

# Characterizing the Profile of Obese Patients: Example from the Newly Opened Obesity Clinic at a Single University Hospital

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**Purpose:** An obesity clinic was newly opened at a single university hospital in South Korea. We aimed to characterize the profile of patients and current status of the clinic. **Materials and Methods:** 60 patients who have visited the obesity clinic from October 2015 to April 2016 were included in this study. Baseline examination included anthropometric measurement, bioelectrical impedance analysis, blood sampling, and abdominal computed tomography (CT) analysis to estimate abdominal fat distribution. Weight loss program of the clinic constituted of 8 sessions of physician encounter and nutrition counselling. Data on the profile of patients and their completion status were collected and analyzed. **Results:** Sixty obese adults (21 males and 39 females) were included in the study. The mean ( $\pm$ standard deviation [SD]) body mass index was  $31.1 \pm 5.7$ , and abdominal circumference was  $100.2 \pm 18.3$ . The mean  $\pm$ SD percentage of body fat measured by bioelectrical impedance analysis was analyzed  $35.7 \pm 6.2\%$  in males, and  $40.6 \pm 6.2\%$  in females. The average intra-abdominal fat area was 243.7 cc in males, and 142.5 cc in females. Among 60 subjects, 37 patients (61.7%) are currently on their sessions; 11 patients (18.3%) completed 8 sessions of the program; 8 patients (13.3%) dropped out; 4 patients (6.7%) did not register the program session with initial evaluation only. The mean weight loss (kg) of 11 completers was 5.1 kg. **Conclusion:** Using the strengths of a university hospital as multidisciplinary team care, effective treatment strategies for overweight and obesity are the future directions of our clinic.

**Key Word:** Obesity

## INTRODUCTION

The growing prevalence of obesity is a global health concern. According to WHO Adult Obesity Facts, more than one-third of U.S. adults are obese [1]. Obesity issues have been considered more prominent in western countries, but an increasing number of Asian countries are quickly gaining weight. Also in Korea, 31.5 percent of Korean adults were analyzed to be categorized as obese, with a BMI of 25 or above according to Korea National Health and Nutrition Examination Surveys (KNHANES) in

2014. American Medical Association [2] has recently announced obesity as a disease. Obesity-related conditions include hypertension, dyslipidemia, type 2 diabetes, stroke, coronary heart disease, sleep apnea and certain types of cancer [3]. Growing prevalence of obesity and obesity-related diseases leads to increasing socioeconomic burden. According to the National Health Insurance Corporation (NHIC) cohort data and the 2005 Korea National Health and Nutrition Examination Survey (KNHANES) data, the estimated total socioeconomic costs of overweight and obesity were approximately U\$1,787 million (men: U\$1,081

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million, women: U\$706 million) [4].

The early detection and appropriate management of obesity are needed to reduce the burden of obesity related diseases. AHA/ACC/TOS has provided an algorithm for primary care physicians in the evaluation, prevention, and management of excess body weight in their patients [5]. Treatment options include lifestyle modifications, such as dietary, physical activity, and behavioral intervention, and medical interventions, such as pharmacotherapy and surgery. Since obesity is a multifactorial disease, management of obesity is needed to be coordinated among multi-disciplinary treatment teams. University medical center has its strength in multidisciplinary care compared with primary care setting. Evaluation and management of obesity can be more individualized to obese patients.

Herein, we report an example of the obesity clinic newly opened at a single university hospital in South Korea. We aimed to characterize the profile of patients visiting our clinic and discuss the challenges and future directions of our clinic.

## MATERIALS AND METHODS

In this study, we included 60 patients who have visited the obesity clinic from October 2015 to April 2016. Baseline examination of obesity clinic included anthropometric measurements obtained by a trained and certified nurse. The height (cm), weight (kg), waist circumference (cm), and hip circumference (cm) of each subject were measured, and the body mass index (BMI; kg/m<sup>2</sup>) was calculated as body weight (kilogram) divided by body height squared (square meter). Overweight was defined as a BMI of 23.0 kg/m<sup>2</sup> or greater, and obesity was defined as a BMI of 25.0 kg/m<sup>2</sup> or greater according to WHO definitions based on the revised criteria for Asian populations [6]. Bioelectrical impedance (BIA) measurement, evaluating exercising capacity, and analyzing abdominal computed tomography (CT) measurements to estimate abdominal fat distribution were done to each patient. Fasting venous blood samples were drawn into serum separator tubes from all subjects on their first visit. Complete blood count, serum glucose, hemoglobin

