

The Effect of Oral Health on Obesity in Middle-aged Men

So-young Park¹, So-youn An², Youn-soo Shim^{*3}

¹Assistant professor, Department of Dental Hygiene, Wonkwang Health Science University, 514, Iksan-daero, Iksan-si, Jeollabuk-do, 54538, Korea

²Professor, Dept. of Pediatric dentistry, College of dentistry, Wonkwang University, 460, Iksan-daero, Iksan-si, Jeollabuk-do, 54538, Korea

^{*3}Associate professor, Department of Dental Hygiene, Sunmoon University, 70, Sunmoon-ro 221beon-gil, Tangeong-myeon, Asan-si, Chungcheongnam-do, 31460, Korea

1101so-young@hanmail.net¹, 9543sue@hanmail.net², shim-21@hanmail.net^{*3}

Abstract

Background/Objectives: This study is to discuss the determinants of oral health variables that affect the obesity of some middle-aged men and to help them to operate an effective obesity-related program.

Methods/Statistical analysis: In oral health, the body mass index was high when the teeth were sore, when there was mental discomfort, when there was periodontal disease. Scaling, frequency of brushing and use of oral hygiene supplements were the factors affecting the obesity of oral health behavior. That is, when you regularly measure BMI, you have more than three brushings per day and a higher BMI when you use oral hygiene products.

Findings: The factors affecting the waist circumference are the higher waist circumference when scaling is performed regularly and the number of brushings per day is more than three times.

The presence of periodontal disease, gum bleeding, and long waist circumference were associated with oral health loss, tooth loss, and periodontal disease. The conclusion of this study is that middle-aged men are required to manage their obesity and to have good health and oral health status in order to lead a healthy life. Factors influencing body mass index were demographic, socioeconomic, family, and age, religion, and occupation were not statistically significant. In other words, middle-aged men with lower economic status had higher BMI than those with higher middle-aged men.

Improvements/Applications: Self - health care behaviors for lowering obesity in middle - aged men and health and oral health promotion projects with low cost and high efficiency should be systematically promoted.

Keywords: Body Mass Index, Health Risk, Middle-aged Men, Oral Health, Waist Circumference

1. INTRODUCTION

Considering that middle-aged adults are now the subject of an aging society that is realizing soon, middle-aged people are preparing for a successful old age and their emotional and social conditions and health problems are much more meaningful in terms of preventing the problems related to the elderly.

The World Health Organization has declared that obesity is an accumulation of fat in the adipose tissue that is harmful to health and is one of the most dangerous health risks worldwide and a global health risk factor for the world[1]. Obesity is a chronic disease that requires not only changes in body shape but also active treatment. It is an important public health concern that is attracting attention in various countries. The main reason for obesity to come to the fore as a social issue is physiological disease, because it negatively affects relationship activities and lowers the happiness of life.

The oral health status of the subjects is an important factor in improving the management aspect, social life, appearance, and life satisfaction of oneself. Their health and oral health have a great impact on family members and require systemic health care. Studies on mental health and physical health have been published mainly in middle age[2,3], but there are few studies on the relationship between health and oral health status and obesity in middle-aged men. Subjects with periodontal disease had a higher degree of obesity. In previous studies, the body mass index of adults was higher as perceived periodontal disease symptoms[4]. Overweight, obesity, and increased waist circumference were also found to be risk factors for periodontal disease or periodontal health [5-7].

The prevalence of periodontal disease in adults increases with age, is increasing rapidly from middle age, and is the highest in old age. Obesity is one of the leading causes of periodontal disease. About 30 % of the obese group and 10% of the abdominal obesity group had poor periodontal status. Patients with periodontal disease prefer to drink high-calorie beverages and processed foods that are chewy and supplement their energy, which is uncomfortable to ingest food that requires chewing activity, which will help increase obesity rates[8-10].

2. MATERIALS AND METHODS

2.1. *Research subject and method*

This study was conducted on 427 middle - aged men. The subjects were selected by convenience sampling method. The questionnaire was used to measure the body mass index and waist circumference of middle - aged males who accepted the study after completing the study.

