

## The Effects of Body Type Perception on the Quality of Life and Disease Morbidity

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### Abstract

**Purpose.** This study reported on body type perception of people aged  $\geq 19$  years, regardless of gender, and on its association with disease morbidity and the quality of life and aimed to observe the effects of stress on body weight perception, disease morbidity, and the quality of life.

**Methods.** The data from 218,899 persons aged  $\geq 19$  years who were respondents to the 2010 Community Health Survey were finally analyzed. A designated program was used to perform complex sample analysis; chi-square test was carried out to determine body type perception by the general characteristics and disease status and analyze health-related behavior and weight control behavior by body type perception, and multiple logistic regression was used to observe the effects of body type perception on mental health and the quality of life.

**Results.** 34.9% of all the respondents misperceived their body type and females were more likely to misperceive their body type. The older they were, the more poorly they perceived their body type; those perceiving their body type poorly were significantly more susceptible to both hypertension and diabetes. When correction was made in relation to gender, age, and so on, those perceiving their body type excessively were more susceptible to hypertension (1.43[1.367-1.050]) and diabetes morbidity (1.36[1.294-1.428]). Body type perception affected the quality of life: the respondents perceiving their body type poorly (0.91[0.884-0.940]) or excessively (0.75[0.720-0.770]) showed lower quality of life than those perceiving their body type correctly.

**Conclusions.** Distorted body type perception affected disease morbidity and the quality of life: the respondents excessively perceiving their body type were significantly more susceptible to both hypertension and diabetes and those perceiving their body type excessively or poorly showed lower quality of life than those perceiving it correctly. It is therefore necessary to make multilateral efforts to cultivate correct body type perception.

**Key words.** Body type perception, Chronic disease, Disease morbidity, Quality of life, Self-rated health

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## 1. Introduction

In the South Korean society, the excessive concerns about and the distortion of body type have caused people to perceive their body type on the basis of their appearance without correct criteria for judgment and the body type they perceive can differ from the objective evaluation of the actual one.

The objective evaluation of body type is associated with the correct measurement and judgment of the body size and is differentiated from a sense of satisfaction or dissatisfaction with their body type, which is subjective evaluation. Subjective criteria for the desirable body type, instead of the correct and objective ones, can make them less satisfied with their body type and cause them to long for a slender figure, become obsessed with body weight, and go on a reckless diet accompanied by undesirable weight loss<sup>1)</sup>.

As for perception of body type, the increasing concerns over and negative perception of obesity and the spread of the social atmosphere in which slenderness is preferred have rapidly increased the number of people trying to lose weight, and such a phenomenon is being generalized to the underweight and normal weight groups as well as to the obese one<sup>2)</sup>.

In today's society, many people regard underweight as desirable and prefer thinness; consequently, they misperceive themselves as overweight and are often hardly satisfied with their body type although they keep their weight at normal levels<sup>3)</sup>.

As a result, it may form wrong eating habits and cause physical and mental distress. A beautiful appearance and body is not a means of labor any longer but has become a part of personal ability to gain chances to obtain a higher rank and wealth. Not only women but

also men have recently been more concerned about their physical appearance and tried to approach an ideal body type, for example, by losing weight or by doing more exercise<sup>4)</sup>. They have distorted perception of their body type by regarding a slender figure as ideal or by considering standard body weight to be fat, try to lose weight recklessly, suffer not only from eating disorder and nutritional imbalance but also from mental and physical disorder caused by eating disorder, and cause big social problems<sup>5,6)</sup>. In the subjective respect, a body image is associated with individuals' own belief in or idea of their body type<sup>7)</sup>. Briefly speaking, the obese can never think of their body type as obese and the slender can never think of their body type as slender<sup>8)</sup>. This is probably because their misperceived, self-evaluated body type disagrees with the one they hope to be shown to others. The misperceived body type can cause negative attitudes toward their body and identity in confusion<sup>1)</sup>. To keep body weight at a normal level is a prerequisite to a healthy life. Any state beyond the scope of normal body weight—overweight, obesity, or underweight—is closely correlated with mental and social health as well as with physical health<sup>9)</sup>. Both obesity and underweight are correlated with physical health status; lots of research has reported that they are correlated with mental and social health. Studies on obese patients' health-related quality of life (HRQL) found that obesity negatively affected mental health, for example, by causing social phobia and depression and that they showed low quality of life<sup>10,11)</sup>. The studies on body type perception in South Korea have primarily been conducted either in secondary school students or in college women and most of them have mentioned body type perception and weight control; therefore, it is necessary to conduct research on their mental health and on the quality

of their life in relation to body type misperception<sup>12)</sup>. This study reported on body type perception of people aged  $\geq 19$  years, regardless of gender, and on its association with disease morbidity and the quality of life and aimed to observe the effects of stress on body weight perception, disease morbidity, and the quality of life.

