

# 지역사회 거주 중년 여성 집단에서 건강증진 행위와 삶의 질: 과체중 집단과 정상체중 집단 간 비교

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## Health-Promoting Behavior and Quality of Life among Community-Dwelling, Middle-Aged Women: A Comparative Study between Overweight and Normal-Weight Groups

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**Background:** Strategically improving health-related quality of life (HRQOL) should be discussed among overweight middle-aged women who are vulnerable to low HRQOL. We examined firstly if overweight middle-aged women would have significantly lower levels of HRQOL and health-promoting behaviors than normal-weight middle-aged women, and to examine secondly if health-promoting behaviors would be significantly associated with generic and obesity-specific HRQOLs within the overweight middle-aged women.

**Methods:** We conducted a cross-sectional, comparative study. Participants were 119 women aged 30-49 years who were recruited from a community in Seoul, South Korea; 63 women for the overweight group who were recruited from a baseline sample of the Community-Based Heart and Weight Management Trial, while 56 for the normal-weight group who were recruited separately. Health Promoting Lifestyle Profile II (HPLP II), World Health Organization Quality of Life-brief version (WHOQOL-BREF) of a generic HRQOL measure, and Impact of Weight on Quality of Life-Lite (IWQOL-Lite) of an obesity-specific HRQOL measure were used.

**Results:** Compared to the normal-weight group, the overweight group showed significantly lower scores of total WHOQOL-BREF as well as some HPLP II subscales including stress management ( $P=0.029$ ). Among the HPLP II subscales, stress management was significantly and positively associated with total WHOQOL-BREF ( $\beta=1.58$ ,  $P=0.003$ ) and self-esteem IWQOL-Lite ( $\beta=11.58$ ,  $P=0.034$ ) among the overweight group.

**Conclusions:** Among middle-aged overweight women, low levels of health-promoting behavior for stress management were shown, which should be strategically increased for improving their generic and obesity-specific HRQOLs.

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**Keywords:** Obesity, Women, Health promotion, Quality of life, Community health

## Introduction

The worldwide overweight/obesity has nearly tripled since 1975 and reached 39.0% in 2016.<sup>1)</sup> Concurrently, obesity prevalence in South Korea has been also rapidly increasing since 1998 and risen by 35.5% in 2016, specifically including the data that middle-aged women (25.2%) showed a higher prevalence of overweight/obesity than younger women (ages

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19-29) (13.8%). Furthermore, women may be more likely to have impaired health outcomes associated with overweight/obesity than men.<sup>2)</sup> Therefore, nurses should pay attention to these issues on overweight/obesity and its health outcomes in a vulnerable group of middle-aged women.

Health-promoting behavior, conceptualized in the Health Promotion Model, was defined as multidimensional action and cognition patterns<sup>3)</sup> that may reflect an incorporated, comprehensive pattern of health behaviors in individual daily lives. Reportedly, the overweight/obese individuals walked for 30 minutes/day less,<sup>4)</sup> and had a lower fruit and vegetable intake<sup>5)</sup> than did the normal-weight group. However, few studies have reported that overweight/obese individuals had more impaired levels of health-promoting behaviors than normal-weight ones,<sup>6)</sup> specifically among middle-aged, Asian women.

Health-promoting behaviors may be an associate of health-related quality of life (HRQOL). However, evidence of the significant associations was confined within individuals with illness<sup>7,8)</sup> or the general population of middle aged-women,<sup>9)</sup> but not within the overweight/obese groups. Furthermore, no previous studies have reported an association of health-promoting behaviors including comprehensive domains (i.e., spiritual growth, health responsibility, physical activity, nutrition, interpersonal relations, and stress management) with HRQOL, although a few studies reported the association of a single health behavior (e.g., physical activity) with HRQOL among the overweight/obese group.<sup>10,11)</sup> To this point, no studies have examined how comprehensive domains of health-promoting behaviors would be associated with HRQOL among overweight/obese individuals. In this context, identifying such an association may provide basic information for strategically improving HRQOL via enhancing specific domains of health-promoting behaviors associated with HRQOL for overweight/obese individuals.