2.2. *Data analysis*

The variables set in this study were demographic characteristics, oral health, body mass index and waist circumference. The Body Mass Index (BMI) is a measure of obesity that is calculated as body weight (kg) / height (m²) to determine the obesity level of the subject. Using the baseline indicators provided by the World Health Organization's Asia-Pacific region [1], the BMI of less than 18.5 kg / m² was 'underweight', 18.5-22.9 kg / m² was 'normal', and 23.0-24.9 kg / m² 'Overweight', and over 25.0 kg / m² 'obesity'. The body measurements were measured by a surveyor who had received the consent of a middle - aged woman and a cultural center representative. The measuring instrument used a high - precision scales that can calculate the mobile body mass index. The measuring method was

to measure the zero point of the scale and measure with the number plate fixed.

In the case of waist circumference, middle-aged women with a waist circumference of 85 cm or less are referred to as "normal", middle-aged women over 85 cm are referred to as "abdominal obesity", and middle-aged women with a waist circumference of 88 cm or more on the basis of the standard indexes proposed by the International Diabetes Federation (IDF) And 'high abdominal obesity'.

3. RESULTS

3.1. The general characteristics of the subjects

The subjects of the study were 306 (71.7%) aged 40-50 and 121 (28.3%) aged 51-60. 387(90.6%) had a family member living together, and 40 (9.4%) did not. 196 (45.9%) had no religion, and 231 (54.1%) had no religion.

Economically, 258 (60.4%) were middle, 87 (20.4%) were low, and 82 (19.2%) were high. There were 179 (41.9%) of the occupations and 248 (58.1%) of them were not. There were 115(26.9%) cases with system disease and 312(73.1%) cases without system disease.

In the Body Mass Index, 166 (38.9%) were overweight, 92 (21.5%) were normal-weight, and 87 (20.4%) were under-weight and 82 were obese (19.2 percent). Table 1 shows that the highest group in waist circumference was 'normal' 204 (47.8%), 'abdominal obesity' at 193 (45.2%), and 'abdominal obesity' at 30 (7.0%).

Table 1: The general characteristics of the subjects

Variables		N	%
Age(years)	40-50	306	71.7
	51-60	121	28.3
Cohabiting with family	YES	387	90.6
	No	40	9.4
Religion	YES	196	45.9
	No	231	54.1
Economic level	Low	87	20.4
	Middle	258	60.4
	High	82	19.2
Occupation	YES	179	41.9
	No	248	58.1
System disease	YES	115	26.9
	No	312	73.1
BMI	Under-weight	87	20.4
	Normal-weight	92	21.5

Waist circumference	Over-weight	166	38.9
	Obese	82	19.2
	Normal	204	47.8
	Abdominal obesity	193	45.2
	Abdominal obesity (severe)	30	7.0
Total		427	100.0

3.2. Oral health status and frequency of oral health behavior

In the study subjects, 31 (7.3%) had tooth pain and 396 (92.7%) did not. There were 55 cases (12.9%) with tooth loss and 372 cases (87.1%) without tooth loss. There were 90 cases (21.1%) with mild discomfort, and 337 cases (78.9%) without mild cases. 62 (14.5%) had tooth fracture, and 365 (85.5%) did not have tooth fracture. 209 patients (48.9%) had dental caries and 218 patients (51.1%) had no dental caries. There were 337 (88.3%) cases with periodontal disease and 50 (11.7%) cases without periodontal disease. 385 patients (90.2%) had blood in the gums and 42 patients (9.8%) did not.

181 (42.4%) had halitosis and 246 (57.6%) did not. 312 patients (73.1%) had good oral health status and 115 patients (26.9%) had bad ones.

92 (21.5%) were scaled for the past year, and 335 (78.5%) were not. 90 (21.1%) visited the dentist for the past year, and 337 (78.9%) did not. 181 (42.4%) were taking gum medication and 246 (57.6%) were not taking it. 181 patients (42.4%) had more than 3 times of brushing, and 246 (57.6%) had less than 3 times of brushing. 202 (47.3%) were using oral hygiene products and 225 (52.7%) were not using oral hygiene products. 31 patients (7.3%) were using dentures and 396 (92.7%) were not. In Table 2, 209 (48.9%) received oral health education and 218 (51.1%) did not receive oral health education.