**Table 1.** General characteristics of patients visiting obesity clinic at one university medical center

	Total	Male	Female	P-value
n (%)	60 (100)	21 (35.0)	39 (65.0)	
Age	40.2±13.9	41.0±14.5	39.8±13.8	0.002
≤19	2 (3.3)	0	2 (5.1)	0.39
20-39	28 (46.7)	11 (52.4)	17 (43.6)	
40-59	22 (36.7)	5 (23.8)	17 (43.6)	
≥60	8 (13.3)	5 (23.8)	3 (7.7)	
Height (cm)	164.4±8.8	173.6±6.5	159.4±5.1	0.06
Weight (kg)	84.9±21.2	101.4±22.1	76.1±14.6	0.04
BMI (kg/m <sup>2</sup> )	31.1±5.7	33.4±6.0	29.8±5.2	0.07
<25	9 (15.0)	2 (9.5)	7 (17.9)	0.07
≥25, <30	21 (35.0)	6 (28.6)	15 (38.5)	
≥30, <35	16 (26.7)	5 (23.8)	11 (28.2)	
≥35	14 (23.3)	8 (38.1)	6 (15.4)	
Waist circumference (cm)	100.2±18.3	112.7±13.1	93.3±17.3	0.15
Hip circumference (cm)	108.7±6.8	112.3±6.3	107.0±6.4	0.08
SBP (mmHg)	131.9±22.6	138.6±18.9	126.9±23.7	0.02
DBP (mmHg)	82.3±14.9	88.2±12.7	79.0±15.2	0.06
Muscle (kg) <sup>†</sup>	28.3±7.2	36.3±5.7	24.1±3.2	0.06
Fat (kg) <sup>†</sup>	33.8±12.0	37.3±14.1	32.0±10.5	0.07
Fat percent (%) <sup>†</sup>	38.9±6.6	35.7±6.2	40.6±6.2	0.03
Abdominal total fat area (cc) <sup>‡</sup>	465.2±163.9	553.3±192.7	414.9±121.5	0.13
Abdominal visceral fat area (cc) <sup>‡</sup>	179.3±86.6	243.7±91.6	142.5±58.2	0.13
Abdominal subcutaneous fat area (cc) <sup>‡</sup>	285.8±112.9	309.5±137.9	272.3±95.4	0.22

Data are presented as n (%) or Mean±SD.

<sup>†</sup>measured by bioelectrical impedance analysis.

<sup>‡</sup>measured by abdominal computed tomography (CT).

**Table 2.** Biochemical profiles of patients visiting obesity clinic at one university medical center

	Total	Male	Female	P-value
Fasting glucose, mg/dl	109.5±40.5	126.9±61.4	99.7±15.6	0.73
Hemoglobin A1c, %	6.0±1.4	6.5±2.1	5.7±0.7	0.62
Total cholesterol, mg/dl	210.4±32.9	206.9±27.8	212.4±35.8	0.49
HDL, mg/dl	50.5±12.8	45.3±8.4	53.3±14.0	0.004
LDL, mg/dl	130.7±31.5	131.5±29.8	130.3±32.9	0.19
Triglyceride, mg/dl	137.0±76.2	151.6±82.2	129.0±72.8	0.02
Creatinine, mg/dl	0.78±0.16	0.95±0.14	0.69±0.08	0.16
eGFR	102.8±16.1	98.4±18.4	105.3±14.3	0.02
ALP, IU/L	57.3±15.6	57.9±20.3	56.9±12.5	0.36
AST, U/L	36.5±36.8	50.2±50.6	28.6±23.4	0.37
ALT, U/L	51.5±47.4	78.0±56.4	36.1±33.6	0.15
TSH, uIU/ml	2.3±2.4	2.3±1.1	2.3±2.9	0.46
Urine albumin/creatinine ratio, mg/g.Cre	22.6±42.1	32.28±63.3	16.3±18.0	0.29

**Table 3.** Completion status of total patients (based on May 2016)

Status	Total	Male	Female	P-value
On session	37 (61.7)	10 (47.6)	27 (69.2)	0.32
Completed	11 (18.3)	6 (28.6)	5 (12.8)	
Not registered (only initial evaluation done)	4 (6.7)	2 (9.5)	2 (5.1)	
Dropout	8 (13.3)	3 (14.3)	5 (12.8)	
Total	60 (100)	21 (100)	39 (100)	

A1C, ALP (alkaline phosphatase), AST (aspartate aminotransferase), ALT (alanine aminotransferase), albumin, total protein, calcium, phosphorus, total cholesterol, triglyceride, HDL (high density lipoprotein), LDL (low density lipoprotein), thyroid stimulating hormone (TSH), and free T4 were measured.

Patients were told the result of baseline measurement by a physician in a week after initial visit day, and registered the obesity management program. The program consisted of 8 sessions following the initial visit and patients were recommended to complete the course within three months. During the first month, the patient was supposed to visit the clinic every one week, and then visit every two weeks during the next two months. Patients were encouraged to keep a food diary daily in written form. Each session was made of anthropometric measurement, BIA analysis, physician encounter and nutrition counseling by a nutritionist. After the 8 sessions, some completers have re-registered the program of 8 sessions, and the others were recommended a short-term visit to the clinic.

