

Original Article

Prevalence of obesity among primary students from 2009 to 2014 in China: an update meta-analysis

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Abstract: Background: In recent years, obesity has become the major public health problems worldwide. The aim of the meta-analysis is to estimate the overall prevalence of obesity among children and adolescents in China. Publications between 2009 and 2014 on the obesity prevalence among primary school students in China were retrieved from PubMed, CNKI and Wanfang databases. After evaluation of the quality of the articles, 20 papers were finally included in our study. Meta-analysis findings showed that the pooled prevalence of obesity in primary school students is 10.4% (95% CI: 7.8%-13.8%). Our results indicated that the obesity prevalence status in China was still troublesome, effective and practical measures should be taken to control the the situation.

Keywords: Primary students, obesity, prevalence, meta-analysis

Introduction

Globally, there is rising prevalence of overweight and obesity in both developing and developed countries [1]. The children obesity is prevalence in China [2]. Previous study showed that the prevalence of obesity in Chinese children and adolescents was considered to be still relatively low [3]. However, research recently found that rapid increasing of both obesity and overweight, in both urban and rural areas would arouse special attention [4, 5].

However, there have been little studies documented in literature in this part of China assessing the prevalence of overall obesity. Thus, the purpose of this study was to assess the prevalence of obesity in recently.

Material and methods

Literature retrieval

Related publications on obesity released between 2009 and 2014 were retrieved online from PubMed, Wanfang and CNKI database were searched by the following terms “obesity,students,primary and China”.

Included criteria

Entry criteria for the literature consisted of 1) papers on the obesity among college or university students in China published between January 2009 and June 2014; 2) articles aimed at discussion of the prevalence of obesity in China primary students. Exclusion criteria included 1) the indicators described in articles with less association or data being incomplete; 2) repeated articles.

Literature screening and quality assessment in process

Each study was assessed by two investigators independently, and the disagreements were resolved by expert assessment. Blind method was used to ensure quality. The related literatures were retrieved on basis of the key words described previously, and initially selected through the title appraisal and scanning the abstracts. Full-text appreciation was carried out for the primary selections. Data extraction was performed in papers verified eligibly. Evaluation of the article quality was made as meta-analysis of observational studies in epidemiology proposed Stroup DF, et al [6].

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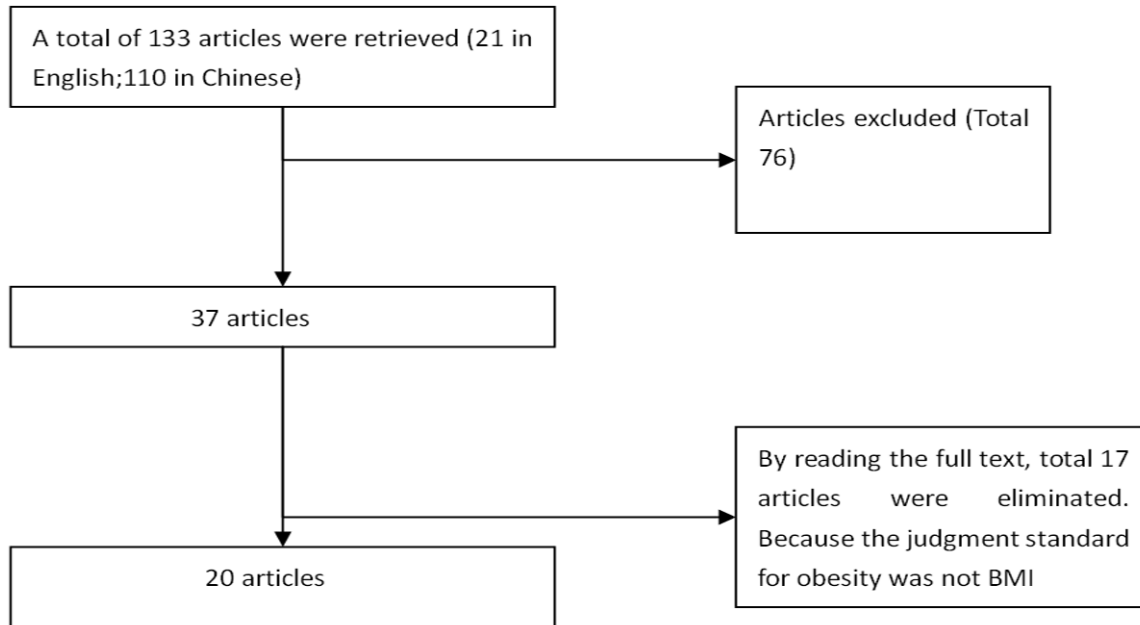


Figure 1. Flow Chart for the Literature Screening.