HRQOL is a comprehensive concept with multiple health dimensions.<sup>12)</sup> Generally, HRQOL is assessed by generic versus disease-specific measures. The World Health Organization Quality of Life-brief version (WHOQOL-BREF) is the short version of the WHOQOL, and a generic measure used commonly across various populations.<sup>13)</sup> However, there has been little evidence that overweight/obesity may impair individuals' generic HRQOL as measured by WHOQOL-BREF. Instead of the generic HRQOL, disease-specific HRQOL measures provide a possible choice for capturing small changes in

HRQOL among specific populations.<sup>14)</sup> In particular, obesity-specific HRQOL, i.e., the Impact of Weight on Quality of Life-Lite (IWQOL-Lite), has been developed for overweight/obese populations.<sup>15)</sup> However, both WHOQOL and IWQOL-Lite have not been assessed in various ethnic populations. Hence, among middle-aged Asian women, comparisons of HRQOLs between overweight and normal-weight groups and associations of health-promoting behaviors with HRQOLs, as measured by various HRQOL measures, may give nurses a comprehensive understanding on nursing strategies for improving their obesity-related health outcomes.

The present study had two aims: 1) to examine firstly if an overweight group significantly had impaired levels of health-promoting behaviors and generic and obesity-specific HRQOLs than a normal-weight group among middle-aged women who are vulnerable to being overweight/obese, and 2) to examine secondly if such health-promoting behaviors were significantly associated with generic and obesity-specific HRQOLs within the overweight group.

## Methods

### 1. Participants

Based on a comparative study, participants were 119 middle-aged, community-dwelling women (56 of normal-weight group and 63 of overweight group) recruited from a community (i.e., a municipal county of Seongbuk-Gu) in Seoul, South Korea. The normal-weight group was recruited and analyzed for the first aim of the present study. The overweight group was obtained from the data of the community-based heart and weight management trial, and used as a secondary analysis for the first and second aims of the present study.

The normal-weight group comprised 56 women who fell into the category of less than 25 kg/m<sup>2</sup> of body mass index (BMI), while the overweight group comprised 63 women who fell into either overweight or obese category defined by the World Health Organization (WHO).<sup>16)</sup> Of 56 of the normal-weight group, six fell into the category of less than 18.5 kg/m<sup>2</sup> of BMI with the range 17.0-18.4 kg/m<sup>2</sup>. The WHO classifies BMI<17.0 kg/m<sup>2</sup> into moderate and severe thinness, and reported that about 3-5% of a healthy adult population have a BMI<18.5 kg/m<sup>2</sup>.<sup>17)</sup> Based on this, the six women were finally included into the normal-weight group.

The minimum size was determined by using a mean (standard deviation [SD]) of the Health-Promoting Lifestyle Profile II (HPLP II) scores that were obtained from Nies et al.<sup>6)</sup> study; means (SDs) were 2.42 (0.57) in the overweight group and 2.71 (0.48) in the normal-weight group. Based on this, the minimum sample size was 54 for each group at the levels of statistical power  $(1-\beta)=0.80$  (Student's *t*-test) and  $\alpha=0.05$  (two-tailed test).

We recruited the normal-weight group first, and then extracted the age-group matched overweight group. Between July 2013 and August 2013, the normal-weight group was recruited using a convenience sampling by community lay health advisors who were working for the Seongbuk-Gu Community Health Center. The inclusion criteria were 1) women aged between 30 and 65 years, 2) those without current health problems (i.e., cardiovascular diseases or cancers), and 3) those without obesity-related health problems (i.e., hypertension, dyslipidemia, or diabetes). The final sample recruited was 56 with an age range between 30 and under 50 (mean age=38.7 years).

Based on characteristics of the final sample of the normal-weight group (i.e., 30-49 years of age), the overweight group was recruited from a baseline sample ( $n=110$ ) of the Community-Based Heart and Weight Management Trial (ISRCTN46069848).<sup>18-21)</sup> The trial was a single-center, randomized controlled trial (RCT) that examined differential effects of three exercise modes on cardiovascular markers in weight management.<sup>18-21)</sup> The sample of the trial was recruited during the period from September 2010 to November 2011 in the Seongbuk-Gu community. Among the sample of the trial ( $n=110$ ), we extracted overweight/obese women with ages between 30 and  $\leq 49$  years (mean age=39.2 years). The final sample for the overweight group was 63.