We analyzed the characteristics of sixty patients by t-test

for continuous variable and chi-square test for categorical variables. Regarding the patient who had completed the program, we compared the result of the initial evaluation with that of the last session. All analyses were conducted using SPSS, version 21.0 (SPSS Inc., Chicago, IL).

## RESULTS

Sixty obese adults (21 males and 39 females) were included in the study. The mean ( $\pm$  standard deviation [SD]) age was  $39.5 \pm 12.7$  years. The rates for those in the age group of  $\leq 19$  years, 20-39 years, 40 to 59 years, and  $\geq 60$  years were 3.3%, 46.7%, 36.7%, and 13.3%, respectively ( $P=.39$ ). The mean  $\pm$  SD BMI was  $31.1 \pm 5.7$ , and AC was  $100.2 \pm 18.3$ . The mean  $\pm$  SD percentage of fat measured by bioelectrical impedance analysis was analyzed  $35.7 \pm 6.2\%$  in males, and  $40.6 \pm 6.2\%$  in females ( $P=.03$ ). The mean  $\pm$  SD area of abdominal visceral fat area was  $243.7 \pm 91.6$  (cc) in males, and  $142.5 \pm 58.2$  (cc) in females ( $P=.13$ ). General characteristics and biochemical profiles of patients are shown in Table 1 and 2.

As shown in Table 3, among study subjects 37 patients (61.7%) are currently on their sessions based on May 2016; 11 patients (18.3%) completed 8 sessions; 8 patients (13.3%) dropped out; 4 patients (6.7%) did not register the program session with initial evaluation only ( $P=.32$ ).

Table 4 compares the result of initial assessment with the result of the last session among 11 patients at the end of 8 sessions. The mean weight loss kilogram of 11 patients was

**Table 4.** Comparison between the result of initial assessment with the result of the last session (n=11)

Case	Sex	Age	Height	BMI	Initial		Session 8		ΔWt (kg)	ΔAC (cm)
					Wt	AC	Wt	AC		
1	F	20	157.1	36.1	89	94	87.1	90.5	1.9	3.5
2	M	44	178.6	28.6	91.3	99	78.8	91.5	12.5	7.5
3	M	40	173.3	37.7	113.3	112	105.4	106	7.9	6
4	M	29	181	41.5	136	133	128.2	126.5	7.8	6.5
5	F	63	156.9	24.4	60.1	80.5	59.5	80	0.6	0.5
6	F	33	173.6	35.7	106.7	110	105.5	105.5	1.2	4.5
7	M	31	175.9	37.4	115.8	112.5	110.1	107	5.7	5.5
8	F	49	157	31.2	77	104.5	71.5	95.5	5.5	9
9	M	69	157.4	29.1	72.1	99	67.8	95	4.3	4
10	M	28	180.3	44.5	144.8	135.5	139.2	131	5.6	4.5
11	F	41	155	32.1	77.1	90	74.3	90	2.8	0

5.1 kg. Subjects who did not lose their weight enough despite 8 sessions were to re-register the program or do regular follow-ups.

## DISCUSSION

Patient-centered programs as well as individual effort to lose weight are both important for obesity management. Multidisciplinary care and practical approaches to lifestyle change can be an effective means of treatment for many patients. Diet, exercise and behavior modification are the foundation of managing obesity. Pharmacologic or surgical treatment of obesity can also be considered. The physician must consider the patient’s risk status when selecting appropriate therapy for obesity. In some persons surgical intervention may be considered if medical treatment and lifestyle modification are insufficient. In terms of surgical management of obesity, the Asian perspective on bariatric and metabolic surgeries has not been actively discussed until recently, despite an elevated risk of type 2 diabetes mellitus, hypertension, and hyperlipidemia at a relatively lower BMI than Western populations [7]. In our clinic, sixty subjects were all intervened with medical management. Several patients whose weight loss was crucial due to coexisting conditions were recommended surgical treatment by physicians. Although diet, exercise and lifestyle modifications remain the cornerstones of obesity treatment, bariatric surgery should be considered the treatment of choice for morbidly obese patients.

The mean weight loss kilogram of 11 patients who had

completed the program in our clinic was 5.1 kg. Success in maintaining weight loss can be defined as intentionally losing 5-10% of initial body weight and maintaining it for at least one year. According to this definition, long-term result of these patients would be necessary with appropriate follow-up strategies. Identifying the predictors of drop-out can be also helpful to discuss the challenges and future directions of our clinic.

In this study, we reported an example of the newly opened obesity clinic at a single university hospital in South Korea. Effective treatment strategies for overweight and obesity would be implemented using the strengths of a university hospital as multidisciplinary team care in the future.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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