteoporosis, middle-aged women, self-rated health status, national survey, secondary analysis.*

Introduction

Osteoporosis is a disease characterized by high risk of bone fracture caused by the weakening of bones from reduced mass[1-2]. In general, osteoporosis is known to be more prevalent in women than men and with increasing age[1-2]. A study reports that over one-third of the entire middle-aged female population of Korea experiences bone fracture caused by poor bone health[3]. As such, health risk of osteoporosis occurs more frequently in women. There are various causes of high prevalence rate of osteoporosis in women including the reduction of hormones after the menopause and poor exercise habit and nutrition intake compared to men[4]. The reason why osteoporosis draws attention is because it not only arouses serious secondary risks such as fracture but also has negative influence on health status by limiting activities of daily living with pain and disability[5]. Therefore, osteoporosis of women is n important disease that needs to be managed carefully.

Self-rated health status refers to subjective awareness of one's own health status[6]. Self-rated health status is a comprehensive and inclusive measure of evaluating one's own health, and the method is

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very easy[7]. Accordingly, Korea National Health and Nutrition Examination Survey include self-rated health status, which identifies health status affected by various domains of everyday life such as diseases and medical service status, as a survey item. The dominant view is that subjective health status is a valid tool to determine actual health status[8]. Accurate subjective awareness of health status can lead to health care behavior. Therefore, it is important to pay attention to self-rated health status in order to enhance health[9]. Examining the factors that affect subjective health status can be an important process to prepare for an effective health care strategy.

A study that examined self-rated health status of osteoporosis patients showed that patients who are aware of having osteoporosis have worse self-rated health status, but this study did not analyze the factors influencing subjective health status[10]. In a previous study on the factors influencing health promoting behavior related to osteoporosis, subjective health status was found to affect health promoting behavior to prevent osteoporosis. Patients with better self-rated health status showed better health promoting behavior[11].

Studies on self-rated health status were carried out on a variety of disease groups, and the results showed that self-rated health status is associated with quality of life, physical and mental health, and practice of health behavior[12-14]. Verifying the factors influencing self-rated health status would be meaningful in verifying the factors that need educational interventions to promote health of patients. As it is difficult to find studies on the factors influencing self-rated health status of middle-aged women with osteoporosis, this study aims to provide the basic data for understanding the factors influencing self-rated health status of female osteoporosis patients aged 40 years or above and seeking the method of improving their health. This study intends to examine the characteristic factors that influence self-rated health status in all middle-aged women with osteoporosis of Korea using the Korea National Health and Nutrition Examination Survey.

Method

1. **Study Design:** A secondary analysis was conducted using the available data of the 7th Korea National Health and Nutrition Examination Survey (2016-2018). The Korea National Health and Nutrition Examination Survey applies the multistage stratified clustered sampling method, which is a complex sampling design that represents the entire population.

2. **Sample:** From 8,127 respondents of the 7th Korea National Health and Nutrition Examination Survey, 508 persons who clearly responded to the question asking about osteoporosis as ‘Yes’ or ‘No’ were extracted. Among them, 462 women aged 40 years or above were selected as the final subjects of this study, and their responses were used for the analysis.

3. **Measures:** In this study, age, education, occupation, duration of osteoporosis, satisfaction of dietary patterns, weight change, body discomfort during the past 2 weeks, restriction of activity, comorbidity (hypertension, diabetes mellitus, dyslipidemia), perceived stress, depressive mood more than 2 weeks, and health-related quality of life were analyzed as general characteristics and health related characteristics. And current smoking status, current alcohol drinking status, participatory rate of aerobic exercise within 1 week, muscle strengthening exercise within 1 week, walking exercise within 1 week were analyzed as health related behavioral characteristics.

4. **Data Analysis:** The data for this study were analyzed using the SPSS 23.0 and STATA 13.0 programs as follows. Based on secondary data analysis, general characteristics, health-related characteristics and health-related behavioral characteristics were analyzed using frequency, percentage, mean and standard error. Self-rated health status of osteoporosis patients according to general characteristics, health-related characteristics and health-related behavioral characteristics was analyzed using t-test, ANOVA and multiple regression. The significance level (α) was defined as 0.05 or below for all analyses. In this study, the score is based on a 5-point scale ranging from 1 to 5 points. A score closer to 5 points indicates poor self-rated health status.

Result

As for self-rated health status according to sub-items of general characteristics and health-related characteristics, there were statistically significant differences in self-rated health status with occupation ($p<.001$), duration of osteoporosis ($p<.001$), satisfaction of dietary patterns ($p = .004$), body discomfort during the past 2 weeks ($p<.001$), restriction of activity ($p<.001$), comorbidity such as hypertension, diabetes mellitus and dyslipidemia ($p<.001$), perceived stress ($p<.001$), and depressive mood perceived for more than 2 weeks ($p<.001$) [Table 1].