## 2. Measurements

Participants' general characteristics were collected: socio-demographic variables such as age, education levels, employed status, monthly household income, married status, religion; and health-related variables such as BMI, current smoking, alcohol drinking, post-menopausal status, and obesity-related health problems. BMI was obtained by using the formula of body weight (kg)/height (m)<sup>2</sup>. For the overweight group, body weight and height were measured using the Tanita bioelectrical impedance scale (Tanita Corporation

of American, Inc., Arlington Heights, IL, USA) and a stadiometer, respectively. For the normal-weight group, body weight and height were self-reported. Obesity-related health problems included hypertension and dyslipidemia.

### 1) Health-promoting behaviors

The levels of health-promoting behaviors were measured by using the Korean version of the HPLP II after permission from the HPLP II developers<sup>22)</sup> and translation of the English version.<sup>20)</sup> The HPLP II consisted of 52-items indicating the frequency with which they engaged in each behavior on a 4-point Likert scale, and 6 subscales comprising spiritual growth, health responsibility, physical activity, nutrition, interpersonal relations, and stress management. Means for total and 6 subscales were obtained, ranging from 1 to 4; higher means indicate higher levels of health-promoting behaviors. Cronbach's alpha for the total score was 0.90 in a community-based sample of women.<sup>6)</sup> Cronbach's alpha was 0.91 in this study.

### 2) Generic health-related quality of life (HRQOL)

Generic HRQOL was measured by the Korean version of WHOQOL-BREF that was obtained under the user agreement with the WHO.<sup>23)</sup> The WHOQOL-BREF comprises of 26 items, which are self-reported on a five-point Likert scale (1-5) based on four domains: physical, psychological, social, and environmental domains. Scores for each domain were calculated by multiplying the mean of all item scores in each domain by a factor of 4. The possible scores for total and each domain ranged from 4 to 20. Higher scores indicate higher levels of WHOQOL-BREF. Cronbach's alphas were 0.68-0.82 for the four domains in a previous study (11,830 adults; undertaken in 23 countries).<sup>24)</sup> Cronbach's alphas were 0.66-0.82 for the four domains in this study.

### 3) Obesity-specific health-related quality of life (HRQOL)

Obesity-specific HRQOL was measured by the Korean version of the IWQOL-Lite that was obtained under the license agreement with the Duke University.<sup>15)</sup> The IWQOL-Lite is a self-reported measure consisting of: 31 items and five subscales of weight-related concerns, i.e., physical function (11 items), self-esteem (7 items), sexual life (4 items), public distress (5 items), and work (4 items). Each scale was scored with a 5-point Likert scale. The possible

scores ranged from 0 (worst) to 100 (best) after converting the raw scores of the IWQOL-Lite.<sup>25)</sup> In a previous study,<sup>15)</sup> Cronbach's alphas were 0.96 and 0.90-0.94 for total and subscale scores, respectively. In the present study, Cronbach's alpha was 0.97 and 0.89-0.97 for total and subscale scores, respectively.

### 3. Statistical analysis

Data were analyzed using SPSS 23.0 (SPSS Inc., Chicago, IL, USA). A *P*-value of less than 0.05 was considered significant. To report participants' general characteristics, descriptive statistics were performed with frequencies, percentages, means, SDs and SEs. To examine the differences in general characteristics between overweight and normal-weight groups, either  $\chi^2$  tests/Fisher's exact test or Student's *t*-test was performed by categorical versus continuous variables. To examine the differences in the outcome variables (i.e., HPLP II, WHOQOL-BREF, and IWQOL-Lite) between the two groups, the general linear model was performed using two

models (i.e., crude and adjusted models). The adjusted models were controlled for married status, which significantly differed by group. Finally, to examine the associations between the HPLP-II and WHOQOL-BREF scores, a multiple regression analysis was conducted with adjusted models; "religion" was selected as covariates with a *P*-value of <0.1 were based on the results of the crude associations between the HPLP II and WHOQOL-BREF scores. To examine the associations between the HPLP II and IWQOL-Lite scores, the multiple regression analysis was performed with adjusted models; "age", "job", and "religion" were selected as covariates with a *P*-value of <0.1 in the associations.