## 2. Subject and Methods

### 2.1. Subject of study

The data from 218,899 out of 229,229 persons aged  $\geq 19$  years who were respondents to the 2010 Community Health Survey were finally analyzed, with the exception of those for whom BMI—height and weight—which is a principal variable was missing.

### 2.2. Methods

#### 2.2.1. Variable definitions and categorizations

##### 1) Body type division

A perceived body type was measured in a five-point scale—very thin, thin, average, obese, and too obese—with the question “what do you think of your body type?” and the respondents with BMI  $< 18.5$  based on height and weight were classified into the underweight group, those with BMI 18.5 to  $< 25.0$  into the normal group, and those with BMI  $\geq 25$  into the obese group.

##### 2) Body type perception grouping

They were divided into three groups on the basis of the perceived body type and obesity status: individuals perceiving their body weight correctly were classified into the correct perception group, those perceiving it poorly into the poor perception group, and those perceiving

it excessively into the excessive perception group (Table 1).

Table 1. Body type perception

sort	very skinny	skinny	normal	fat	very fat
low	correct perception		excessive perception		
normal	poor perception		correct	excessive	
obesity	poor			correct	

##### 3) The general characteristics

It included gender, age, education, and dong/eup. As for age, the respondents were divided into groups aged 19-39 years, 40-59 years, and  $\geq 60$  years; as for education, they were divided into middle school graduates and those at lower education levels, high school graduates and those at lower education levels, and college graduates and those at higher education levels.

##### 4) Disease morbidity and stress

As for disease morbidity, the respondents were divided by a doctor’s hypertension and diabetes diagnosis status; as for stress, the respondents under lots of stress or under stress were categorized into the stress group, and those under little stress or under very little stress into the stress-free group<sup>13)</sup>.

##### 5) Quality of life

Quality of life was regarded as good or very good when it was either very good or good and as average or lower when it was average, bad, or too bad.

### 2.2. Data analysis

An SAS program was used to perform complex sample analysis; chi-square test was carried out to

determine body weight misperception by the general characteristics and disease status and analyze health-related behavior and weight control behavior by body weight misperception, and multiple logistic regression was used to observe the effects of body weight misperception on mental health and the quality of life.

### 3. Results

#### 3.1. Respondents' general characteristics

Women (35.6%) were more likely to misperceive their body type than men (34.2%) ( $p < 0.001$ ); 65.8% of those aged 40-59, 65.0% of those aged 19-39, and 63.6% of those aged  $\geq 60$  misperceived their body type ( $p < 0.001$ ). 66.1% of college graduates and those at higher education levels misperceived their body type ( $p < 0.001$ ); those residing in dong were more

likely to misperceive their body type ( $p < 0.001$ ). 37.3% of those under stress misperceived their body type ( $p < 0.001$ ); 40.6% of those whose body weight was at normal levels misperceived their body type ( $p < 0.001$ ). 24.7% of the men poorly perceived their body type and 25.4% of the women excessively perceived their body type ( $p < 0.001$ ). 25.0% of the respondents aged  $\geq 60$  and 19.9% of those aged 19-39 poorly perceived their body type. 22.0% of the middle school graduates and those at lower education levels poorly perceived their body type and 19.1% of college graduates and those at higher education levels excessively perceived their body type ( $p < 0.001$ ). The respondents who were under stress or under lots of stress were more likely to perceive their body type excessively, and those under little or no stress were more likely to perceive their body type poorly (Table 2).

