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Original/*Obesidad*

Prevalence of overweight and obesity among primary school children aged 5 to 14 years in Wannan area, China

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Abstract

Background: **Overweight and obesity are epidemic worldwide. The purpose of this research is to estimate whether the prevalence of obesity among primary school children is high, and to identify its potential determinants to optimize the methods of prevention to combat further increases in childhood overweight.**

Methods: **A cross-sectional study was designed to collect the routine health screening data for primary school children in Wannan area, China. Overweight and obesity status were determined using the International Obesity Task Force standard (IOTF) BMI cut-off points.**

Results: **A total of 67956 subjects (36664 male and 31292 female) aged 5-14 years were recruited in this study. Depending on the references used (IOTF), the overall prevalence of overweight, including obesity of the subjects was 17.85% , the prevalence of overweight, including obesity was 22.9% in male subjects and 11.9% in female subjects, respectively. The overall prevalence of obesity was3.7%, the prevalence of obesity was 5.2 % in male subjects and 1.8% in female subjects, respectively. An interesting observation made was that the prevalence of overweight was high in male subjects.**

Conclusions: **Overweight is prevalence among primary school children, especially in male children. The relate department of school and government should take some measure to reduce the prevalence of overweight and obesity.**

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Key words: *Body mass index, primary school children, obesity, overweight, China.*

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LA PREVALENCIA DEL SOBREPESO Y LA OBESIDAD ENTRE LOS NIÑOS DE LA ESCUELA PRIMARIA DE 5 A 14 AÑOS EN WANNAN AREA, CHINA

Resumen

Antecedentes: **El sobrepeso y la obesidad son epidemia en todo el mundo. El propósito de esta investigacion es estimar si la prevalencia de la obesidad entre los niños de la escuela primaria es alto, y a identificar sus posibles factores determinantes para optimizar los métodos de prevención para combatir nuevas subidas en sobrepeso infantil.**

Métodos: **Un estudio transversal fue diseñado para recoger los exámenes de salud de rutina datos para la escuela primaria los niños de 5 a 14 años en Wannan Area, China, el sobrepeso y la obesidad se determinaron utilizando la International Obesity Task Force Standard (IOTF) IMC puntos de corte.**

Resultados: **Un total de 67956 sujetos (36664 macho y 31239 hembra) de 5 a 14 años fueron reclutados en este estudio. Dependiendo de las referencias utilizadas (IOTF), la prevalencia de sobrepeso, incluyendo la obesidad de los sujetos fue 17,85%, la prevalencia de sobrepeso, incluyendo la obesidad fue del 22,9% en sujetos masculinos y el 11,9% en mujeres, respectivamente. La prevalencia global de la obesidad was 3,7%, la prevalencia de obesidad fue de 5,2% en sujetos masculinos y 1,8% de mujeres, respectivamente. Una observación interesante es que la prevalencia de sobrepeso fue alta en sujetos masculinos.**

Conclusiones: **El sobrepeso es la prevalencia entre los niños de la escuela primaria, especialmente en los niños varones. escuela y Departamento de Gobierno debería tomar algo de placer para reducir la prevalencia del sobrepeso y la obesidad.**

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Palabras clave: *Índice de masa corporal, los niños de la escuela primaria, obesidad, sobrepeso, China.*

Introduction

In recent decades, the prevalence of obesity risen steeply worldwide[1, 2], Obesity is associated with significant co morbidities and health problems such as breast cancer[3], asthma[4, 5],diabetes mellitus[6, 7], hypertension[8], coronary artery disease[9], attention deficit hyperactivity disorder[10]and occupational injuries[11, 12, 13]. Previous study showed that the prevalence of obesity in Chinese children and adolescents was considered to be still relatively low[14], meanwhile, rapid increasing of both obesity and overweight, in both urban and rural areas would arouse special attention[15].

Increasing number of study reported that a high prevalence of obesity and overweight in developing countries undergoing nutritional transition[16-18] .These are also a major emerging public health problem in China[19],the prevalence of overweight among Chinese students is increasing[20, 21] and high[22]. However, there are lack of the data on prevalence of overweight and obesity among primary school children in Wannan area, China.