### 4. Ethical considerations

The study was newly approved by the institutional review board at Korea University (1040548-KU-IRB-12-125-A-2), separately from the Community-based Heart and Weight Management Trial. We followed standard procedures of the IRB.

**Table 1.** General characteristics between the overweight and normal-weight women (n=119)

	Total (n=119)	Overweight (n=63)	Normal-weight (n=56)	$\chi^2/t$	<i>P</i>
Socio-demographic variables					
Age	39.0±4.4	39.2±4.8	38.7±3.8	-0.65	0.515
Education				0.28	0.597
<College levels	48 (40.3)	24 (38.1)	24 (42.9)		
≥College levels	71 (59.7)	39 (61.9)	32 (57.1)		
Employed, yes	52 (43.7)	27 (42.9)	25 (44.6)	0.04	0.845
Monthly income, million won				0.03	0.861
≤4	69 (58.0)	37 (58.7)	32 (57.1)		
>4	52 (42.0)	26 (41.3)	24 (42.9)		
Married status	111 (93.3)	55 (87.3)	56 (100.0)	7.62	0.006
Religion, yes	70 (58.8)	39 (61.9)	31 (55.4)	0.53	0.469
Health-related variables					
BMI (kg/m <sup>2</sup> )	25.4±5.1	29.3±3.5	21.0±1.9	-16.20	<0.001
Smoking, yes	7 (5.9)	6 (9.5)	1 (1.8)	3.21 <sup>a</sup>	0.118
Alcohol drinking per week, frequency				0.13	0.911
<2	108 (90.8)	57 (90.5)	51 (91.1)		
≥2	11 (9.2)	6 (9.5)	5 (8.9)		
Post-menopause, yes	2 (1.7)	2 (3.2)	0 (0.0)	1.81 <sup>a</sup>	0.498
Obesity-causing health problems, yes	11 (9.2)	11 (17.5)	0 (0.0)	10.77	0.001

Abbreviations: BMI, body mass index; SD, standard deviation.

Values are presented as number (%) or mean±SD.

<sup>a</sup>Fisher's exact test was performed.

## Results

### 1. Participants' general characteristics

Participants' mean age was 39.0 years (Table 1). Of the participants, 93.3% were married, 59.7% were college-educated or higher, and 42.0% had a monthly household income of at least 4,000,000 Korean won (approximately USD 3,752).<sup>26)</sup> The overweight and normal-weight groups had mean BMIs of 29.3 kg/m<sup>2</sup> and 21.0 kg/m<sup>2</sup>, respectively; BMIs differed significantly by group ( $P<0.001$ ). The overweight and normal-weight group had 87.3% and 100.0% of married women, respectively ( $\chi^2=7.62$ ,  $P=0.006$ ). The overweight group was 3.2% post-menopausal, and had 17.5% with obesity-causing health problems, while the normal-weight group was 100% pre-menopausal and had no obesity-causing health problems.

### 2. Levels of health-promoting behaviors and HRQOL between groups

Comparisons were conducted in crude models and adjusted models (Table 2). The total HPLP-II scores were lower in the overweight group than normal-weight group, but did not differ significantly by group (Table 2). Among the HPLP II subscales, physical activity, nutrition, and stress management scores significantly differed by group ( $P<0.05$ ), showing significant lower levels in the overweight group.

The total WHOQOL-BREF score was significantly lower in the overweight group than normal-weight group ( $P<0.001$ ) (Table 2). Except for the environmental domain score, all physical, psychological, and social relationship domain scores remained significantly lower in the overweight group compared to the normal-weight group ( $P<0.001$ ).

