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Original/*Deporte y ejercicio*

The relationship between obesity and forced vital capacity among university students

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Abstract

Objective: **We sought to explore the relationship between vital capacity and obesity among university students in China.**

Methods: **A cross-sectional study was designed to collect the routine health screening data for university students in 2013. The height, weight and force vital capacity of students were measured, and BMI was calculated with height and weight, so as to estimate the relationship between force vital capacity and obesity.**

Results: **Based on Working Group on Obesity references in China, obesity has a higher force vital capacity in both male and female university students. No correlation was found between vital capacity and BMI.**

Conclusion: **obesity may have effect on pulmonary function among university students, which is a reference for further epidemic study.**

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Key words: *Underweight. Obesity. University students. Force vital capacity.*

LA RELACIÓN ENTRE LA OBESIDAD Y LA CAPACIDAD VITAL FORZADA EN ESTUDIANTES UNIVERSITARIOS (CHINA)

Resumen

Objetivo: **Hemos tratado de explorar la relación entre la capacidad vital y la obesidad entre los estudiantes universitarios en China**

Métodos: **Un estudio transversal fue diseñado para recoger los exámenes de salud para estudiantes universitarios en 2013. La altura, el peso y la fuerza así como la capacidad vital de los estudiantes, y el IMC se calcula con la altura y el peso, así como para estimar la relación entre la capacidad de la fuerza vital y la obesidad.**

Resultados: **Basado en el Grupo de trabajo sobre la obesidad de referencia en China, la obesidad tiene una clara prevalencia sobre la capacidad vital en tanto hombres y mujeres estudiantes universitarias. No se encontró ninguna correlación entre la capacidad vital y el IMC.**

Conclusión: **La obesidad puede tener efecto sobre la función pulmonar entre los estudiantes universitarios, lo que supone una referencia para profundizar el estudio de la epidemia.**

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Palabras clave: *Bajo peso. Obesidad. Estudiantes universitarios. Capacidad vital.*

Introduction

Increasing number of study reported that a high prevalence of obesity and overweight in developing countries undergoing nutritional transition[1-6] . Some researcher found that body mass index correlated with forced vital capacity in a population with a relatively low prevalence of obesity[7] .A study conducted in Korean reveals that changes of pulmonary function were related to menstrual cycle and obesity in adolescent girls[8]. However, the relationship between obesity and pulmonary function among university students is still unclear.

In this study, we sought to evaluate whether obesity is correlate with force vital capacity.

Methods

Subjects and Methods

Participants

This study is a school-based cross-sectional study which was conducted in a university student who admitted routine health screening in 2013. This subjects consist

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of 2617 subjects (1131 male and 1486 female), with a age range from 19 to 23 years. 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 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. Force vital capacity was measured The vital capacity (VC) will be measured with a spirometer (Wright Mark 8) with the patient in a seated position and connected to a disposable mouthpiece and nose clip to prevent air leakage. The test starts with inspiration to total lung capacity, followed by expiration to the residual volume. The greatest of three consecutive measurements will be considered [9].

Definitions

Based on Working Group on Obesity references in China the BMI cut-off points are 24 and 28 for overweight and obesity, respectively.

Statistical analysis

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

Results

In this study a total of 2617 subjects (1131 male and 1486 female) was recruited in 2013, aged 19-23 years. The percentage of age and body type, mean values (±SD) of weight, height, and BMI are shown in Table I. Figure 1 showed the vital capacity volume between gender by age. Figure 2 reveal a increasing trend of vital capacity with body type by gender.

Correlation between vital capacity and BMI by gender

Table II Showed the correlation between vital capacity and BMI by gender. In male and female, vital capacity had a significant positive correlation with BMI ($P<0.05$). no correlation was found between age and vital capacity ($P>0.05$).

Table I
Characteristics of study population

Variable	*Male*		*Female*	
	n or mean	*% or SD*	*n or mean*	*% or SD*
Age (years)				
19	80	7.1	109	7.3
20	354	31.3	457	30.7
21	404	35.7	547	36.8
22	219	19.4	285	19.2
23	74	6.5	90	6.0
Height(m)	1.73	0.05	1.62	0.05
Weight(kg)	64.35	10.13	52.81	18.21
BMI(kg/m^2)	21.43	3.22	20.18	6.68
Vital capacity (ml)	3857.92	869	2424.96	603.95
Body type				
Underweight	161	14.2	409	27.5
Health weight	840	74.3	1037	69.8
Overweight	102	9.0	35	2.4
Obesity	28	2.5	5	0.3

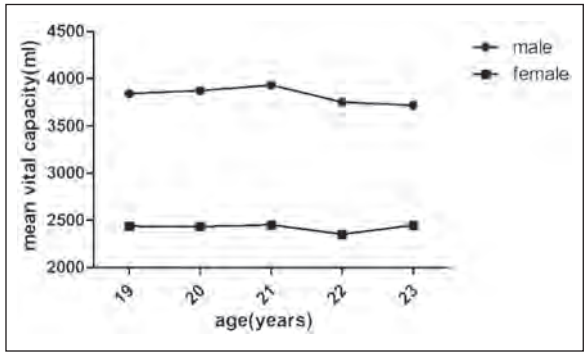

Fig. 1.—Mean level of vital capacity by age and gender.