In this study, the International Obesity Task Force standard (IOTF) body mass index cut-off points established for children was used to assess the prevalence of overweight and obesity among primary school children in Wannan area, Anhui province, China.

Methods

Subjects and Methods

Participants

A population-based cross-sectional study was conducted among primary school children for routine health screening in 2013 from Wannan area,China. The area is located in the south of Yangtze River in Anhui Province, which have an area of about 36500 square kilometers and a population of about 9970000. Including Wuhu, Ma'anshan, Tongling, Xuancheng, Chizhou and Huangshan city. By stratified random sampling, a total of 67956 subjects (36664 male and 31292 female) from urban area aged 5-14 years were recruited in this study. All subjects agreed to provide their personal information regarding the purpose and the procedures of our study, and written informed consent. This study was approved by local ethics committee.

Anthropometric measurements

Height and weight was measured by trained staffs and nurse .Height was measured to the nearest 0.1 cm with a standard stadiometer following study protocols, and weight in kilograms was measured in light clothing to the nearest 0.1 kg on an electronic scales. All anthropometric data were collected by trained staff and supervised by the school nurse. BMI was computed using the following standard equation: BMI=Weight in kg/height squared in meter.

Definitions

Overweight and obesity were defined using the International Obesity Task Force standard (IOTF) body mass index cut-off points established for children [23]. These cut-off points are based on health related adult definitions of overweight (≥25 kg/m^2) and obesity (≥30 kg/m^2) but are adjusted to specific age and sex categories for children [23].

Ethical consideration

All respondents agreed to take part in this study. According to local and international guidelines on ethics considerations in research involving human participants, this study was approved by local ethics committee.

Statistical analysis

Excel software was performed to describe the prevalence of overweight/obesity among primary school children. A line graph was draw for the prevalence of overweight and obesity among children by age.

Results

In this study A total of 67956 subjects (36664 male and 31292 female) aged 5-14 years were recruited in this study. The mean values (±SD) of weight, height, and calculated BMI are shown in table I. The prevalence of overweight and obesity for primary school children are shown in table II. Depending on the references used (IOTF), the overall prevalence of overweight, including obesity of the subjects was 17.85% , the prevalence of overweight, including obesity was 22.9% in male subjects and 11.9% in female subjects, respectively. The overall prevalence of obesity was3.7%, the prevalence of obesity was 5.2 % in male subjects and 1.8% in female subjects, respectively. As showed in table III. An interesting observation made was that the prevalence of overweight was high in male subjects (fig. I).

Discussion

In the present study, we use the IOTF body mass index cut-off points to evaluate the prevalence of the overweight and obesity. The results revealed that the

