

경기 일개 시 초등학교 5학년 전체에서 체질량지수 85백분위수와 95백분위수에 해당하는 체지방률과 허리둘레

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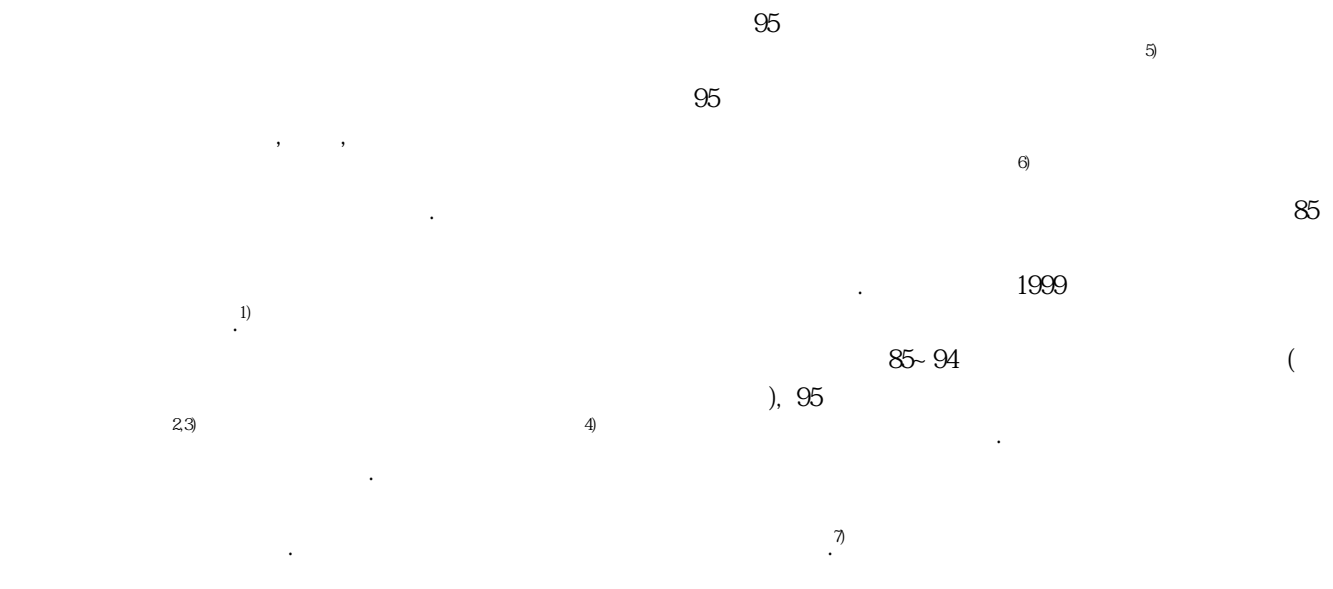
: 소아 비만은 성인비만으로 이어지며 여러 가지 합병증을 조기에 발현시키므로 정확한 평가와 관리가 매우 중요하다. 그러나 체질량지수를 사용하는 진단 이외에 허리둘레와 체지방률에 대한 절단점이 없는 상황이다. 본 연구에서는 동일 성별, 연령별 체질량지수의 95백분위수에 해당하는 체지방률과 허리 둘레의 절단점을 알아보려고 하였다.

: 경기도 군포시 전체 22개 초등학교 5학년 학생 총 4,242명(남 2,152 여 2,090)을 대상으로 2005년 4월부터 5월까지 키, 체중, 복부둘레 등의 신체계측 및 생체전기저항분석법(bioelectrical impedance analysis, BIA)의 원리를 이용하는 체성분분석기를 사용하여 체지방률을 측정하였다. 성별, 연령변화에 따른 체질량지수를 표준(Gold standard)으로 하였고 Receiver Operating Characteristics (ROC) curve를 통해 체지방률과 허리둘레의 비만과 과체중 진단에 대한 민감도와 특이도가 가장 높은 절단점을 구하였다.

: 연구 대상자의 평균 체지방률은 남학생 13.6±6.9%, 여학생 19.4±5.3%였으며 허리둘레의 평균값은 남학생이 68.0±9.1 cm, 여학생은 64.3±7.7 cm였다. 비만의 절단점은 체지방률의 경우 남학생 21.8%, 여학생 24.5%이고 이를 통한 비만학생비율은 남학생과 여학생이 각각 15.2%, 16.7%이며 허리둘레는 남학생 76.9cm, 여학생 70.7cm로 비만학생비율은 남학생 19.7%, 여학생 20.0%로 허리둘레가 체지방률보다 더 많은 학생들을 비만으로 진단하였다.