Table 1. Self-rated health status according to general characteristics and health-related characteristics (N = 462)

Characterist-ics	Categories	n(%) or M±SE	M±SE	t or F	p (post-hoc)
Age	40~59 60~79 ≥80	77(16.7) 327(70.8) 58(12.6)	3.20±0.89 3.43±0.85 3.65±0.87	0.381	.683
Education (complete school)	≤Elementary Middle High ≥University	280(60.6) 70(15.2) 72(15.6) 39(8.4)	3.55±0.87 3.23±0.85 3.27±0.83 3.09±0.78	1.358	.255
Occupation	Yes No	150(32.5) 311(67.5)	3.18±0.82 3.53±0.87	-3.925	<.001
Duration of osteoporosis	<10 years ≥10 years	6.87±6.95	3.31±0.84 3.72±0.86	-4.146	<.001
Satisfaction of dietary patterns	Good Moderate Bad	49(10.6) 227(49.1) 186(40.3)	3.26±0.85 3.50±0.82 3.85±0.86	5.719	.004 (a<c)
Weight change	Weight loss No change Weight gain	60(13.0) 330(71.4) 72(15.6)	3.52±0.90 3.38±0.87 3.46±0.80	2.272	.080
Body discomfort (during the past 2 weeks)	Yes No	215(46.5) 247(53.5)	3.76±0.85 3.12±0.77	7.742	<.001
Restriction of activity	Yes No	111(24.0) 351(76.0)	3.83±0.86 3.28±0.83	5.633	<.001
Comorbidity (hypertension, diabetes mellitus, dyslipidemia)	Yes No	615(65.4) 160(34.6)	3.54±0.83 3.21±0.89	3.721	<.001
Perceived stress	Very High High Moderate Low	28(6.1) 96(20.8) 238(78.4) 100(21.6)	4.08±0.91 3.64±0.93 3.33±0.81 3.19±0.78	9.276	<.001 (a>c,d, b>c,d)
Depressive mood (more than 2 weeks)	Yes No	95(20.6) 366(79.2)	3.76±0.93 3.32±0.82	4.238	<.001
Health-related quality of life		0.91±0.15 (possible range -0.17~1.00)			

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

As for self-rated health status according to subitems of health-related behavioral characteristics, there were statistically significant differences in self-rated health status with current alcohol drinking status (p = .002), participatory rate of aerobic exercise within 1 week (p = .002), and walking exercise within 1 week (p = .012) [Table 2].

Table 2. Self-rated health status according to health-related behavioral characteristics (N = 462)

Characteristi -cs	Categories	n(%) or M±SE	M±SE	t or F	p (post-hoc)
Current smoking status	Every day Sometimes Not now Never	6(1.3) 3(0.6) 15(3.2) 438(94.8)	4.25±0.50 3.33±0.58 3.93±0.92 3.39±0.86	2.865	.037
Current alcohol drinking status	Yes No	189(40.9) 273(59.1)	3.25±0.82 3.52±0.88	3.146	.002
Participatory rate of aerobic exercise (within 1 week)	Yes No	130(28.4) 327(71.6)	3.20±0.83 3.50±0.87	-3.173	.002

Characteristi -cs	Categories	n(%) or M±SE	M±SE	t or F	p (post-hoc)
Muscle Strengthening Exercise (within 1 week)	No	412(89.6)	3.45±0.86	1.307	.272
	1-3/week	26(5.7)	3.09±0.97		
	≥4/week	22(4.8)	3.15±0.88		
Walking Exercise (within 1 week)	No	132(28.7)	3.67±0.88	4.455	.012 (a>b,c)
	1-3/week	129(28.0)	3.37±0.80		
	≥4/week	199(43.3)	3.26±0.86		

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

The regression model for self-rated health status of the subjects was significant (F = 15.622, $p<.001$), and explanatory power of the overall model was 34.7% (adjusted R^2 = .347). The factors influencing self-rated health status of middle-aged women with osteoporosis aged 40 years or above in Korea verified in this study were occupation (β = 0.113, p = .011), current alcohol drinking status (β = 2.259, p = .024), body discomfort during the past 2 weeks (β = -3.364, p = .001), comorbidity (β = -2.174, p = .030), perceived stress (β = -2.895, p = .004), and health-related quality of life (β = 6.012, $p<.001$) [Table 3].