Table 2: Oral health status and frequency of oral health behavior

Variables		N	%
Tooth pain	YES	31	7.3
	No	396	92.7
Tooth loss	YES	55	12.9
	No	372	87.1
Chewing problem	YES	90	21.1
	No	337	78.9
Tooth fracture	YES	62	14.5
	No	365	85.5
Dental caries	YES	209	48.9

	No	218	51.1
Periodontal disease	YES	377	88.3
	No	50	11.7
Gingival bleeding	YES	385	90.2
	No	42	9.8
Halitosis	YES	181	42.4
	No	246	57.6
Subjective oral health status	YES	312	73.1
	No	115	26.9
Scailing(year)	YES	92	21.5
	No	335	78.5
Dental visits(year)	YES	90	21.1
	No	337	78.9
Gum medicine	YES	181	42.4
	No	246	57.6
Toothbrushing frequency	YES	181	42.4
	No	246	57.6
Using oral hygiene auxiliaries	YES	202	47.3
	No	225	52.7
Denture use	YES	31	7.3
	No	396	92.7
Oral health education	YES	209	48.9
	No	218	51.1
Total		427	100.0

3.3. Factors affecting obesity by population sociological characteristics

The results of multiple regression analysis of factors affecting obesity were as follows. Factors influencing body mass index were demographic, socioeconomic, family, and age, religion, and occupation were not statistically significant. In other words, middle-aged men with lower economic status had higher BMI than those with higher middle-aged men. The explanatory power of the variable was 74.3. The factors influencing the waist circumference were demographic and socioeconomic characteristics such as age, religion, and economic status. In other words, if

you live alone, your waist circumference is longer than that of a middle-aged male with no occupations. Table 3 shows the explanatory power of the variables was 62.1.

Table 3: Factors affecting obesity by population sociological characteristics

Classification	BMI		WC	
	B	β	B	β
Age(years)	-.061	-.052	-.111	-.058
Cohabiting with family	-.091	-.028*	-.050	-.015**
Religion	.206	.077	1.795	.877
Economic level	-.121	-.062*	.085	.041
Occupation	-.326	-.036	.033	.014*
System disease	.038	.017	.513	.412
R ²	4.947		25.780	
AdR ²	.743		.621	
F	.737		.614	

BMI : Body Mass Index

WC : Waist Circumference

3.4. Factors Affecting Oral Health on Obesity

The results of multiple regression analysis on the factors affecting oral health on obesity were as follows. Tooth loss, Tooth fracture, Dental caries, Gingival bleeding, Halitosis, Subjective oral health status were not statistically significant. In other words, the body mass index was higher when the teeth were sick, when there was mental discomfort, and when periodontal disease was present. The explanatory power of the variables was 45.7.

Tooth loss, periodontal disease, and gingival bleeding were the factors that affected oral health, and Tooth pain, Chewing problem, Tooth fracture, Dental caries, Halitosis and Subjective oral health status were not statistically significant. In other words, when there is a missing tooth, periodontal disease, and gum bleeding, the waist circumference is longer. Looking at Table 4, the explanatory power of the variables was 56.0.

Table 4: Factors affecting oral health on obesity

Classification	BMI		WC	
	B	β	B	β
Tooth pain	.147	.076*	.044	.017
Tooth loss	-.001	-.000	-.023	-.009*
Chewing problem	1.792	.775**	-.032	-.010
Tooth fracture	.059	.028	-.233	-.122

Dental caries	.096	.045	.228	.089
Periodontal disease	-.179	-.054**	.075	.039**
Gingival bleeding	-.134	-.075	.067	.025*
Halitosis	-.226	-.087	-.036	-.011
Subjective oral health status	.410	.213	.135	.326
R ²	14.199		5.924	
AdR ²	.457		.560	
F	.425		.513	

BMI : Body Mass Index

WC : Waist Circumference

3.5. Factors Affecting Oral Health Behavior on Obesity

The results of multiple regression analysis on the factors affecting the obesity degree of oral health behavior are as follows. Scaling, Toothbrushing frequency, and Using oral hygiene auxiliaries were the factors that affected the BMI, and Dental visits and Gum medicine were not statistically significant. In other words, when scaling is regularly performed, the body mass index is higher when the number of times of brushing per day is more than three times, and when using oral hygiene products. The explanatory power of the variable was 77.0.

The factors affecting the waist circumference were 'Scaling', 'Toothbrushing frequency', 'Using oral hygiene auxiliaries', 'Dental visits', and 'Gum medicine' were not statistically significant. That is, when scaling is regularly performed, the waist circumference is higher when the number of times of brushing per day is three times or more. Table 5 shows the explanatory power of the variables was 60.8.