**Table 2.** Comparisons of HPLP-II, WHOQOL-BREF, and IWQOL scores between overweight and normal-weight women (n=119)

	Crude model			Adjusted model		
	Overweight (n=63)	Normal-weight (n=56)	<i>P</i>	Overweight (n=63)	Normal-weight (n=56)	<i>P</i> <sup>a</sup>
<b>HPLP-II</b>						
Total	2.14 (0.043)	2.26 (0.045)	0.062	2.14 (0.044)	2.25 (0.046)	0.073
Physical activity	1.46 (0.066)	1.76 (0.070)	0.002	1.47 (0.067)	1.75 (0.072)	0.006
Nutrition	2.31 (0.052)	2.57 (0.056)	0.001	2.35 (0.053)	2.56 (0.056)	0.004
Stress management	2.05 (0.061)	2.27 (0.065)	0.014	2.06 (0.062)	2.26 (0.066)	0.029
Health responsibility	1.83 (0.065)	1.80 (0.069)	0.718	1.83 (0.067)	1.80 (0.071)	0.774
Spiritual growth	2.48 (0.066)	2.47 (0.070)	0.920	2.46 (0.067)	2.49 (0.071)	0.827
Interpersonal relations	2.60 (0.054)	2.60 (0.057)	0.995	2.59 (0.055)	2.61 (0.058)	0.817
<b>WHOQOL-BREF</b>						
Total	12.84 (0.250)	14.15 (0.265)	0.001	12.78 (0.252)	14.22 (0.268)	<0.001
Physical	13.62 (0.282)	15.47 (0.299)	<0.001	13.56 (0.285)	15.54 (0.303)	<0.001
Psychological	11.88 (0.338)	13.54 (0.359)	0.001	11.78 (0.341)	13.65 (0.363)	<0.001
Social relationships	13.35 (0.304)	14.95 (0.322)	<0.001	13.32 (0.309)	14.99 (0.329)	<0.001
Environmental	12.52 (0.285)	12.63 (0.302)	0.793	12.50 (0.288)	12.70 (0.306)	0.556
<b>IWQOL-Lite</b>						
Total	54.54 (1.786)	90.85 (1.895)	<0.001	54.65 (1.822)	90.72 (1.936)	<0.001
Physical function	52.30 (1.908)	89.33 (2.024)	<0.001	52.66 (1.938)	88.92 (2.059)	<0.001
Self esteem	47.56 (2.344)	87.50 (2.486)	<0.001	47.12 (2.381)	88.00 (2.530)	<0.001
Sexual life	69.58 (2.633)	94.98 (2.725)	<0.001	70.17 (2.654)	94.35 (2.740)	<0.001
Public distress	74.70 (1.822)	97.37 (1.932)	<0.001	75.13 (1.845)	96.89 (1.961)	<0.001
Work	75.64 (1.822)	97.80 (1.952)	<0.001	75.20 (1.844)	98.31 (1.980)	<0.001

Abbreviations: HPLP-II, health promotion lifestyle profile-II; WHOQOL-BREF, World Health Organization Quality of Life-brief; IWQOL-Lite, impact of weight on Quality of Life-Lite; SE, standard error.

Values are presented as mean (SE).

<sup>a</sup>General linear analysis (two-tailed) was performed after adjusting for marital status.

**Table 3.** Associations between HPLP-II and HRQOLs within the overweight women (n=63)

WHOQOL-BREF <sup>a</sup>						IWQOL-Lite <sup>b</sup>					
	$\beta$ ( <i>P</i> -value)					$\beta$ ( <i>P</i> -value)					
	Total	Physical	Psychological	Social relationship	Environmental	Total	Physical function	Self-esteem	Sexual life	Public distress	Work
Total	2.72 (0.001)	2.34 (0.019)	1.44 (0.211)	4.71 (<0.001)	2.38 (0.009)	13.39 (0.064)	10.34 (0.165)	20.81 (0.014)	6.08 (0.603)	9.70 (0.239)	5.75 (0.488)
Physical activity	-0.19 (0.757)	-0.13 (0.855)	-0.96 (0.244)	0.81 (0.299)	-0.48 (0.474)	2.94 (0.590)	0.42 (0.940)	11.31 (0.076)	2.76 (0.749)	-1.38 (0.824)	-3.93 (0.522)
Nutrition	-0.38 (0.571)	-0.66 (0.399)	-1.56 (0.078)	0.72 (0.397)	0.01 (0.995)	-2.13 (0.715)	-5.98 (0.316)	0.18 (0.980)	5.08 (0.585)	-3.71 (0.574)	-1.16 (0.860)
Stress management	1.58 (0.003)	1.43 (0.026)	1.21 (0.102)	2.35 (0.001)	1.35 (0.023)	7.75 (0.096)	5.03 (0.296)	11.58 (0.034)	7.28 (0.989)	5.83 (0.272)	2.80 (0.598)
Health responsibility	0.09 (0.853)	-0.36 (0.530)	-0.78 (0.231)	1.19 (0.053)	0.32 (0.553)	-0.02 (0.996)	2.21 (0.604)	3.81 (0.437)	-6.11 (0.356)	-3.43 (0.464)	-3.13 (0.507)
Spiritual growth	2.00 (<0.001)	1.88 (<0.001)	2.24 (<0.001)	2.29 (<0.001)	1.59 (0.001)	9.65 (0.011)	6.97 (0.078)	11.74 (0.009)	4.28 (0.516)	11.23 (0.009)	7.28 (0.096)
Interpersonal relations	2.88 (<0.001)	3.04 (<0.001)	2.21 (0.004)	3.78 (<0.001)	2.47 (<0.001)	12.38 (0.013)	12.77 (0.012)	11.59 (0.051)	6.02 (0.463)	11.07 (0.051)	9.46 (0.099)