Table 2. Body type perception by general characteristics

characteristic		normal		misperception						total	p-value
				Sub		low		over			
		N	%	N	%	N	%	N	%		
gender	M	66,686	65.8	35,855	34.2	27,115	24.7	8,740	9.6	102,541	<0.001
	F	75,127	64.4	41,231	35.6	14,941	10.2	26,290	25.4	116,358	
age	19-39	43,855	65.0	23,510	35.0	10,041	15.1	13,469	19.9	42,056	<0.001
	40-59	57,839	65.8	29,757	34.2	14,873	16.5	14,884	17.7	141,813	
	$\geq 60$	40,119	63.6	23,819	36.4	17,142	25.0	6,677	11.4	35,030	
level of edu.	middle	51,730	64.0	29,804	36.0	19,555	22.0	10,249	14.0	41,964	<0.001
	high	50,387	64.7	26,898	35.3	13,383	17.1	13,515	18.2	141,438	
	college	39,321	66.1	20,218	33.9	9,026	14.8	11,192	19.1	34,956	
district	town	81,164	65.1	43,591	34.9	21,151	17.0	22,440	18.0	124,755	0.223
	mid-town	60,649	64.4	33,495	35.2	20,905	22.2	12,590	13.4	94,144	
stress	Yes	35,792	62.7	21,609	37.3	11,627	18.3	9,982	18.9	57,401	<0.001
	No	105,880	66.0	55,354	34.0	30,333	17.1	25,021	16.9	161,234	
obesity	low	9,157	72.1	3,157	27.9	-	-	3,157	27.9	42,056	<0.001
	normal	93,588	59.4	62,964	40.6	31,091	18.4	31,873	22.1	141,813	
	over	39,068	81.2	10,965	18.8	10,965	18.8	-	-	35,030	
total		141,813	64.8	141,813	34.9	42,056	19.2	35,030	16.0	218,899	

### 3.2. Disease morbidity and quality of life by body type perception

As for disease morbidity by body type perception, correct perception was more correlated with hypertension( $p<0.001$ ) and misperception was insignificantly more correlated with diabetes.

Correct perception was more correlated with good or excellent quality of life status ( $p<0.001$ ). As for misperception, poor perception was more correlated with both hypertension and diabetes ( $p<0.001$ ) as well as with good or excellent quality of life(Table 3).

Table 3. Disease morbidity and quality of life by body type perception

	hypertension					diabetes					quality of life				
	yes		no		p-value	yes		no		p-value	better		less		p-value
	N	%	N	%		N	%	N	%		N	%	N	%	
normal	29,735	16.4	112,038	83.6	<0.001	10,918	6.0	130,815	94.0	0.534	62,403	48.5	79,350	51.5	<0.001
mis~	15,162	14.8	61,878	85.2		6,033	6.1	71,003	93.9		30,899	44.4	46,157	55.6	
low	9,139	16.3	32,886	83.7		4,020	7.7	37,999	92.3		16,629	45.4	25,409	54.6	
over	6,023	13.3	28,992	86.7		2,013	4.5	33,004	95.5		14,270	43.4	20,748	56.6	
total	44,897	15.9	173,916	84.1		16,951	6.0	201,818	94.0		93,302	47.1	125,507	52.9	

### 3.3. Disease morbidity and quality of life by general characteristics

The respondents who were older ( $p<0.001$ ), who were middle school graduates or those at lower education levels(35.1%)( $p<0.001$ ), and who resided in eups were more susceptible to hypertension. 26.5% of the overweight or obese had hypertension ( $p<0.001$ ). Men (6.6%) were more susceptible to diabetes than women ( $p<0.001$ ); the younger and the less educated, the more susceptible to diabetes. Those who resided in eups and who were under stress were more susceptible to diabetes( $p<0.001$ ). The overweight were most susceptible to diabetes.

The respondents who were male and who were aged 19-39( $p<0.001$ ) and those who were college graduates or at higher education levels and who resided in donges had good or excellent quality of life( $p<0.001$ ). Those who were not under stress ( $p<0.001$ ) and who had normal weight ( $p<0.001$ ) had good or excellent quality of life(Table 4).

### 3.4. Effects on hypertension morbidity

The multiple regression analysis of the factors affecting hypertension morbidity found that women had 0.78(0.755-0.807) times lower OR(95% CI) than men and that the respondents aged 40-59 and those aged  $\geq 60$  had higher OR than those aged 19-39: 6.38(5.983-6.800) times and 28.47(26.609-30.470) times, respectively. High school graduates and college graduates and those at higher education levels had lower OR than middle school graduates and those at lower education levels—0.65(0.628-0.679) times and 0.58 (0.553-0.611) times, respectively—and the respondents residing in eups had 0.91 (0.885-0.944) times lower OR than those residing in donges. The respondents under stress had 1.21(1.168-1.258) times higher OR; those poorly perceiving their body weight had 0.69 (0.663-0.722) times lower OR and those excessively perceiving their body weight had 1.43(1.367-1.505) times higher OR than those

having correct perception. The underweight had 0.49 (0.452-0.537) times lower OR and the overweight had 2.74(2.642-2.844) times higher OR than those with normal weight(Table 5).