Table 5: Factors Affecting Oral Health Behavior on Obesity

Classification	BMI		WC	
	B	β	B	β
Scaling(year)	.010	.067*	.008	.042*
Dental visits(year)	.116	.038	-.099	-.023
Gum medicine	.066	.096	-.037	-.038
Toothbrushing frequency	.011	.006*	-.749	-.301*
Using oral hygiene auxiliaries	1.722	.894*	-.636	-.237
Denture use	.222	.111	-.061	-.022
Oral health education	-.089	-.025	.186	.038
R ²	.773		.623	
AdR ²	.770		.608	
F	204.181		8.393	

4. CONCLUSION

The physical characteristics of middle-aged obese men are characterized by the concentration of fat deposits around the waist and abdomen, increasing neck circumference, waist circumference, and thickening of waist. The implication of this study is that health care and desirable oral health management are needed to reduce the body mass index and waist circumference of middle - aged men. Healthcare accessibility is required to practice this. In other words, self health care behavior for lowering obesity of middle-aged men, and oral health promotion project with low cost and high efficiency should be systematically promoted.

Most importantly, systematic and effective management of oral health conditions that increase the risk of constituents in middle-aged men is required to prevent obesity. This study will be useful data for health and oral health care and health care services for middle - aged men.

In order to improve the quality of life through health promotion of middle-aged men, and health promotion programs should be developed. In addition, a systematic program for preventing and managing overweight and obesity should be continuously provided as the main cause of chronic diseases. A systematic prevention and management system for obesity should be established to raise the health level of middle-aged men and to prevent chronic diseases.

Improving the efficiency of obesity prevention and management programs and improving obesity In order to achieve this, an obesity prevention program based on a more scientific and systematic research design should be developed. In addition, a management system for continuous monitoring is required, and cooperation with community-related organizations is needed to utilize limited resources.

REFERENCES

- [1] World Health Organization. Obesity: Preventing and Managing the Global Epidemic: Report of a WHO Consultation. World Health Organ Tech Rep Ser. 2000;894:i-xii, 1-253.
- [2] Holahan CK, Holahan CJ, Li X, Chen YT. Association of Health-related Behaviors, Attitudes, and Appraisals to Leisure-Time Physical Activity in Middle-Aged and Older Women. *Women & Health*. 2017 Feb;57(2):121-136.
- [3] Khader YS, Bawadi HA, Haroun TF, Alomari M, Tayyem RF. The association between periodontal disease and obesity among adults in Jordan. *J Clin Periodontol*. 2009 Jan;36(1):18-24.
- [4] Heslehurst N, Lang R, Rankin J, Wilkinson JR, Summerbell CD. Obesity in pregnancy: a study of the impact of maternal obesity on NHS maternity services. *BJOG*. 2007 Mar;114(3):334-42.
- [5] Keller A, Rohde JF, Raymond K, Heitmann BL. Association between Periodontal Disease and Overweight and Obesity: A Systematic Review. *J Periodontol*. 2015 Jun;86(6):766-76.
- [6] Doll S, Paccaud F, Bovet P, Burnier M, Wietlisbach V. Body Mass Index, Abdominal Adiposity and Blood Pressure: Consistency of their Association Across Developing and Developed Countries. *Int J Obes Relat Metab Disord*. 2002 Jan;26(1):48-57.
- [7] Ervin RB. Prevalence of Metabolic Syndrome Among Adults 20 Years of Age and Over, by Sex, Age, Race and Ethnicity, and Body Mass Index: United States, 2003-2006. *Natl Health Stat Report*. 2009 May 5;(13):1-7.

- [8] Peter G.K. Obesity as a Medical Problem, International Journal of Science Nature, 2000 Apr;404, 635-643.
- [9] Paeratakul S, Lovejoy JC, Ryan DH, Bray GA. The Relation of Gender, Race and Socioeconomic Status to Obesity and Obesity Comorbidities in a Sample of US Adults. Int J Obes Relat Metab Disord. 2002 Sep;26(9):1205-10.
- [10] Byrne NM, Sainsbury A, King NA, Hills AP, Wood RE. Intermittent energy restriction improves weight loss efficiency in obese men: the MATADOR study. Int J Obes (Lond). 2018 Feb;42(2):129-38.