Abbreviations: HPLP-II, health-promoting lifestyle profile; HRQOL, health-related quality of life; WHOQOL-BREF, World Health Organization Quality of Life-brief; IWQOL, Impact of

Abbreviations: HPLP-II, health-promoting lifestyle profile; HRQOL, health-related quality of life; WHOQOL-BREF, World Health Organization Quality of Life-brief; IWQOL, Impact of

Weight on Quality of Life.

<sup>a</sup>Multiple regression models adjusted for religion.<sup>b</sup>Multiple regression models adjusted for age, job, and religion.

The total IWQOL score was significantly lower among the overweight group compared to the normal-weight group ( $P<0.001$ ) (Table 2). All the IWQOL subscales of physical function, public distress, self-esteem, sexual life, and work remained significantly lower in the overweight group than normal-weight group ( $P_s<0.001$ ).

### 3. Associations between health-promoting behaviors and HRQOLs in the overweight group

Among the overweight group, lower scores for total HPLP-II had significant associations with lower scores for total WHOQOL-BREF after adjusting for religion ( $\beta=2.72$ ,  $P<0.001$ ), but were not associated with the total IWQOL scores (Table 3). Lower subscale scores for stress management ( $\beta=1.58$ ,  $P=0.003$ ), spiritual growth ( $\beta=2.00$ ,  $P<0.001$ ), and interpersonal relations ( $\beta=2.88$ ,  $P<0.001$ ) revealed significant associations with lower scores for total WHOQOL-BREF. Lower subscale scores for spiritual growth ( $\beta=9.65$ ,  $P=0.011$ ) and interpersonal relations ( $\beta=12.38$ ,  $P=0.013$ ) had significant associations with lower total IWQOL-Lite scores. Lower subscale scores for stress management had significant associations with lower scores for its self-esteem subscale ( $\beta=11.58$ ,  $P=0.034$ ).

## Discussion

Among community-dwelling middle-aged women, the overweight group showed not only lower levels of health-promoting behaviors, but also lower levels of both generic and obesity-specific HRQOLs than the normal-weight group. Moreover, the overweight women with low scores of stress management, spiritual growth, and interpersonal relations (i.e., a subscale of health-promoting behaviors) showed significantly low levels of both generic and obesity-specific HRQOL levels.

We found that the overweight and normal-weight women showed no significant variations in total HPLP II scores, but significant variations in some HPLP II subscales including nutrition, physical activity, and stress management. Unlike our findings, Nies and colleagues<sup>6)</sup> found between-group differences in all HPLP II subscales among 86 American women.<sup>6)</sup> The discrepancy in HPLP-II subscales between the two studies may be attributable to the different BMI levels of the study participants. Our study participants

fell into the overweight category, whereas those of Nies and colleagues<sup>6)</sup> fell into the severely obese category (i.e., a mean of BMI, 40.3–41.3 kg/m<sup>2</sup>) according the WHO criteria of obesity and overweight categories.<sup>16)</sup> This may be based on the postulation that health-promoting behaviors may be more comprehensively impaired with increasing obesity status.