Table 1. Main Characteristic of the Studies and the Detection Rate of Obesity among Primary School Students in China

First author	Year	Geographical distribution	Prevalence of obesity (%)			Subjects	Age range
			Total	Boy	girl		
Wang HH [8]	2009	Handan	16.01			pupil	7-12
Yu T [9]	2009	Chengdu	7.00	8.80	5.00	pupil	7-12
Li L [10]	2010	Jinan	17.47	22.27	13.15	pupil	7-12
Hu YR [11]	2010	Zhenjiang	8.70	13.40	7.00	pupil	-
Liu XH [12]	2010	Linghai	9.60	12.80	6.00	pupil	-
Zhang H [13]	2010	Xinyang	6.17	7.50	4.77	pupil	7-12
Zeng YH [14]	2010	Yangchun	4.19	5.91	1.85	pupil	-
Zhuang J [15]	2011	Chaozhou	10.26	13.58	6.59	pupil	7-12
Jiang JJ [16]	2011	Ji,an	11.20	14.50	8.00	pupil	7-12
Fu ZJ [17]	2011	Shanghai	22.64			pupil	7-12
Huang JH [18]	2011	Beijing	21.00	28.00	14.40	pupil	-
Lan FQ [19]	2011	Shenzhen	8.98	10.65	7.19	pupil	7-12
Liu M [20]	2012	Yongzhou	13.7	21.2	3.9	pupil	6-12
Zhu B [21]	2013	Zhoushan	12.86	15.93	9.51	pupil	7-12
Jia L [22]	2013	Wenzhou	6.4	7.9	4.6	pupil	6-13
Zhou H [23]	2013	Dongguan	7.32	5.55	1.77	pupil	7-14
Gao G [24]	2013	Suzhou	11.23	14	7.9	pupil	7-12
Yao Y [25]	2014	Tongling	3.66	5.2	1.8	pupil	5-14
Yan W [26]	2014	Shenzheng	9.32	12	5.88	pupil	7-13
Zhang Y [27]	2014						

Statistical analysis

Meta Analyst 3.1 for Windows [7] was used for performing meta-analysis. By heterogeneity te-

st, the random-effect model was applied to merging sets of data and data analysis. The final data were subdivided into several groups for statistical analysis and chart description.

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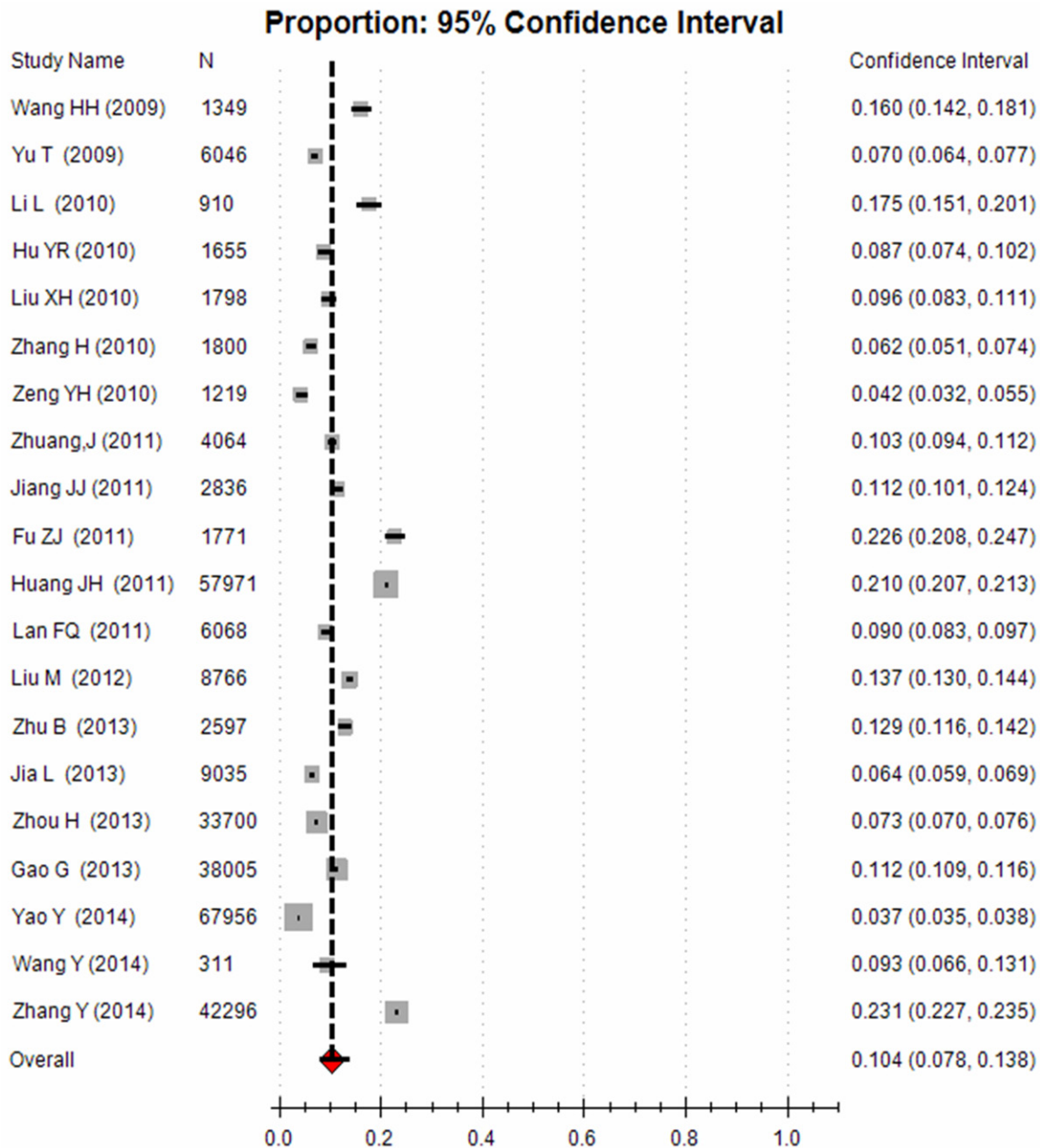