Table 4. Disease morbidity and quality of life by general characteristics

characteristic	hypertension				p-value	diabetes				p-value	quality of life				p-value	
	yes		no			yes		no			better		less			
	N	%	N	%		N	%	N	%		N	%	N	%		
gender	M	20,533	15.9	82,019	84.1	0.778	8,664	6.6	93,867	93.4	<0.001	49,289	52.2	53,246	47.8	<0.001
	F	24,396	15.9	91,966	84.1		8,297	5.5	108,040	94.5		44,044	41.9	72,331	58.1	
age	19-39	1,634	2.5	65,720	97.5	<0.001	494	0.7	66,853	99.3	<0.001	40,193	59.8	27,166	40.2	<0.001
	40-59	14,360	15.9	73,245	84.1		5,608	6.1	81,977	93.9		38,554	44.3	49,040	55.7	
	≥60	28,935	46.0	35,020	54.0		10,859	18.1	53,077	81.9		14,586	24.4	49,371	75.6	
edu.	≤middle	29,546	35.1	52,013	64.9	<0.001	11,099	13.7	70,434	86.3	<0.001	20,809	26.3	60,750	73.7	<0.001
	high	9,949	11.1	67,327	88.9		3,877	4.2	73,386	95.8		38,877	51.1	38,400	48.9	
	≥college	5,319	8.2	54,223	91.8		1,945	2.8	57,590	97.2		33,419	56.5	26,114	43.5	
town	town	22,166	15.1	102,590	84.9	<0.001	8,475	5.7	116,258	94.3	<0.001	56,102	47.8	68,655	52.2	<0.001
	mid-town	22,763	19.3	71,395	80.7		8,486	7.4	85,649	92.6		37,231	43.9	56,922	56.1	
stress	no	33,390	15.9	127,856	84.1	0.711	12,158	5.8	149,058	94.2	<0.001	73,975	50.9	87,259	49.1	<0.001
	yes	11,433	15.8	45,976	84.2		4,768	6.6	52,625	93.4		19,325	37.1	38,084	62.9	
BMI	low	1,492	6.9	10,820	93.1	<0.001	513	2.6	11,793	97.4	<0.001	4,617	43.7	7,691	56.3	<0.001
	normal	27,862	13.3	128,668	86.7		10,762	5.2	145,741	94.8		69,161	48.9	87,385	51.1	
	over	15,557	26.5	34,469	73.5		5,680	9.4	44,334	90.6		19,539	42.1	30,471	57.9	

Table 5. Effects on hypertension, diabetes morbidity & quality of life

characteristic	hypertension		diabetes		quality of life		
	OR	95% CI	OR	95% CI	OR	95% CI	
gender	M	1			1		
	F	0.78	0.76-0.81	0.66	0.63-0.69	0.71	0.69-0.72
age	19-39	1		1		1	
	40-59	6.38	5.98-6.80	8.10	7.23-9.08	0.60	0.59-0.62
	≥ 60	28.47	26.61-30.47	25.28	22.47-28.45	0.30	0.29-0.31
level of edu.	< middle	1		1		1	
	high school done	0.65	0.63-0.68	0.70	0.66-0.74	1.73	1.67-1.79
	> college	0.58	0.55-0.61	0.57	0.52-0.61	2.02	1.95-2.10
district	town	1		1		1	
	mid-town	0.91	0.89-0.94	0.91	0.87-0.95	1.05	1.02-1.08
stress	yes	1		1		1	
	no	1.21	1.17-1.26	1.36	1.29-1.43	0.50	0.49-0.52
body type perception	normal	1		1		1	
	low	0.69	0.66-0.72	0.97	0.92-1.02	0.91	0.88-0.94
	over	1.43	1.37-1.51	1.36	1.29-1.43	0.75	0.72-0.77
obesity	normal	1		1		1	
	low	0.49	0.45-0.54	0.58	0.51-0.67	0.77	0.73-0.81
	over	2.74	2.64-2.84	1.79	1.70-1.88	0.72	0.70-0.74