Table I
Mean (±SD) of height, weight and BMI of children by age

	Age (years)	Male			Female			Total		
		n	Mean	Std. Deviation	n	Mean	Std. Deviation	n	Mean	Std. Deviation
BMI	5	13	16.06	3.41	34	15.61	1.73	47	15.73	2.28
	6	3116	16.12	2.27	3082	15.46	2.30	6198	15.79	2.31
	7	5561	16.33	2.36	4855	15.61	2.24	10416	15.99	2.33
	8	5855	16.82	2.72	4901	15.90	2.31	10756	16.40	2.58
	9	6111	17.42	2.92	5317	16.33	2.39	11428	16.91	2.74
	10	6267	17.97	3.11	5443	16.84	2.50	11710	17.45	2.90
	11	6571	18.63	3.35	5489	17.61	2.70	12060	18.17	3.11
	12	2934	18.74	3.35	2021	18.08	2.82	4955	18.47	3.16
	13	204	18.13	3.28	125	18.18	2.73	329	18.15	3.08
	14	32	18.66	2.59	25	19.08	3.12	57	18.85	2.81
	Total	36664	17.47	3.06	31292	16.50	2.60	67956	17.02	2.90
Height(m)	5	13	1.24	0.12	34	1.18	0.05	47	1.20	0.08
	6	3116	1.22	0.05	3082	1.21	0.05	6198	1.22	0.05
	7	5561	1.27	0.06	4855	1.25	0.05	10416	1.26	0.06
	8	5855	1.32	0.06	4901	1.31	0.06	10756	1.32	0.06
	9	6111	1.37	.06	5317	1.36	0.06	11428	1.37	0.06
	10	6267	1.42	0.06	5443	1.43	0.07	11710	1.43	0.07
	11	6571	1.48	0.07	5489	1.49	0.07	12060	1.49	0.07
	12	2934	1.52	0.08	2021	1.53	0.06	4955	1.53	0.07
	13	204	1.55	0.08	125	1.53	0.06	329	1.54	0.07
	14	32	1.58	0.08	25	1.53	0.07	57	1.56	0.08
	Total	36664	1.38	0.11	31292	1.37	0.12	67956	1.37	0.12
Weight(kg)	5	13	25.38	11.05	34	21.85	3.23	47	22.83	6.47
	6	3116	24.26	4.60	3082	22.59	4.16	6198	23.43	4.46
	7	5561	26.38	5.26	4855	24.61	4.51	10416	25.56	5.00
	8	5855	29.58	6.36	4901	27.32	5.20	10756	28.55	5.96
	9	6111	33.11	7.45	5317	30.58	6.05	11428	31.93	6.95
	10	6267	36.76	8.51	5443	34.59	7.16	11710	35.75	7.98
	11	6571	41.24	9.79	5489	39.57	8.11	12060	40.48	9.10
	12	2934	43.88	10.30	2021	42.42	8.29	4955	43.29	9.56
	13	204	43.85	9.89	125	42.51	7.56	329	43.34	9.08
	14	32	47.33	10.06	25	45.05	8.44	57	46.33	9.37
	Total	36664	33.79	9.98	31292	31.45	8.95	67956	32.71	9.59

overall prevalence of overweight, including obesity of the subjects was 17.85%, the prevalence of overweight, including obesity was 22.9% in male subjects and 11.9% in female subjects, respectively. However, the prevalence of overweight and obesity was lower than that of previous study[14]. An interesting observation made was that the prevalence of overweight was high in male subjects, which is similar to the other research[24]. The cut-off points of BMI for overweight is varying from different standard .We should explore a more suitable standard in future study, for example, World Health Organization growth standard.

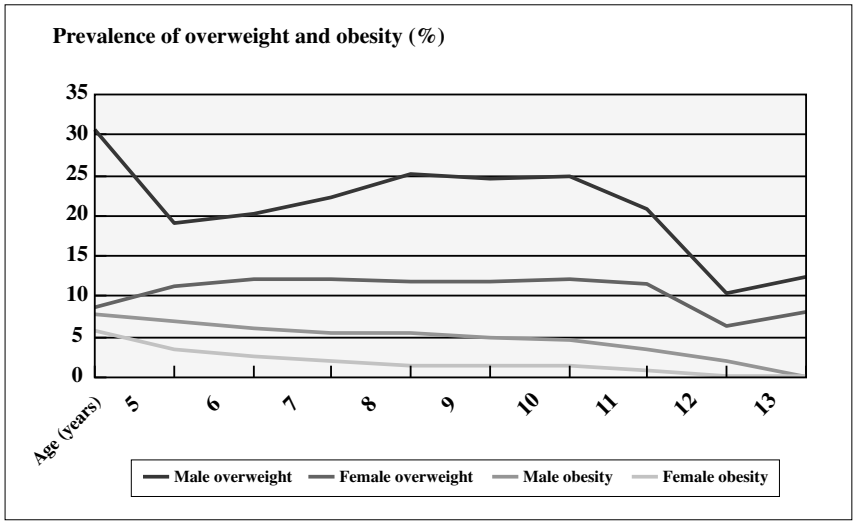

Fig. 1.— The prevalence of overweight and obesity (%) for children by age.