: 경기도 일개시 초등학교 5학년의 체지방률과 허리둘레의 절단점은 이전의 연구들에서 제시한 값들보다 낮았다.

: 소아비만, 체지방률, 복부 둘레, 절단점



: 2007 4 4 , : 2008 6 13

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9

(Measurement bias)

(DEXA)

Dual-energy X-ray absorptiometry

^{10,11)}

220 (Jawon medical, Korea)

Genius

¹²⁾

DEXA

(Iliac crest)

1999

85

94

), 95

3.

5

13

Recei-

ver Operating Characteristics (ROC) curve

¹⁴⁾

¹⁵⁾

5

curve

The area under the curve (AUC)
(Overall performance)

ROC

¹⁶⁾

1.

SPSS for window version 12.0

4 18

5

2005

25

22

2,152 , 2,090 , 4,242

1.

4,242

2,152

2.

(50.7%),

2,090 (49.3%)

194

180

68.0 cm

64.3 cm

6

136

194

(1). (2).

2. 3.

95 17.2%, 22.2%

21.8% 24.5% 94.6%, 95.2%

15.2%, 16.7% 93.3%, 88.6% (1). 30.0%

76.9 cm 70.7 cm 28.1%

19.7%, 20.0% 71.5 cm 68 cm

. Area under 93.7%, 90.9% 94.7%, 87.7%

the curve (AUC)

0.99, 0.98 0.98, 0.97 32.9%, 29.3%

0.99, 0.98 0.97, 0.97

AUC

Table 1. Subject characteristics (mean±SD).

	Boys (n= 2,152)	Girls (n= 2,090)	P
Age (year)	10.8±0.4	10.7±0.4	0.531
Body weight (kg)	40.1±8.9	37.7±8.0	< 0.001
Height (m)	143.2±6.3	143.9±6.9	0.014
BMI (kg/m ²)	19.4±3.3	18.0±2.9	< 0.001
WC (cm)	68.0±9.1	64.3±7.7	< 0.001
Body fat percentage	13.6±6.9	19.4±5.3	< 0.001
Muscle mass (kg)	31.7±4.6	27.9±4.6	< 0.001
Body fat mass (kg)	6.0±4.3	7.6±3.6	< 0.001

BMI: body mass index, WC: waist circumference

(3).

¹⁷⁾ (Bioelectrical impedance analysis, BIA) (Body composition)

¹⁸⁾

Table 2. Characteristics of diagnostic tests for obesity.

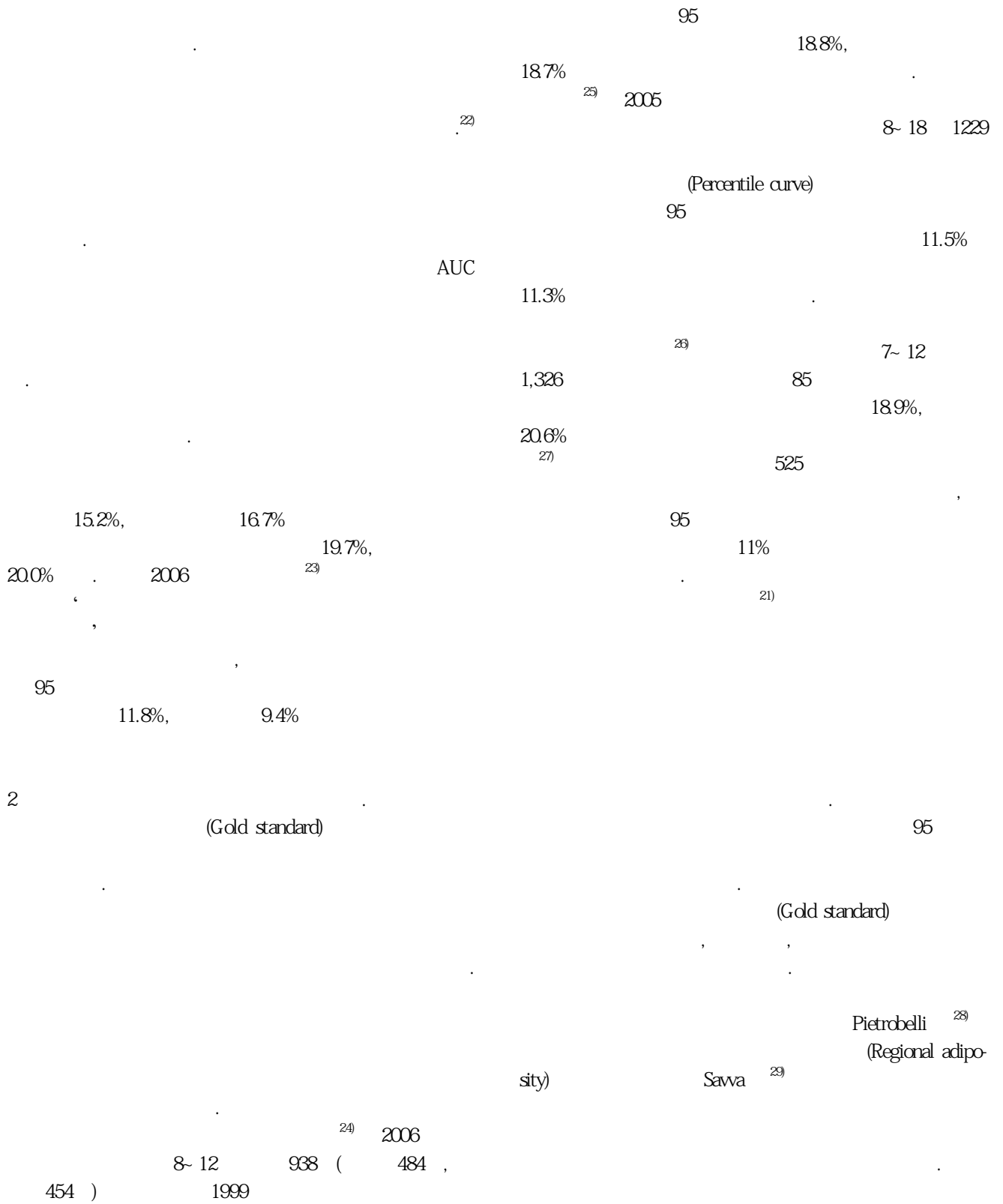
Variables		Cutoffs	AUC (95%CI)	Sensitivity (%)	Specificity (%)	Prevalence (%)
Boys	%BF	21.8%	0.99 (0.98- 0.99)	95.5	95.1	15.2
	WC	76.9 cm	0.98 (0.97- 0.98)	95.9	90.0	19.7
Girls	%BF	24.5%	0.98 (0.98- 0.99)	97.7	90.5	16.7
	WC	70.7 cm	0.97 (0.97- 0.98)	97.7	86.8	20.0