Table 3. Factors influencing perceived self-rated health status (N = 462)

Characteristi-cs	Unstandardized coefficient		Standardized coefficient	t	p
	B	SE	β		
(Constant)	5.645	.447		12.638	<.001
Duration of osteoporosis	0.131	.087	0.068	1.503	.134
Occupation	0.202	.079	0.113	2.552	.011
Satisfaction of dietary patterns	0.109	.059	0.083	1.842	.066
Current smoking status	-0.012	.031	-0.018	-0.399	.690
Current alcohol drinking status	0.175	.077	0.101	2.259	.024
Body discomfort	-0.268	.080	-0.158	-3.364	.001
Restriction of activity	-0.139	.092	-0.071	-1.515	.131
Comorbidity	-0.169	.087	-0.096	-2.174	.030
Participatory rate of aerobic exercise	-0.129	.090	-0.069	-1.432	.153
Walking Exercise	-0.028	.050	-0.027	-0.546	.586
Perceived stress	-0.154	.053	-0.147	-2.895	.004
Depressive mood	-0.013	.104	-0.006	-0.120	.905
Health-related quality of life	2.664	.250	.221	6.012	<.001
	R^2 = .371Adj R^2 = .347 F = 15.622p<.001				

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

Discussion

This study used raw data from the 7th Korea National Health and Nutrition Examination Survey to verify that factors influencing self-rated health status of women with osteoporosis aged 40 years or above in Korea. Out of 8,127 respondents, 462 women aged 40 years or above who have osteoporosis were selected as the subjects to examine the differences in self-rated health status according to general characteristics, health-related characteristics and health-related behavioral characteristics.

This study verified significant differences in self-rated health status according to general characteristics, health-related characteristics and health-related

behavioral characteristics of middle-aged women with osteoporosis. And also the factors influencing subjective health status were identified. The factors influencing self-rated health status were found to be body discomfort during the past 2 weeks, comorbidity (hypertension, diabetes mellitus, dyslipidemia), perceived stress, and health-related quality of life level. In other words, osteoporosis patients showed poor subjective health status when they have body discomfort and comorbidity. They also showed poor subjective health stress if they perceive stress. Health-related quality of life was found to affect self-rated health status. Poor health-related quality of life resulted in poor subjective health status. To clarify the correlation between subjective health status and influencing factors, additional analysis must be performed in a future study.

High subjective health status was shown in patients who have occupation, high satisfaction of dietary patterns, no body discomfort experienced during the past 2 weeks, no restriction of activity, low degree of perceived stress, no depressive mood perceived for more than 2 weeks, and no comorbidity such as hypertension, diabetes mellitus and dyslipidemia. This was similar to a study conducted on obese adults[15] and studies that examined subjective health status of elders[15-16]. In addition, high subjective health status was shown with short duration of osteoporosis, indicating that time passage after diagnosis of osteoporosis has an negative influence on self-rated health status. Therefore, it would be necessary to check difficulties in management of osteoporosis at different times and come up with appropriate educational approaches for intervention.

In the case of health behavior, patients who currently drink alcohol showed higher subjective health status than patients who do not drink. This is probably because drinking relieves stress and has a positive impact on self-rated health status, but additional analysis is required to identify the cause of this result. In addition, it is necessary to verify that patients do not neglect management of osteoporosis because of drinking. Participatory rate of aerobic exercise within 1 week and walking exercise within 1 week caused positively significant differences in self-rated health status. Therefore, this study proposes a method of positively changing self-rated health status by adding physical activities, namely light aerobic exercise and walking exercise, to manage osteoporosis.

Since previous studies suggest that self-rated health status is related to quality of life, physical and mental health, and practice of health behavior[12-14], it is important to verify the factors influencing self-rated health status to find an effective strategy to improve subjective health status. In this study, the factors influencing subjective health status were analyzed. The results showed that educational interventions can be applied to body discomfort during the past 2 weeks, comorbidity (hypertension, diabetes mellitus, dyslipidemia), perceived stress, and health-related quality of life level. Body discomfort is thought to be recognized from restriction of activities to reduce chronic pain, back pain and risk of bone fracture in osteoporosis patients. Interventions to resolve various situations that lead to pain and activity restriction would be necessary to reduce body discomfort experienced by osteoporosis patients. Comorbidities were found to have an adverse effect on subjective health status. Accordingly, an additional study is required to identify the factors related to the effects of comorbidity on subjective health status. Furthermore an intervention program to verify and reduce the cause of body discomfort and an integrated education program to manage osteoporosis and comorbidity would be necessary. Also, various interventions must be developed to remove the causes of stress and change awareness of stress situations to improve subjective health status according to perceived stress.

Conclusion

The meaning of this study is in verifying self-rated health status of middle-aged women with osteoporosis and deriving the factors influencing self-rated health status using data from the Korea National Health and Nutrition Examination Survey, a survey conducted to examine health status of Korean citizens.

Ethical Clearance: This study was approved by the Institutional Review Board of the author's affiliated university (201905-HR-003).

Source of Funding: Self

Conflict of Interest: Nil

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