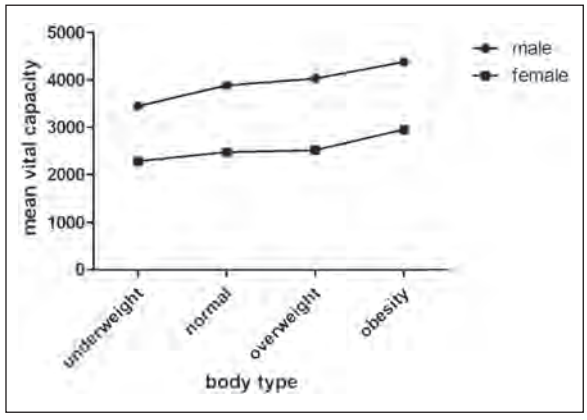

Fig. 2.—Mean level of vital capacity by age and gender.

Table II
Correlation between vital capacity and BMI by gender

Parameter	Male (n=1130)		Female (n=316)	
	r	p	r	p
BMI	0.241	0.000	0.081	0.002
Age	-0.046	0.118	-0.026	0.324

Discussion

In the present study, we use Working Group on Obesity references in China (2004) to define the overweight and obesity among university students. The results reveal that obesity has a higher force vital capacity in both male and female university students. No correlation between vital capacity and BMI was found by gender.

Previous study documented that a positive independent relationship was found between lung function impairment and metabolic syndrome in both sexes, predominantly due to abdominal obesity[10]. Thus, further investigation should be taken to confirm that whether there are a relationship between obesity and force capacity among university students.

There are also some limitations in present study, for example .lacking of more detail information on pulmonary function. Confound bias maybe exist in our study, thus we will collect more data such as behavior history and dietary habit, so as to further explore the relationship between pulmonary and obesity after controlling to confound bias.

Conclusion

Obesity may have effect on pulmonary function among university students, which is a reference for further epidemic study.

Conflict of Interest

None

References

1. Cheong, S.M., M. Kandiah, K. Chinna, Y.M. Chan and H.A. Saad, Prevalence of obesity and factors associated with it in a worksite setting in malaysia. *J Community Health,* 2010. 35(6): 698-705.
2. Ferreira Marques, C.D., C. Ribeiro Silva Rde, M.E. Machado, M.L. Portela de Santana, R. Castro de Andrade Cairo, J. Pinto Ede, et al., The prevalence of overweight and obesity in adolescents in bahia, brazil. *Nutr Hosp,* 2013. 28(2): 491-6.
3. Cerrillo, I., M.S. Fernandez-Pachon, L. Ortega Mde, E. Valero, F.M. Martin, I. Jauregui-Lobera, et al., Two methods to determine the prevalence of overweight and obesity in 8-9 year-old-children in seville, spain. *Nutr Hosp,* 2012. 27(2): 463-8.
4. Jin, Y.L., L.L. Ding, Y.S. Yao, X.L. Song, H. Tang, L.P. He, et al., Obesity detection rate among primary school students in the people's republic of china: A meta-analysis. *Ther Clin Risk Manag,* 2013. 9: 383-90.
5. He, L., X. Ren, Y. Chen, Y. Jin, R. Pan, N. Wei, et al., Prevalence of overweight and obesity among primary school children aged 5 to 14 years in wannan area, china. *Nutr Hosp,* 2014. 30(n04): 776-81.
6. He, L., X. Ren, Y. Qian, Y. Jin, Y. Chen, D. Guo, et al., Prevalence of overweight and obesity among a university faculty and staffs from 2004 to 2010 in wuhu, china. *Nutr Hosp,* 2014. 29(5): 1033-7.
7. Fukahori, S., H. Matsuse, N. Takamura, T. Tsuchida, T. Kawano, C. Fukushima, et al., Body mass index correlated with forced expiratory volume in 1 second/forced vital capacity in a population with a relatively low prevalence of obesity. *Chin Med J (Engl),* 2010. 123(20): 2792-6.
8. Jeon, Y.H., H.J. Yang and B.Y. Pyun, Lung function in korean adolescent girls: In association with obesity and the menstrual cycle. *J Korean Med Sci,* 2009. 24(1): 20-5.
9. Mayos, M., J. Giner, P. Casan and J. Sanchis, Measurement of maximal static respiratory pressures at the mouth with different air leaks. *Chest,* 1991. 100(2): 364-6.
10. Leone, N., D. Courbon, F. Thomas, K. Bean, B. Jego, B. Leynaert, et al., Lung function impairment and metabolic syndrome: The critical role of abdominal obesity. *Am J Respir Crit Care Med,* 2009. 179(6): 509-16.