In our findings, the overweight women showed significantly lower total scores for the generic HRQOL (i.e., WHOQOL-BREF) compared to the normal-weight women. Particularly, we found such lower scores in the three domains except for the environmental domain, whereas Dinc and colleagues<sup>27)</sup> found them in all sub-domains including the environmental domain among 1,602 women recruited from the 11th largest city in Turkey. Such a discrepancy in the environmental domain between studies might be attributed to different sociocultural backgrounds in the research settings. Among the four domains of the WHOQOL-BREF, the environmental domain is characterized by fulfilment with the surrounding neighborhood; the availability of medico-social care; possibilities for the acquisition of new information and skills; and possibilities for transportation.<sup>13)</sup> In this context, our sample was recruited from the largest metropolitan city in South Korea, Seoul, which is particularly characterized by high accessibility to mass media, the Internet, a convenient transportation system and medical service.<sup>28–30)</sup> Based on this, environmental WHOQOL-BREF may not be related to obesity-related health outcomes in Korean women.

Additionally, we found that the overweight women had significantly lower scores for obesity-specific HRQOL (i.e., IWQOL-Lite) than the normal-weight women, across total and all subscale IWQOL-Lite scores. These findings were consistent with those of Kolotkin and Crosby<sup>31)</sup> and Caixàs et al.<sup>32)</sup> Meanwhile, our participants in the overweight group mostly fell into the overweight category (68%), as those in previous two studies were mostly in the obese category. Nevertheless, the obesity-specific IWQOL-Lite has easily captured vulnerability to impaired HRQOL with increasing BMI levels among Korean women. Choo et al.<sup>2)</sup> reported gender differences in obesity-related HRQOL among a Korean population group; women had significantly low obesity-related HRQOL, but men did not.

We found that the overweight women with low scores for stress management (a HPLP-II subscale) was significantly more likely to have low scores for total WHOQOL-BREF

and self-esteem IWQOL-Lite subscale. Such an association has not been reported in previous studies, whereas the association between perceived stress and HRQOL had been previously reported. Wang et al.<sup>33)</sup> found that obese individuals with high scores of perceived stress were more likely to have low scores of the mental component of HRQOL. As a result, stress management behavior may be impaired with overweight/obesity (as shown with our empirical data), and its impaired levels may explain impaired HRQOL levels among the overweight/obese women. Therefore, enhancing stress management skills for overweight women should be first prioritized for improving impaired HRQOL among overweight middle-aged women.

In addition, our findings showed that higher scores for interpersonal relations and spiritual growth of HPLP-II subscales were significantly associated with higher scores for the WHOQOL-BREF and IWQOL-Lite in the overweight group. Wu et al.<sup>34)</sup> reported a significant positive correlation between classmate support and total IWQOL-Kids scores among obese adolescents. Additionally, Saffari et al.<sup>35)</sup> reported that spiritual/religious factors were significantly related to HRQOL in patients undergoing hemodialysis. Similarly, Jafari et al.<sup>36)</sup> had reported that the levels of spiritual well-being were significantly associated with generic HRQOL among Iranian women with breast cancer undergoing radiation therapy. Therefore, health-promoting behaviors for interpersonal relations and spiritual growth may be essential to improve HRQOL among overweight/obese women.

Our study has some strengths. First, we used two measures of generic and obesity-specific HRQOLs simultaneously to identify any variations in HRQOLs between overweight and normal-weight groups. Second, we firstly revealed a significant finding that health-promoting behavior may be an associate of HRQOL among overweight individuals. However, the study also had some limitations. First, our results may not be representative of Korean women because of our convenience sampling method, and have limited generalizability to other ethnic groups. Second, body weight measures self-reported among the normal-weight group may be underestimated compared to those measured among the overweight women; however, self-reported body weight may have a bias of <3% to estimate obesity prevalence in women aged 30–49 years, compared to measured body weight.<sup>37)</sup> Based on this, it may be small on the results

of between-group differences in study outcome variables. Finally, as a control group, the normal-weight group was separately recruited from the overweight women in a community, with the interval of one and half years. This time-effect may result in a bias. However, there were no events to be considered as influencing factors on sociodemographic and health-related characteristics of the community-dwelling group. Further, there was little difference in the prevalence of overweight/obesity within the interval, showing from 26.6% to 25.0%.<sup>38)</sup>