### 3.5. Effects on diabetes morbidity

The multiple regression analysis of the factors affecting diabetes morbidity found that women had 0.66(0.630-0.690) times lower OR(95% CI) than men and that the respondents aged 40-59 and those aged  $\geq 60$  had higher OR than those aged 19-39: 8.10(7.230-9.075) times and 25.28(22.470-28.450) times, respectively. High school graduates and college graduates and those at higher education levels had lower OR than middle school graduates and those at lower education levels—0.70(0.658-0.739) times and 0.57 (0.524-0.608) times, respectively—and the respondents residing in eups had 0.91 (0.872-0.952) times lower OR than those residing in dong. The respondents under stress had 1.36(1.294-1.428) times higher OR; those excessively perceiving their body weight had 1.79(1.702-1.876) times higher OR than those having correct perception. The underweight had 0.58(0.511-0.669) times lower OR and the overweight had 1.79(1.702-1.876) times higher OR than those with normal weight(Table 5).

### 3.6. Effects on quality of life

The multiple regression analysis of the factors affecting the quality of life found that women had 0.71(0.689-0.722) times lower OR(95% CI) than men and that the respondents aged 40-59 and those aged  $\geq 60$  had lower OR than those aged 19-39: 0.60(0.587-0.621) times and 0.30 (0.289-0.312) times, respectively. High school graduates and college graduates and those at higher education levels had higher OR than middle school graduates and those at lower education levels—1.73(1.673-1.788) times and 2.02(1.947-2.095) times, respectively—and the respondents residing in eups had 1.05 (1.022-1.078) times higher OR than those

residing in dong. The respondents under stress had 0.50 (0.490-0.517) times lower OR than those free of stress; both those poorly perceiving their body weight and those excessively perceiving their body weight had lower OR than those having correct perception: 0.91 (0.884-0.940) times and 0.75(0.720-0.770) times, respectively. Both the underweight and the overweight had lower OR—0.77(0.728-0.807) times and 0.72(0.696-0.738) times, respectively—than those with normal weight(Table 5).

## 4. Discussion

This study aimed to analyze body type perception and determine its correlation with disease morbidity and the quality of life for those aged  $\geq 19$  years who were respondents to the 2010 Community Health Survey.

34.9% of all the respondents misperceived their body type; women were more likely to misperceive their body type than men; and those under stress were more likely to misperceive their body type. This is lower than in Park<sup>8)</sup>'s finding that 42.8% misperceived their body weight, and is consistent with the one that women were more likely to misperceive their body weight.

Older respondents were more likely to perceive their body type poorly. Since people become more susceptible to chronic diseases as they get older, poor perception of body weight can lead to wrong weight control; therefore, it is necessary to give the elderly weight control training in relation to chronic diseases.

The respondents poorly perceiving their body type were significantly more susceptible to both hypertension and diabetes and were more likely to show good or excellent quality of life. Further research should be conducted on whether weight control caused by chronic disease morbidity is

more likely to lead to poor perception or on whether body type perception is a factor affecting chronic disease morbidity. The respondents considering their body weight to be at lower levels were more likely to show higher levels of quality of life represented by the quality of life; therefore, considering body weight to be at lower levels seems to affect mental health and the quality of life.

When correction was made in relation to gender, age, and so on, poor perception was less likely to affect hypertension morbidity than correct perception; excessive perception was 1.43 times more likely to affect hypertension morbidity; and overweight were 2.74 times more likely to affect hypertension morbidity. Those who considered themselves to be more obese than actual were more susceptible to hypertension; the overweight were more susceptible to hypertension.

Like hypertension, the overweight with excessive perception were significantly more susceptible to diabetes.

Both poor and excessive perception—0.91(0.884-0.940) times and 0.75(0.720- 0.770) times, respectively—led to lower quality of life than correct one; both underweight and overweight—0.77(0.728- 0.807) times and 0.72(0.696-0.738) times, respectively—led to lower quality of life than normal weight. This is consistent with Youn<sup>9)</sup>'s finding that the underweight and the obese had lower quality of life than those with normal weight.

## 5. Conclusion

As 34.9% of the whole adult population in South Korea misperceive their body type, it is urgent to give education and instruction about correct body type perception. Distorted body type perception affected disease morbidity and the quality of life: the respondents excessively

perceiving their body type were significantly more susceptible to both hypertension and diabetes and those perceiving their body type excessively or poorly showed lower quality of life than those perceiving it correctly. It is therefore necessary to make multilateral efforts to cultivate correct body type perception. However, as the comparison of body type perception and disease morbidity found that cognitive differences affected disease morbidity, it is necessary to make relevant factor analysis additionally.

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