AUC: area under the curve, %BF: percentage body fat, WC: waist circumference, Obesity: BMI 95th percentile

Table 3. Characteristics of diagnostic tests for overweight.

Variables		Cutoffs	AUC* (95%CI)	Sensitivity (%)	Specificity (%)	Prevalence (%)
Boys	%BF	17.2%	0.99 (0.98- 0.99)	94.6	95.2	30.0
	WC	71.5 cm	0.98 (0.97- 0.98)	93.7	90.9	32.9
Girls	%BF	22.2%	0.97 (0.96- 0.98)	93.3	88.6	28.1
	WC	68.0 cm	0.97 (0.96- 0.97)	94.7	87.7	29.3

AUC: area under the curve, %BF: percentage body fat, WC: waist circumference, Overweight: BMI 85th percentile



ABSTRACTS

Percent Body Fat and Abdominal Circumference Cutoff Points Accounted for 85th and 95th Percentile of Body Mass Index in One City of Gyeonggi Province

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Background: Childhood obesity is becoming more prevalent, associated with a variety of adverse consequences which leads to adulthood obesity. Although diagnosis is usually made by body mass index, there is neither a cutoff point for the percentage body fat nor abdominal circumference. The aim of this study was to identify each cutoff point for both measures.

Methods: The measurement of height, weight, abdominal circumference and percentage body fat was performed through manual assessment and bioelectrical impedance analysis for 4,242 subjects aged 11 in Gunpo City, South Korea. The cutoff point for body fat percentage and abdominal circumference is set to maximize the sum of sensitivity and specificity for detecting obesity and overweight using the Receiver Operating Characteristics (ROC) curve.

Results: The mean percentage body fat was $13.6 \pm 6.9\%$ for boys and $19.4 \pm 5.3\%$ for girls. The mean abdominal circumference of boys was 68.0 ± 9.1 cm, and that of girls was 64.3 ± 7.7 cm. The cutoff point of percentage body fat

for obesity was 21.8% in boys and 24.5% in girls. The prevalence of obesity was 15.2%, 16.7% for males and females, respectively. The abdominal circumference cutoff for obesity was 76.9 cm in boys and 70.7cm in girls. Based on that, the prevalence of obesity was 19.7% for boys and 20.0% for girls, which was higher than what was identified by body mass index, as in the case of body fat percentage.

Conclusion: The cutoffs of body fat percentage and abdominal circumference in one city of Gyeonggi Province were lower than those suggested in the previous studies. (J Korean Acad Fam Med 2008;29:492-498)

Key words: childhood obesity, percentage body fat, abdominal circumference, cutoff point

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