Overweight middle-aged women showed lower scores for both generic and obesity-specific HRQOLs and more impaired levels of nutrition, physical activity and stress management behaviors compared to normal-weight women. Community nurses need to provide health counseling and education to improve health-promoting behaviors of nutrition, physical activity and stress management for the overweight/obese women. Moreover, low levels of stress management, interpersonal relations, and spiritual growth were significantly associated with low levels of HRQOL levels among overweight/obese middle-aged women. Based on this, we could take note of the result that overweight women showed low levels of stress management behaviors, which, in sequence, were significantly associated with low HRQOL levels. Therefore, enhancing health-promoting behaviors for stress management skills could be the first strategy for improving impaired HRQOL levels among community-dwelling middle-aged women who are overweight/obese. As the second strategy, improving health-promoting behaviors of interpersonal relations and spiritual growth may help increase HRQOL levels among the middle-aged women. As a result, community nurses should be cultivated for the knowledge and skills for developing and conducting these two behavioral strategies to improve HRQOL for overweight/obese middle-aged women.

## 요 약

연구배경: 중년기 여성은 젊은 여성에 비하여 과체중과 비만의 유병률이 높으며, 특히 여성이 남성에 비하여 비만과 관련된 건강관련 삶의 질이 나쁘다고 알려져 있다. 이에 건강관련 삶의 질에 취약한 과체중 중년 여성의 건강관련 삶의 질을 전략적으로 개선하는 것이 중요하겠다. 건강증진 행위는 건강관련 삶의 질과 밀접한 연관성이 있을 수 있다. 이에 본 연구는 과체중 중년 여성이 정상체중의 중년 여성

에 비하여 건강증진 행위와 건강관련 삶의 질이 낮은지를 조사하고, 과체중 중년 여성에서 건강증진 행위가 일반적(generic) 혹은 비만특이적(obesity-specific) 건강관련 삶의 질과 유의한 연관성이 있는지 밝히고자 한다.

방법: 본 연구는 횡단적 비교 연구이다. 서울시 성북구에 거주하는 30-49세 중년 여성 119명을 대상으로 하였으며, 과체중군은 63명이고 정상체중군은 56명이었다. 건강증진 행위는 Health Promoting Lifestyle Profile II (HPLP II) 도구를 사용하여 측정하였다. 일반적 건강관련 삶의 질은 World Health Organization Quality of Life-brief version (WHOQOL-BREF)을 사용하였으며, 비만특이적 건강관련 삶의 질은 Impact of Weight on Quality of Life-Lite (IWQOL-Lite)를 사용하였다. 과체중군과 정상체중군 간의 건강증진 행위와 건강관련 삶의 질 차이를 분석하기 위하여 일반선형모형을 수행하였고, 과체중군 안에서 건강증진 행위와 건강관련 삶의 질과의 연관성은 다중회귀분석을 시행하였다.

결과: 과체중군은 정상체중군에 비하여 건강증진 행위의 스트레스 관리( $P=0.029$ )를 포함하여 영양( $P=0.004$ )과 신체 활동( $P=0.006$ )의 하부영역에서 유의하게 낮은 점수를 보였다. 또한 과체중군은 정상체중군에 비하여 일반적 건강관련 삶의 질 총점( $P<0.001$ )과 비만특이적 건강관련 삶의 질 총점이 유의하게 낮았다( $P<0.001$ ). 더욱이, 과체중군에서 건강증진 행위 하부영역 중 스트레스 관리 점수가 높을수록 일반적 건강관련 삶의 질 총점이 높고( $\beta=1.58$ ,  $P=0.003$ ), 비만특이적 삶의 질 영역 중 자아존중감 점수가 유의하게 높았다( $\beta=11.58$ ,  $P=0.034$ ).

결론: 중년기 과체중 여성이 정상체중 여성과 비교하여 특히 건강증진 행위 중 스트레스 관리의 수준이 낮은 것으로 나타났다. 이에, 지역사회 중년기 과체중 여성의 일반적 혹은 비만과 관련된 건강관련 삶의 질 개선을 위해서는 스트레스 관리의 전략적 접근이 무엇보다 중요하겠다.

중심 단어: 비만, 여성, 건강 증진, 삶의 질, 지역사회 건강

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