Previous study documented that girls in urban areas had higher prevalence of overweight and obesity than girls in rural settings. Among the boys, similar but less marked trends were found, except that the rural boys tended to be more overweight on average than their peers in urban area[25]. Our result showed that the overweight and obesity are more prevalent in boys, the possible maybe that the parents may have more attention on nutrition of boys than that of girls.

Recent evidence suggests that the nutrition transition is accelerating and the outcome of this trend is a rapid increase in hypertension[26] and chronic diseases[27]. Lifestyle transition and socio-economic improvement have contributed enormously to the escalating problem in developing countries[28]. Especially, lifestyle[29] and food variety[30] may have an influence on obesity. Lack of health education and less physical training to primary school children may also be linked to its high prevalence. There are some limitations in our present study, lacking the data of type of feeding, characteristics of families and physical activity; we should collect more information in future study.

Conclusions

Overweight is prevalence among primary school children, especially in male children. the school and government department should take some pleasure to reduce the prevalence of overweight and obesity.

Table II
The prevalence of overweight for children according to age

Age (years)	*Male*			*Female*		
	Normal	*Overweight (including obesity)*	*Total*	*Normal*	*Overweight (including obesity)*	*Total*
5	9(69.2)	4(30.8)	13(100.0)	31(91.2)	3(8.8)	34(100.0)
6	2519(80.8)	597(19.2)	3116(100.0)	2710(88.7)	345(11.3)	3055(100.0)
7	4439(79.8)	1122(20.2)	5561(100.0)	4263(87.8)	592(12.2)	4855(100.0)
8	4542(77.6)	1313(22.4)	5855(100.0)	4305(87.8)	596(12.2)	4901(100.0)
9	4569(74.8)	1542(25.2)	6111(100.0)	4687(88.2)	630(11.8)	5317(100.0)
10	4719(75.3)	1548(24.7)	6267(100.0)	4795(88.1)	648(11.9)	5443(100.0)
11	4934(75.1)	1637(24.9)	6571(100.0)	4818(87.8)	671(12.2)	5489(100.0)
12	2322(79.1)	612(20.9)	2934(100.0)	1787(88.4)	234(11.6)	2021(100.0)
13	183(89.7)	21(10.3)	204(100.0)	117(93.6)	8(6.4)	125(100.0)
14	28(87.5)	4(12.5)	32(100.0)	23(92.0)	2(8.0)	25(100.0)
Total	28264(77.1)	8400(22.9)	36664(100)	27536(88.1)	3729(11.9)	31265(100.0)

Note: Values are absolute numbers (percent)

Table III
The prevalence of obesity for children according to age

Age(years)	Male			Female		
	No-obesity	obesity	Total	No-obesity	obesity	Total
5	12(92.3)	1(7.7)	13(100.0)	32(94.1)	2(5.9)	34(100.0)
6	2903(93.2)	213(6.8)	3116(100.0)	2974(96.5)	108(3.5)	3082(100.0)
7	5225(94.0)	336(6.0)	5561(100.0)	4736(97.5)	119(2.5)	4855(100.0)
8	5535(94.5)	320(5.5)	5855(100.0)	4804(98.0)	97(2.0)	4901(100.0)
9	5784(94.6)	327(5.4)	6111(100.0)	5242(98.6)	75(1.4)	5317(100.0)
10	5962(95.1)	305(4.9)	6267(100.0)	5364(98.5)	79(1.5)	5443(100.0)
11	6262(95.3)	309(4.7)	6571(100.0)	5413(98.6)	76(1.4)	5489(100.0)
12	2835(96.6)	99(3.4)	2934(100.0)	2001(99.0)	20(1.0)	2021(100.0)
13	200(98.0)	4(2.0)	204(100.0)	125(100.0)	0(0.0)	125(100.0)
14	32(100.0)	0(0.0)	32(100.0)	25(100.0)	0(0.0)	25(100.0)
Total	34750(94.8)	1914(5.2)	36664(100)	30716(98.2)	576(1.8)	31292(100.0)

Note: Values are absolute numbers (percent)

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Conflict of Interest

None declared

Reference

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