Figure 2. Forest Plot of obesity for the overall prevalence in the Meta-analysis.

Results

Basic information and quality assessment of the articles

A total of 133 articles were retrieved from database of Wanfang, CNKI and PubMed. Quality assessment was made by Meta-analysis of observational studies in epidemiology [6]. **Figure 1** shows the process of literature screening, and the basic information on the final articles is showed in **Table 1**.

Meta-analysis of the obesity detection rate among primary school students in China

Heterogeneity test was carried out on the obesity detection rate, with a result of $I^2 = 0.500$, suggesting that the research results in the 20 papers were heterogeneous. Random-effect model was used for meta-analysis. As is shown by the forest plots (**Figure 2**), the results suggested that pooled prevalence of obesity in primary school students is 10.4% (95% CI: 7.8%-13.8%).

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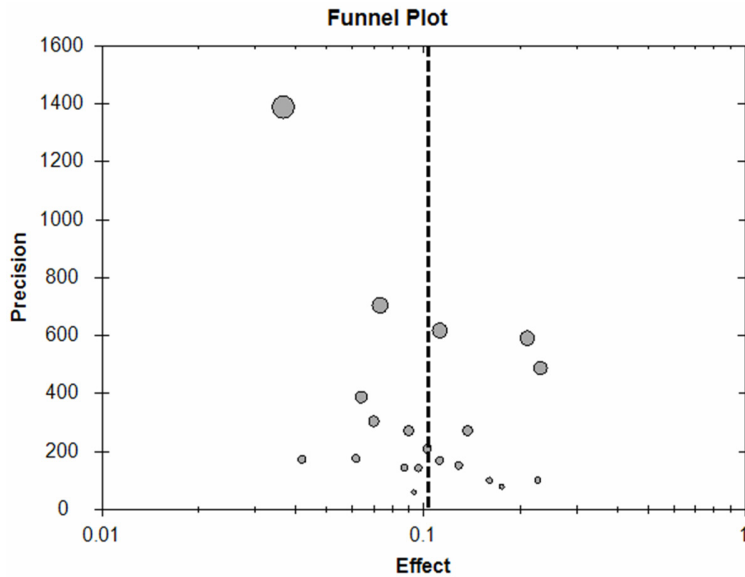


Figure 3. Funnel Plot.

Publication bias

Figure 3 showed that the literatures included were in better symmetry, suggesting less possibility of publication bias on the prevalence of obesity among primary school students in China.

Discussion

Our results indicated that the pooled prevalence of obesity in primary school students is 10.4% (95% CI: 7.8%-13.8%). The possible reason for the results may be explained by the following aspects: there are maybe lack healthy lifestyle knowledge and actual healthy behavior among students [28]. In addition, lacking of properly excises also explain the high obesity prevalence. Moreover, the overall prevalence rates of overweight and obesity in northern area were higher than in other areas [29].

Although the figure by our meta-analysis with mean 10.4% doesn't look so high as previous reports in western nations. This trend of obesity increase will lead to poor mental devilmint in childhood and even represents social dysfunction when they grow up. Thus, educational and health related departments should jointly take effective and practical measures, such as health education and regular physical examination, to control the increase trend of obesity.

Limitations

This study provides the current status of childhood obesity from 2009 to 2014 in China. Some limitations to our meta-analysis. Only the papers published was included in our study, Relatively smaller sized samples from literatures for subgroups tends to weaken the validity of the results; failure to exclude the genetic susceptibility is not taken into account. Therefore, more reliable study on obesity prevalence in elementary school students are remains need further study.

Conclusion

Our results indicated that the obesity prevalence status in China was still troublesome, for the situation will go worse if we currently fail to take effective and practical measures.

Disclosure of conflict of interest

None declared.

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